
bulletin of
Duke University
2003-2004

School of Medicine



The Mission of Duke University

James B. Duke's founding Indenture of Duke University directed the members of the University to "provide real leadership in the educational world" by choosing individuals of "outstanding character, ability and vision" to serve as its officers, trustees and faculty; by carefully selecting students of "character, determination and application;" and by pursuing those areas of teaching and scholarship that would "most help to develop our resources, increase our wisdom, and promote human happiness."

To these ends, the mission of Duke University is to provide a superior liberal education to undergraduate students, attending not only to their intellectual growth but also to their development as adults committed to high ethical standards and full participation as leaders in their communities; to prepare future members of the learned professions for lives of skilled and ethical service by providing excellent graduate and professional education; to advance the frontiers of knowledge and contribute boldly to the international community of scholarship; to promote an intellectual environment built on a commitment to free and open inquiry; to help those who suffer, cure disease and promote health, through sophisticated medical research and thoughtful patient care; to provide wide ranging educational opportunities, on and beyond our campuses, for traditional students, active professionals and life-long learners using the power of information technologies; and to promote a deep appreciation for the range of human difference and potential, a sense of the obligations and rewards of citizenship, and a commitment to learning, freedom and truth.

By pursuing these objectives with vision and integrity, Duke University seeks to engage the mind, elevate the spirit, and stimulate the best effort of all who are associated with the University; to contribute in diverse ways to the local community, the state, the nation and the world; and to attain and maintain a place of real leadership in all that we do.

Adopted by the Board of Trustees on February 23, 2001.

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The information in the bulletin applies to the academic year 2003-2004 and is accurate and current, to the best of our knowledge, as of May 2003. The university reserves the right to change programs of study, academic requirements, lecturers, teaching staffs, the announced university calendar, and other matters described in the bulletin without prior notice, in accordance with established procedures.

Duke University does not discriminate on the basis of race, color, national and ethnic origin, disability, sexual orientation or preference, gender, or age in the administration of educational policies, admission policies, financial aid, employment, or any other university program or activity. It admits qualified students to all the rights, privileges, programs, and activities generally accorded or made available to students. The university also does not tolerate harassment of any kind.

Questions, comments or complaints of discrimination or harassment should be directed to the Office of the Vice-President for Institutional Equity, (919) 684-8222. Further information, as well as the complete text of the harassment policy, may be found at <http://www.duke.edu/web/equity/>.

Duke University recognizes and utilizes electronic mail as a medium for official communications. The university provides all students with email accounts as well as access to email services from public clusters if students do not have personal computers of their own. All students are expected to access their email accounts on a regular basis to check for and respond as necessary to such communications, just as they currently do with paper/postal service mail.

Information that the university is required to make available under the Student Right to Know and Campus Security Acts may be obtained from the Office of University Relations at 684-2823 or in writing to 615 Chapel Drive, Duke University, Durham, NC 27708.

Duke University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, Georgia 30033-4097; telephone number 404-679-4501) to award baccalaureates, masters, doctorates, and professional degrees.

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School of Medicine Calendar 2003-2004

M.D. Program¹

FIRST YEAR

Fall Term 2003

August

4-8 Monday-Friday – Introductory orientation to 1st year
11 Monday, 8:00 a.m. – Begin Block I

September

1 Monday, Labor Day holiday

October

3 Friday, 6:00 p.m. - End Block I
6 Monday, 8:00 a.m. – Begin Block II
24 Friday, Deadline for Block I grade submission to Registrar's Office

November

17 Monday, 9:00 a.m. - Registration for Spring 2004 begins
25 Tuesday, 6:00 p.m. – Begin Thanksgiving holiday

December

1 Monday, 8:00 a.m. – Classes Resume
5 Friday, 5:00 p.m. - Registration for Spring 2004 ends
12 Friday, 6:00 p.m. - End Block II and Fall 2003 Term

Spring Term 2004

January

2 Friday, Deadline for Block II grade submission to Registrar's Office
8-10 Thursday-Friday, Late Registration
5 Monday, 8:00 a.m. – Begin Block III and Spring 2004 Term
19 Monday - Martin Luther King, Jr. holiday
30 Friday – End Block III

February

2 Monday, Intro to Physical Diagnosis (intensive learning period)
13 Friday, 6:00 p.m. - End Intro to Physical Diagnosis
TBA Class of 2003 Promotions Committee Meeting - (date, time & location TBA)
16 Monday, 8:00 a.m. - Begin Block IV
20 Friday, deadline for Block III grade submission to Registrar's Office

March

TBA Friday-Sunday - Medical Families Weekend
TBA Friday, 8:00 p.m. - Student/Faculty Show

April

23 Friday, 6:00 p.m. - End Block IV
24 Saturday, Begin Spring Vacation (4/24/03 thru 5/2/03)

May

3 Monday, 8:00 a.m. - Begin Block V
12 Wednesday, deadline for Block IV grade submission to Registrar's Office

¹Calendar subject to change.

**SECOND YEAR
Fall Term 2003**

July		
	TBA	Class of 2003 Promotions Committee Meeting - mid-July (date, time & location TBA)
	24	Thursday, deadline for Block V grade submission to Registrar's Office
	28	Monday, 8:00 a.m. - Begin Orientation to the Clinical Year (OCY)
August		
	22	Friday, 6:00 p.m. - End intensive learning period
	25	Monday, 8:00 a.m. - Begin classes in sections 81,41
September		
	1	Monday, Labor Day holiday
	17	Wednesday, 6:00 p.m. – End classes in section 41
	22	Monday, 8:00 a.m. - Begin classes in section 42
October		
	10	Friday, deadline for section 41 grade submission to Registrar's Office
	TBA	Class of 2002 Promotions Committee Meeting (2nd week of October - date, time & location TBA)
	15	Wednesday, 6:00 p.m. - End classes in regular sections 81,42
	20	Monday, 8:00 a.m. - Begin classes in sections 82,43
November		
	7	Friday, deadline for section 81, 42 grade submission to Registrar's Office
	12	Wednesday, 6:00 p.m. - End classes in section 43
	17	Monday, 8:00 a.m. - Begin classes in section 44
	26	Wednesday, 6:00 p.m. - Begin Thanksgiving holiday
December		
	1	Monday, 8:00 a.m. - Resume classes in section 82,44
	5	Friday, deadline for section 43 grade submission to Registrar's Office
	13	Saturday, 6:00 p.m. - End classes in regular sections 82,44
Alternate Schedule for Psychiatry/Health Systems		
	81	PSYCHTRY August 25 – October 3
	81	MPS October 6 – October 17
	82	PSYCHTRY October 20 – November 26
	82	MPS December 1 – December 12
Spring Term 2004		
January		
	5	Monday, 8:00 a.m. - Begin classes in sections 81,41
	19	Monday - Martin Luther King, Jr. holiday
	28	Wednesday, 6:00 p.m. – End classes in section 41
February		
	2	Monday, 8:00 a.m. - Begin classes in section 42
	20	Friday, deadline for section 41 grade submission to Registrar's Office
	25	Wednesday, 6:00 p.m. - End classes in sections 81,42
March		
	1	Monday, 8:00 a.m. - Begin classes in sections 82,43
	12	Friday, deadline for section 81,42 grade submission to Registrar's Office
	24	Wednesday, 6:00 p.m. - End classes in section 43
	29	Monday, 8:00 a.m., Begin classes in section 44
	TBA	Monday, 8:00 a.m - Registration begins for MS3 -- Fall 2003 & Spring 2004

April
 14 Wednesday, deadline for section 43 grade submission to Registrar's Office
 TBA Friday, 5:00 p.m. Registration ENDS for MS3 - Fall 2003 & Spring 2004
 21 Wednesday, 6:00 p.m. - End classes in regular sections 82,44
 22 Thursday, Students begin Spring Break through Sun., 5/2²

Alternate Schedule for Psychiatry/Health Systems

81 PSYCHTRY January 5 – February 13
 81 MPS February 16 – February 27
 82 PSYCHTRY March 1 – April 9
 82 MPS April 12 – April 23

Summer Term 2004

May
 3 Monday, 8:00 a.m. - Begin classes in sections 81,41
 12 Wednesday, deadline for sections 82,44 grade submission to Registrar's Office
 26 Wednesday, 6:00 p.m. - End classes in section 41
 31 Monday, 8:00 a.m. - Begin classes in section 42

June
 16 Wednesday, deadline for section 41 grade submission to Registrar's Office
 23 Wednesday, 6:00 p.m. - End classes in regular sections 81,42
 28 Monday, 8:00 a.m. - Begin classes in sections 82,43

July
 5 Monday, Independence Day holiday
 14 Wednesday, deadline for sections 81,42 grade submission to Registrar's Office
 21 Wednesday, 6:00 p.m. - End classes in section 43
 26 Monday, 8:00 a.m. - Begin classes in section 44

August
 18 Wednesday, 6:00 p.m. - End classes in regular sections 82,44

Alternate Schedule for Psychiatry/Health Systems

81 PSYCHTRY May 3 – June 11
 81 MPS June 14 – June 25
 82 PSYCHTRY June 28 – August 6
 82 MPS August 9 – August 20

THIRD YEAR

Fall Term 2003

August
 18 Monday, 9:00 a.m. - Late reg/DROP/ADD begins for Fall 2003, sections 81,16,41,42

September
 1 Monday, Labor Day holiday
 2 Tuesday - 8:00 a.m., Begin classes in section 16
 8 Monday, 5:00 p.m. - Late reg/DROP/ADD ends for Fall 2003, sections 81,16,41,42
 9 Tuesday, Deadline for MS2, sections 82,44 grade submission to Registrar's Office

²Students on Alternate Schedule for Psychiatry/Health Systems begin Spring break after classes on Friday, April 23rd

November
 17 Monday, 7:00 a.m. - Registration BEGINS for Spring 2004 for MS1, MS3 and MS4
 26 Wednesday, 6:00 p.m. - Begin Thanksgiving holiday

December
 5 Friday, 5:00 p.m. - Registration ENDS for Spring 2004 - for MS1, MS3 and MS4
 15 Late reg/DROP/ADD begins for Spring 2004
 20 Saturday - 12:00 noon - End classes in sections 16

Spring Term 2004

January
 5 Monday, 8:00 a.m., Begin Classes
 7 Wednesday – Deadline for section 16 grade submission to Registrar's Office
 9 Friday, 5:00 p.m. Late Reg/DROP/ADD ends for spring 2004 (M1, M3 & M4's)
 19 Monday - Martin Luther King, Jr. holiday

March
 TBA Registration BEGINS for Sum 2004, Fall Term 2004 – rising third & fourth year (MS3's & MS4's)

April
 TBA Friday, Registration ENDS for Summer/Fall 2004 for rising third & fourth year
 TBA Late Reg/DROP/ADD begins for rising 3rd year and rising 4th years
 24 Saturday, 12:00 noon - End classes

May
 TBA Late reg/DROP/ADD ends for rising 3rd and rising 4th year students

FOURTH YEAR Summer Term 2003

April
 21 Monday, 7:00 a.m., Late reg/DROP/ADD begins for Summer 2003 - sections 81,16,41,42
 28 Monday, 8:00 a.m. – Begin classes in sections 16, 81, 41

May
 2 Friday, 5:00 p.m. - DROP/ADD ends, Summer 2003, sections 81,16,41,42
 24 Saturday, 12:00 noon – End classes in section 41
 26 Monday, 8:00 a.m. – Begin classes in section 42

June
 6 Friday, deadline for section 41 grade submission to Registrar's Office
 16 Monday, 7:00 a.m., Late reg/DROP/ADD begins for Summer 2003, sections 82,43,44
 21 Saturday, 12:00 noon – End classes in sections 81,42
 23 Monday, 8:00 a.m. – Begin classes in sections 82, 43
 27 Friday, 5:00 p.m. Late reg/DROP/ADD ends for Summer 2003, sections 82,43,44

July
 4 Friday – Independence Day holiday
 11 Friday, deadline for section 81,42 grade submission to Registrar's Office
 19 Saturday, 12:00 noon - End classes in section 43
 21 Monday, 8:00 a.m. – Begin classes in section 44

August

8 Friday, deadline for section 43 grade submission to Registrar's Office
 16 Saturday, 12:00 noon- End classes in sections 16, 82, 44

Fall Term 2003**August**

18 Monday, 7:00 a.m. - Late reg/DROP/ADD begins for Fall 2003- 16, 81,41,42
 25 Monday, 8:00 a.m. – Begin classes in sections 16, 81, 41

September

1 Monday, Labor Day holiday
 6 Saturday, Deadline for Year 4, Summer Term 2003, section 16,82,44 grade submission to Registrar's Office
 8 Monday, 5:00 p.m. - Late reg/DROP/ADD ends for Fall 2003 - 16,81,41,42
 20 Saturday, 12:00 noon - End classes in section 41
 22 Monday, 8:00 a.m. Begin classes in sections 42

October

10 Friday, Deadline for section 41 grade submission to Registrar's Office
 13 Monday, 7:00 a.m., Late reg/DROP/ADD begins for fall 2003, sections 16,82,43,44
 18 Saturday, 12:00 noon - End classes in sections 81,42
 20 Monday, 8:00 a.m. – Begin classes in sections 82,43
 24 Friday, 5:00 p.m. - Late Reg/DROP/ADD ends for fall 2003, sections 16,82,43,44

November

7 Friday, Deadline for section 81,42 grade submission to Registrar's Office
 15 Saturday, 12:00 p.m. - End classes in section 43
 17 Monday, 8:00 a.m. – Begin classes in section 44
 17 Monday, 7:00 a.m. - Registration begins for spring 2004 (M1,M3 & M4's)
 26 Wednesday, 6:00 p.m. - Begin Thanksgiving holiday

December

1 Monday, 8:00 a.m. – Classes resume in section 44
 5 Friday, Deadline for section 43 grade submission to Registrar's Office
 5 Friday, 5:00 p.m. Registration ends for Spring 2004 (M1,M3, & M4's)
 15 Monday, 7:00 a.m., Late reg/DROP/ADD begins for Spring 2004
 17 Wednesday, 12:00 noon - End classes in section 16,82,44

Spring Term 2004**January**

5 Monday, 8:00 a.m. – Begin classes in sections 16,81,41
 9 Friday, 5:00 p.m. - Late Reg/DROP/ADD ends for Spring 2004 (M1, M3 and M4's)
 19 Monday - Martin Luther King, Jr. holiday
 31 Saturday, 12:00 noon – End classes in section 41

February

2 Monday, 8:00 a.m. – Begin classes in section 42
 20 Friday, Deadline for section 41 grade submission to Registrar's Office
 23 Monday, 7:00 a.m. - Late reg/DROP/ADD begins for Spring 2004, sections 82, 43, 44
 28 Saturday, 12:00 noon – End classes in sections 81,42

March

1 Monday, 8:00 a.m. – Begin classes in sections 82,43
5 Friday, 5:00 p.m. Late reg/DROP/ADD ends for Spring 2004 - sections 82,43,44
19 Friday, Deadline for sections 81,42 grade submission to Registrar's Office
TBA Registration begins for Sum 2004, Fall Term 2004 - rising third & fourth years (MS3's & MS4's)
27 Saturday, 12:00 noon - End classes in section 43
29 Monday, 8:00 a.m. – Begin classes in section 44

April

TBA Registration ends for Summer/Fall 2004 - rising 3rd & 4th year students
16 Friday, Deadline for section 43 grade submission to Registrar's Office
TBA Late reg/DROP/ADD begins for Summer 2004
24 Saturday, 12:00 noon - End classes in sections 16,82,44

May

TBA Late reg/DROP/ADD ends for Summer/Fall 2004
8-9 Saturday-Sunday - Graduation activities
14 Friday, Deadline for section 16, 82,44 grade submission to Registrar's Office

University Administration

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 Bebe Mills, B.A., *Director, Office of Admissions and Student Services*
 Izy Obi, B.A., *Clinical Site Placement Coordinator*

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Audit and Tissue

Clinical chairman of each clinical service and head of each division in service.

Basic Science Appointments, Promotion, and Tenure

Marc G. Caron, Ph.D., *Chair*; Drs. Chikaraishi, Cullen, Hsieh, Kelsoe, and Nijhout.

Basic Science Faculty Steering

B. Capel, Ph.D., *Chair*; Drs. Abraham, Been, Bloom, Cartmill, Dawson, McCusker, McKinney, Reinhart, and Wright.

Brain Death

Larry B. Goldstein, M.D., *Chair*; Drs. Bedlack, Burke, Bushnell, Chilukuri, Graffagnino, Hurwitz, Husain, Kong, Laskowitz, Lynch, E.W. Massey, J. Massey, McKeown, McNamara, Morgenlander, Radtke, Rich, Sanders, Schmechel, Scott, Strittmatter, Vance, and Van Landingham.

Clinical Sciences Appointments, Promotions, and Tenure

Michael M. Frank, M.D., *Chair*; Drs. Anderson, Buckley, Coleman, Krishnan, Pisetsky, and Robboy; Dr. Corless, *ex officio*.

Clinical Science Faculty Council on Academic Affairs

Jonathan Mark, M.D., *Chair*; Drs. Allen, Allingham, Bashore, Bastian, Brizel, Burton, Connor, DeLong, Frush, Georgiade, Hoffman, Jaffe, Jirtle, Lee, Livingston, Lyerly, Madden, Mark, McBride, R. Moon, S. Moon, Onken, Ortel, Patz, Rosoff, Swartz, Tanaka, and Tyler.

Duke Comprehensive Cancer Center Clinical Cancer Committee

Thomas D'Amico, *Chair*; Drs. Anscher, Chao, Clarke-Pearson, Crawford, Madden, Moore, Soo, Sullivan, and Tyler; Messrs. Downey and Sowers; Mses. Caufield-Carpenter, Harwood, and Morgan.

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Stacey R. McCorison, M.B.A., *Chair*; Dr. Armstrong; Ms. Heineman; three OSR representatives.

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James L. Travis, Ph.D., *Chair*; Drs. Alexander and Jones; Mses. Burke and Taylor, *Co-chairs*; Drs. Falletta, Fortney, Heflin, Keating, Lylerly, Moylan, and Rosoff; Messrs. Ayotte, Borg, Burke, Crewes, and Freck; Mses. Alexander, Feidelson, Maher, Radford, Reyes, and Tart.

Hospital Infection Control

Daniel J. Sexton, M.D., *Chair*; Drs. Christmas, Jackson, Kaye, Livengood, McKinney, Reller, Schulmann, Sebastian, and Thomann; Messrs. Borg, Branch, Guerry, Haynes, Kessler, Riddick, and Stewart; Mses. Adams, Avent, Bronstein, Cheesborough, Evans, McKenzie, McLean, Oden, and Vereen.

Hospital Transfusion Committee

John M. Falletta, M.D., *Chair*; Drs. Bredehoeft, Greenberg, Hill, Telen, Vaslef, Ware, and Wroth; Messrs. Andresen and Bennett; Mses. Avent and Campbell.

Institutional Animal Care and Use Committee

E. Lee Tyrey, Ph.D., *Chair*; James Reynolds, Ph.D. and Warren Meck, Ph.D., *Vice-chairs*; Drs. Amalfitano, Anderson, Buhusi, Cant, Collins, Crowder, Dempsey, Ehlers, Gerard, Glower, Hale, Hawkins, Hedlund, Kirby-Smith, Klopfer, Koch, Krangel, Lewis, Linney, Lyerly, McClay, McClellan-Green, McKay, Mills, Opara, Orchard, Peng, Pickup, Read, Rezvani, Rickman, Saling, Schanberg, Schomberg, Sharp, Sullivan, Sun, Trasti, Vaslef, Vigna, Williams, and Zhuang; Mses. deGuehery, Dillon, Keys, Lasley, and Lundberg.

Institutional Biosafety Committee

Jack D. Keene, Ph.D. and Wayne R. Thomann, Dr.PH., *Co-chairs*; Drs. Drake, Fuller, Gilboa, Hunt, Kost, Pickup, and Resnick; Ms. deGuehery. Contact person: Ms. Lundberg, Compliance Specialist, *ex-officio*.

Institutional Committee for Graduate Medical Education

John L. Weinerth, M.D., *Chair*; Drs. Adamson, Allsbrook, Aloia, Anderson, Andolsek, Bradford, Briley, Buckley, Chatterjee, Chevy, Couchman, Dorcey, Davis, Dodd, Eck, Ferro, Ford, Fortney, Garges, Goldner, Gradison, Gray, Griggs, Grotegut, Gutman, Halperin, Hardaker, Haugan, Herrera, Hulka, Jones, Jones, Kalady, Katz, Keitz, King, Kirkpatrick, Lee, Liao, Lineberger, Lyerly, Majure, Mitchell, Muir, Rodriguez, Rogers, Rourk, Routbort, Scannell, Sebastian, Shaddock, Siddiqui, Slifer, Snyder, Thrall, Weaver, Weintrob, Wilson, Yarger, Ying; Mses. Hendrix and Tuck.

Institutional Review Board for Clinical Investigations

John M. Falletta, M.D., *Chair*; Joseph C. Farmer, M.D. and George R. Parkerson, M.D., MPH, *Co-chairs*; John Harrelson, M.D.; Marc Majure, M.D.; and Ken Mahaffey, *Vice-chairs*; Drs. Adams, Alvarez, Amalfitano, Annex, Bajwa, Bentley, Blood-Siegfried, Carroll, Charles, Cotten, DiBernardo, Dobbins, Docherty, Drucker, Ellis, Ellison, Freedman, Gan, Goldstein, Goodwin, Gustafson, Gwyer, Habib, Hahn, Herndon, Hertzberg, Hulette, Hurwitz, Jackson, Jones, Kenan, Kessler, Koeberl, Lane, Lee, Livingston, Ludeman, MacFall, Martin, Matchar, McBride, McConkie-Rosell, Montana, Morse, Muhlbaier, Muir, Murray, Myers, Olsen, Ostbye, Patterson, Pegram, Pollock, Poulson, Proia, Rabinovich, Robertson, Schildkraut, Shaw, Smith, Speer, Sullivan, Sutton, Taylor, Toffaletti, Travis, B. Turner, G. Turner, Walmer, Westman, Whelen, Wolfe, and Zimmerman; Messrs. Coleman, Gustafson, Maney, and Minnick; Mses. Campbell, Coley, Ferree-Clark, McCaskill, Olsen, Pangborn, Scanga, and Sigman-Hendricks; Student Representatives: Messrs. Alexander, Bourque, Decamp, Kim, Palmeri, Reynolds; Ms. Stewart.

Library

Patricia L. Thibodeau, M.L.S., M.B.A., *Chair*; Drs. Edwards, Gwyer, Madden, McCusker, Oas, and Turner; Meses. Carpenter and Odom; Mr. Peterson, *ex officio*; Ms. Murphy, *ad hoc member*.

Medical Center Awards

Drs. Anderson, Bollinger, Casey, Cullen, Dawson, Epstein, Greenberg, Hertzberg, Parkerson, Perfect, Pisetsky, Pizzo, Schwab, Williams, and Whorton.

Medical Center Executive Committee

R. Sanders Williams, M.D., *Chair*; Drs. Bigner, A. Brown, H. Brown, Califf, Capel, Casey, Champagne, Cohen, Corless, Epstein, Frank, Fulkerson, George, Halperin, Haynes, Heitman, Hogan, Jacobs, Kay, Krishnan, Mark, McCarthy, McKinney, McNamara, Means, Michener, Nevins, Newgard, Newman, Pericak-Vance, Pizzo, Raetz, Ravin, Telen, Sugarman, Tedder, Wigfall, Wilkinson, Willard, and Wright; Messrs. Gibson, Rum, and G. Williams; Meses. Saito and Tenney.

Medical Center Safety Committee

Wayne R. Thomann, Dr.P.H., *Chair*; Drs. Brewer, Broda, Hunt, Jackson, Kaye, and Yoshizumi; Messrs. Bergen, Borg, Elks, Eroe, Garber, Good, Guerry, Oldham, Stanley, Streater, and Tencer; Meses. Finch, Hughes, J. James, T. James, Johnson, Shulby, Turner, and Zabrycki.

Medical Radiation Control and Radioactive Drug Research Committee

Christopher T. Coughlin, M.D., *Chair*; Drs. Harris, Lobaugh, Ludwig, Reiman, Samulski, Wong, and Yoshizumi; Mr. Petry; Ms. Fuchs and Tenney.

Merit Awards

R. Sanders Williams, M.D., *Chair*; Dr. Armstrong; Ms. McCorison.

Minority Affairs Committee for Undergraduate Medical Education

Delbert Wigfall, M.D., *Chair*; Drs. Svetkey and Winn; Meses. Hall and Newby; Student Representatives from SNMA and the Davison Council; Drs. Armstrong and Williams, *ex officio*.

Misconduct in Research

R. Randal Bollinger, M.D., Ph.D., *Chair*; Drs. Crawford, Olsen, Pisetsky, and Tedder.

North Carolina Residence

Brenda Armstrong, M.D., *Chair*; Mr. Wallace; Ms. McCorison.

Operations Committee for Undergraduate Medical Education

Deborah Heineman, M.A., M.Ed., *Chair*; Drs. Anderson, Armstrong, Dawson, Drucker, Haynes, Petrusa, Puckett, Sebastian, and Wigfall; Meses. Couch, Cullins, Dieter, McCorison, Reilly, and Tuck.

Pharmacy and Therapeutics

Peter S. Kussin, M.D., *Chair*; Drs. Califf, Clem, Colon-Emeric, Doraiswamy, Ginsberg, Moylan, Perfect, and Rudd; Messrs. Borg and Dedrick; Meses. Crouch and Price; Mr. Dozier; Ms. Walbrun, *ex officio*.

Promotions Committee, Entering Class of 1999

Philip C. Goodman, M.D., *Chair*; Drs. Kaprielian, Krystal, Raetz, Schmitt, Tuttle-Newhall, and Waugh; Meses. McCorison and Senter.

Promotions Committee, Entering Class of 2000

Barbara L. Sheline, M.D., *Chair*; Drs. Andolsek, Dawson, Guilak, King, Muir, and Stein; Meses. McCorison and Senter.

Promotions Committee, Entering Class of 2001

Steven J. Bredehoeft, M.D., *Chair*; Drs. Bowes Rickman, Chilukuri, Lo, Major, McIntosh, Nadler, and Prose; Meses. McCorison and Senter.

Promotions Committee, Entering Class of 2002

Charles Steenbergen, M.D., Ph.D., *Chair*; Drs. Allingham, Copeland, Gerardo, Jakoi, Mitchell, and Nahum; Meses. McCorison and Senter.

Scholarship Committee

William D. Bradford, M.D., *Chair*; Drs. Dawson, Mitchell, and Weinberg; Ms. Tuck.

Second Year Course Directors Committee

Robert A. Waugh, M.D., *Chair*; Drs. Bredehoeft, Chilukuri, Copeland, Drucker, Haynes, Nahum, Petrusa, Sebastian, Sheline, Stein, Tuttle-Newhall, and Wigfall; Mses. McCorison and Reilly.

Senior Scholarships

John M. Falletta, M.D., *Chair*; Drs. Amaya-Jackson, Bastian, Drucker, Haynes, Pendergast, Wigfall, and Sebastian; Ms. McCorison.

Study Away

Caroline Haynes, M.D., Ph.D., *Chair*; Drs. Drucker, Sebastian, and Wigfall; Ms. McCorison.

Third Year Committee

Debra A. Schwinn, M.D., *Chair*; Jeffrey R. Dawson, Ph.D., *Vice-chair*; Drs. Andolsek, Bowes Rickman, Buckley, Freedman, Glower, Gromeier, Guilak, Humphreys, King, Krystal, Kwatra, Laskowitz, Lo, Mitchell, Moon, O'Connor, Scott, Speer, and Wagner. Official liaisons: Dr. Drucker; Mses. Berke, Heineman, Holladay, McCorison, and Reilly; Student Representatives: Mr. Karra and Ms. Huang.

Undergraduate Medical Education - Curriculum

Edward Buckley, M.D. and Charles Steenbergen, M.D., Ph.D., *Chairs*; Drs. Bartlett, Bollinger, Cartmill, Chatterjee, Cohen, Dawson, Gaudet, Govert, Haynes, Kaprielian, Major, Mark, Marks, Michener, Nadler, Neelon, Petrusa, Raetz, Schwartz, Schwinn, Sexton, Sheline, Speer, Stolp, Swartz, and Taekman; Messrs. Dawn, Howard, Johnson, and Williams; Mses. Gatewood, Heineman, Ibom, Joynt, Lott, McCorison, Payne, Reilly, Thibodeau, and Woo.

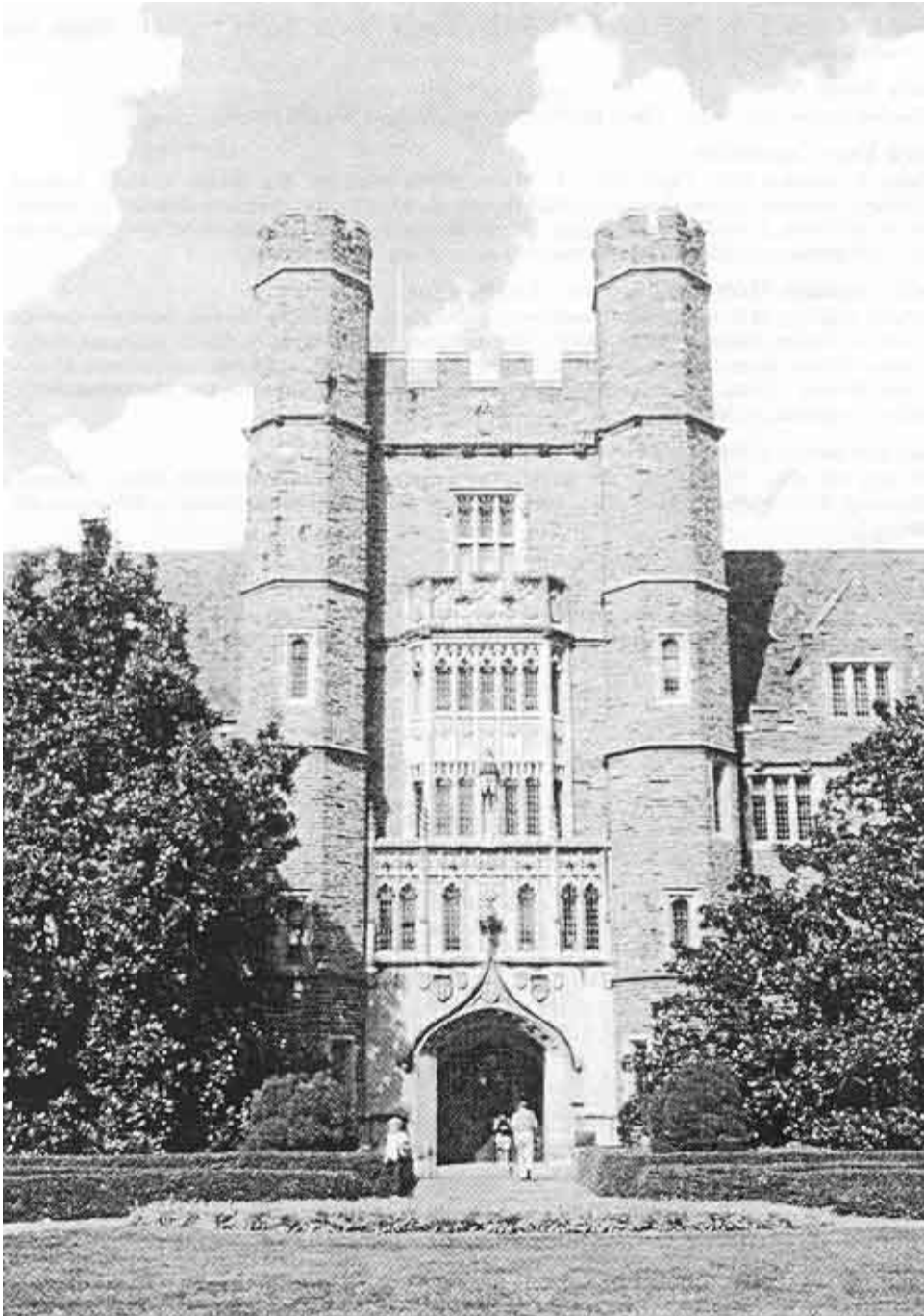
Veterans Administration Research and Development

Gregory McCarthy, Ph.D., *Chair*; Drs. Bastian, Dunn, Edelman, Levesque, Madison, Olson, Shelburne, Weinberg, Welty-Wolf, and Wilson; Mses. Brese, Brinkley, and Thorne; Messrs. Freeman and Phaup, *ex officio*.

Veteran's Administration, Dean's

R. Sanders Williams, M.D., *Chair*; Drs. Begbie, Brown, Cohen, Corless, Epstein, Halperin, Hoenig, Howell, Keitz, Krishnan, Jacobs, Mark, McKinney, Michener, Newman, Oddone, Pappas, Pizzo, Ravin, Shelburne, Simel, Vandemark, Weinberg, Weiner, Wright, Yarger, and Yevich; Messrs. Phaup and G. Williams; Mses. Haigh, Huggins, and Low.

History



History

I have selected Duke University as one of the principal objects of this trust because I recognize that education, when conducted along sane and practical, as opposed to dogmatic and theoretical, lines is, next to religion, the greatest civilizing influence. I have selected hospitals as another of the principal objects of this trust because I recognize that they have become indispensable institutions, not only by way of ministering to the comfort of the sick, but in increasing the efficiency of mankind and prolonging human life.

James Buchanan Duke, Indenture of the Duke Endowment, 1924

In 1924, James Buchanan Duke, an industrialist and philanthropist, established the Duke Endowment and directed that part of his gift be used to transform Trinity College in Durham, N.C. into Duke University. The following year, upon his death, Duke made an additional bequest to the Endowment and the university, including funds to establish the School of Medicine, the School of Nursing, and Duke University Hospital.

One of Duke's primary motivations in establishing the Endowment and the School of Medicine was the improvement of health care in the Carolinas and across the country. At a time when medicine in the Carolinas was still a cottage industry, Duke dared to dream of creating what he hoped would become one of the leading medical institutions in the nation.

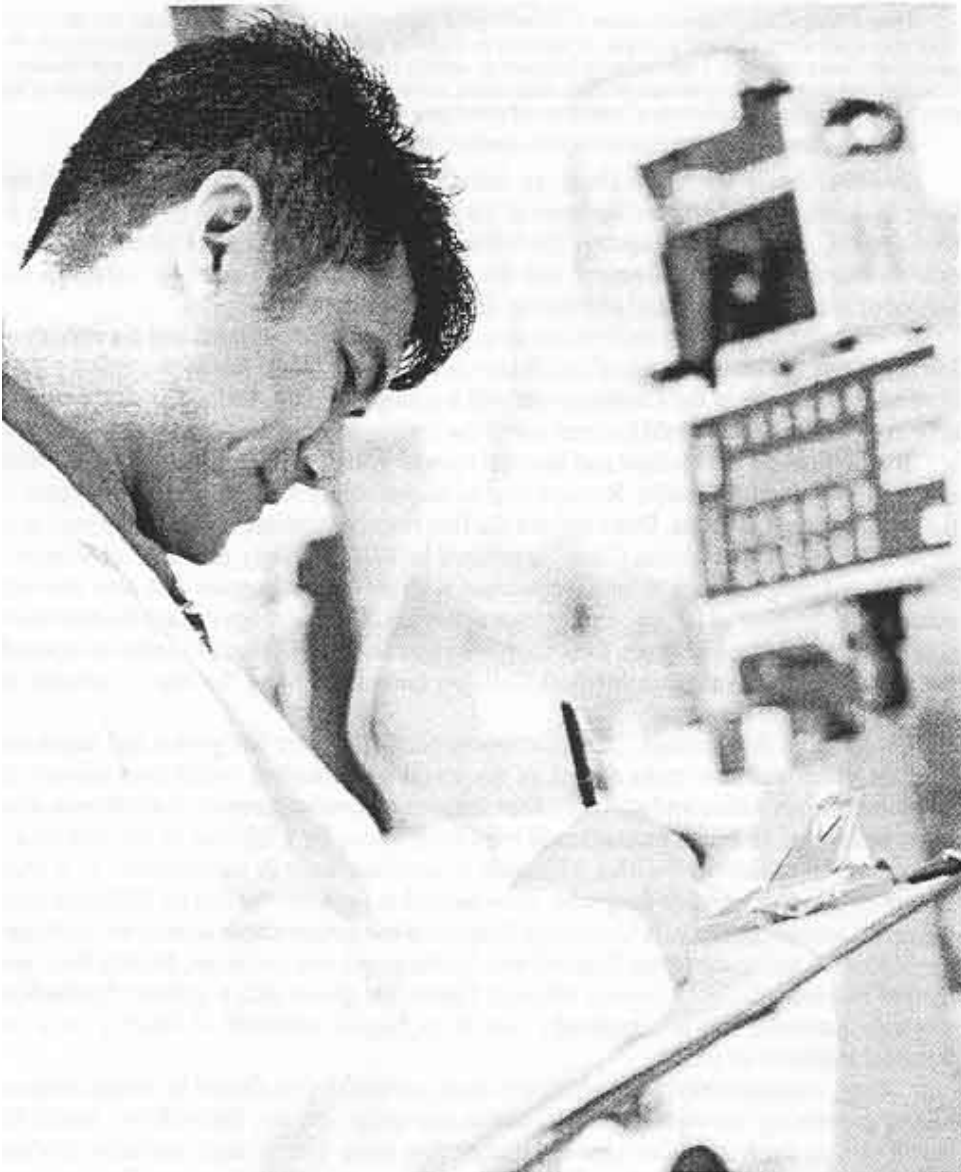
By the time the new school and hospital opened in 1930, this dream was already well on its way to becoming reality. Recognizing its responsibility for providing quality care to the people of the Carolinas, Duke opened the first major outpatient clinics in the region in 1930. The Private Diagnostic Clinic, organized in 1932, not only provided coordinated medical and surgical care to private patients with moderate incomes but also allowed members of the medical faculty to contribute a portion of their earnings toward the continued excellence of medicine at Duke. Less than five years after the School of Medicine opened, the Association of American Medical Colleges ranked it among the top 25 percent of medical schools in the country.

Building on this heritage, Duke University Medical Center has grown and expanded over the years and now ranks as one of the world's outstanding health care centers. In education, its innovative medical curriculum features a generous measure of elective courses in the belief that all health professionals must be prepared for a lifetime of self-education. The scientific grounding for that education is provided through participation in a wide variety of ongoing research programs. Now located in facilities opened in 1980 and since expanded several times, Duke University Hospital draws patients from across the Carolinas, the Southeast, and much of the United States for diagnosis and treatment. In both basic and clinical research, Duke University Medical Center has grown into a premier biomedical research institution and is consistently one of the largest recipients of funding from the National Institutes of Health.

Today, in an era of rapid and substantial change in health care, Duke University Medical Center is evolving into an even broader health care institution, one that will be a model for health care in the twenty-first century. Rather than being a traditional academic medical center where patients are referred almost exclusively for specialty care, Duke is now building an integrated system of health care providers. This new Duke University Health System is composed of Duke Hospital and Clinics; Durham Regional Hospital; Raleigh

Community Hospital; Triangle Hospice; Duke Community Infusion Services; Duke and St. Joseph Home Care; Duke University Affiliated Physicians, Inc.; and many other strategic relationships and programs.

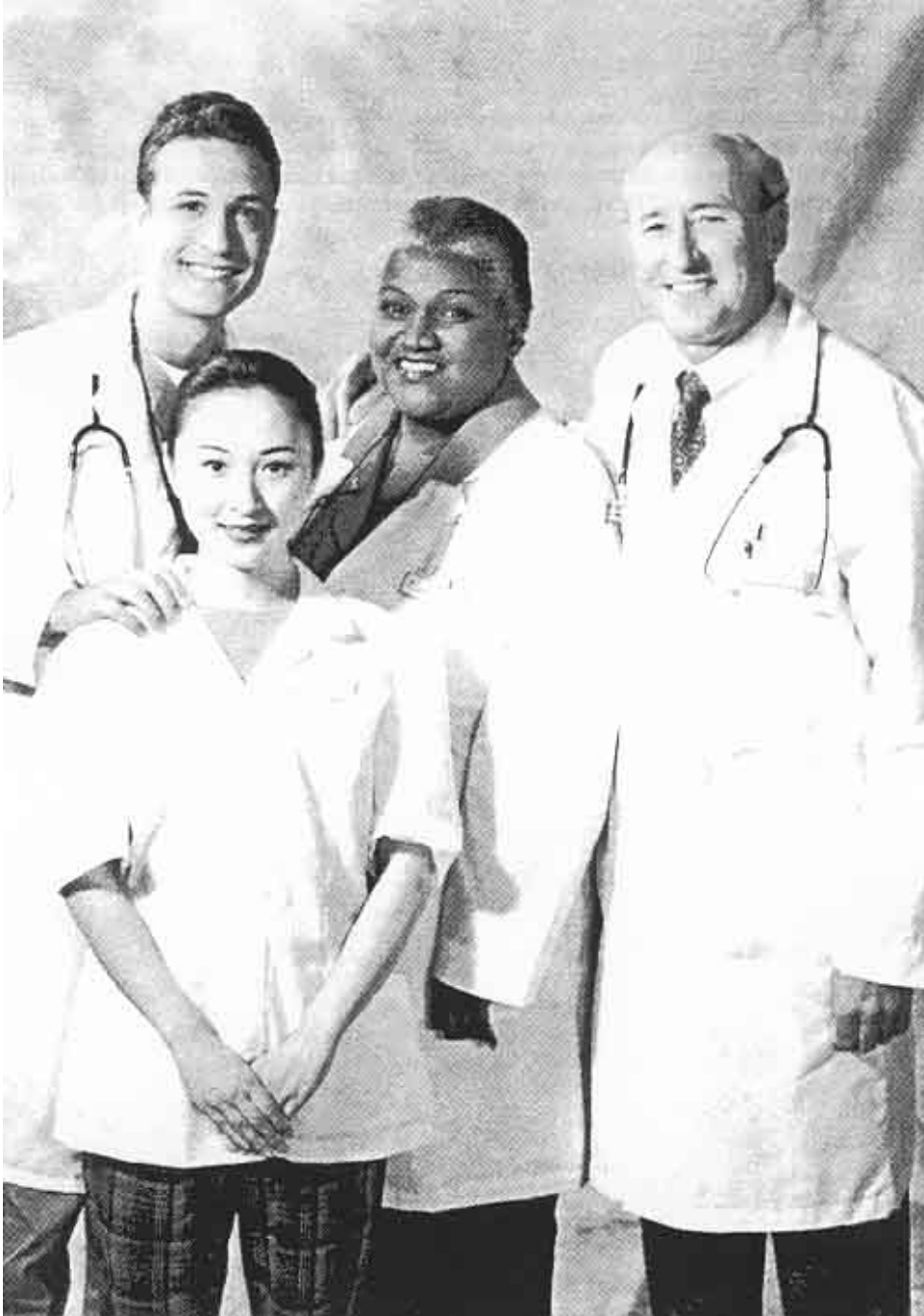
Representing the continuing fulfillment of the dream of James Buchanan Duke, Duke University Medical Center still seeks to carry out its teaching, research, and patient care programs in a manner that meets the needs of society. In keeping with its heritage, it seeks to provide socially relevant medical education, research, and patient care and is expressly committed to the search for solutions to regional and national health care problems.



The University

Duke University, located in Durham, North Carolina, has an enrollment of 11,171 students from all 50 states and from many foreign countries. Currently, Trinity College of Arts and Sciences, the Graduate School, and the Schools of Business, Divinity, Engineering, Environment and Earth Sciences, Law, Medicine, and Nursing comprise the university. Durham, with a population of 222,000, is in the Piedmont region of North Carolina and has easy access to the sea coast and mountains. It is one of the three cities bounding the Research Triangle Park where numerous private research laboratories and governmental agencies are located. Duke University is 25 miles from North Carolina State University in Raleigh, eight miles from the University of North Carolina at Chapel Hill, and is in the same city as North Carolina Central University.

Doctor of Medicine Program



Doctor of Medicine Program Mission Statement and the Medical Curriculum

The mission of the Duke University School of Medicine is:

To prepare students for excellence by first assuring the demonstration of defined core competencies.

To complement the core curriculum with educational opportunities and advice regarding career planning which facilitates students to diversify their careers, from the physician-scientist to the primary care physician.

To develop leaders for the twenty-first century in the research, education, and clinical practice of medicine.

To develop and support educational programs and select and size a student body such that every student participates in a quality and relevant educational experience.

Physicians are facing profound changes in the need for understanding health, disease, and the delivery of medical care—changes which shape the vision of the medical school. These changes include: a broader scientific base for medical practice; a national crisis in the cost of health care; an increased number of career options for physicians, yet the need for more generalists; an emphasis on career-long learning in investigative and clinical medicine; the necessity that physicians work cooperatively and effectively as leaders among other health care professionals; and the emergence of ethical issues not heretofore encountered by physicians. Medical educators must prepare physicians to respond to these changes. The most successful medical schools will position their students to take the lead addressing national health needs. Duke University School of Medicine is prepared to meet this challenge by educating outstanding practitioners, physician scientists, and leaders.

Continuing at the forefront of medical education requires more than educating Duke students in basic science, clinical research, and clinical programs for meeting the health care needs of society. Medical education also requires addressing such concerns as national science and health policy, meeting the health care needs of society, providing medical care for the disadvantaged, and applying basic science discoveries to clinical medicine. As health care practices at the federal, state, institutional, and individual levels evolve, these endeavors need input from physicians uniquely prepared to assume guiding roles.

Duke University's role as a leader in medical education is built upon its internationally-recognized tradition of fostering scientific scholarship and providing excellent preparation for the practice of medicine. The curriculum promotes creativity, scholarship, leadership, and diversity. It integrates the basic and clinical sciences and prepares students to pursue the spectrum of options available to modern physicians, from basic science to primary care. Duke University Medical School produces at least three prototype physicians; the physician scientist, the clinician-investigator, and the practitioner (either generalist or specialist).

The Duke faculty enhance the Medical School's curriculum by continually embracing new methods of education and evaluation to improve the medical education experience. Attention to curricular development assures Duke graduates that they are grounded in basic biomedical sciences, competent and caring clinicians, prepared to pursue a lifetime of continuing education, and capable of participating in local, national, and international discussions about the delivery of health care now and in the future.

Features of the four-year curriculum include:

- Development of a core medical curriculum that is rigorous, efficient, integrative, and forms a realistic base of knowledge for a physician;

- Integration of basic, clinical, psychosocial, and population information and skills throughout the four years of medical education;
- General introduction to basic and clinical science for one year each, followed by two years of individualized curricular options that promote professional diversity and personal development;
- An elective third year which permits students to pursue their independent scholarly interest across a range of scientific disciplines from basic biomedical science to health policy;
- Promotion of structured active learning that includes explicit experience in leadership and cooperative roles;
- Mentorship of students by faculty in all facets of the learning process;
- Implementation of a standardized and valid assessment of progress, carefully and thoughtfully evaluating the acquisition of knowledge, skills, and attitudes appropriate to the future goals of each student;
- Incorporation of information technology and the use of computers into student learning and evaluation;
- Research and implementation of new and improved methods of teaching.

The curriculum, while offering a previously unattainable degree of flexibility to medical education and new opportunities for intellectual exploration, also makes heavy demands upon the student. It should be recognized that medical students at the Duke University School of Medicine are expected to maintain a consistent level of performance and to demonstrate qualities of initiative and dedication to their chosen profession. A scholarly attitude toward medicine that continues throughout an entire career is an important objective of the medical school. The foundations of this attitude to learning should accompany the student upon entering.

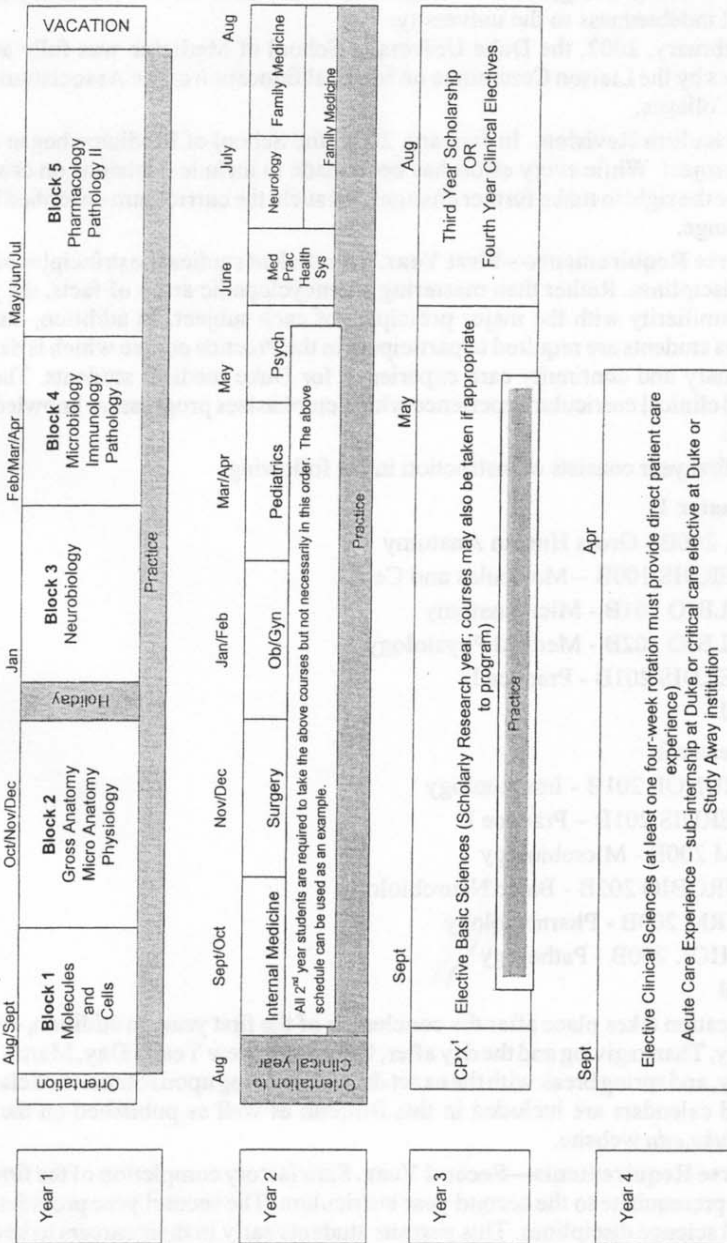
Students are expected to maintain a professional attitude toward patients at all times, to respect confidences, and to recognize that they are the recipients of privileged information only to be discussed within the context of scholarship and in circumstances that truly contribute to the educational process or to the care of the patient. This attitude involves consideration not only of speech and personal appearance but also of morality, honor, and integrity.

Beginning in the fall of 1987, the School of Medicine greatly enlarged the focus on ethics and human values in the curriculum. In the face of major advances in medical technology and sciences, today's medical student must be prepared to deal with new complexities of medical practice. These advances and complexities also make it of paramount importance that medical education enable each student to grow in both depth and breadth as a human being. The Duke University School of Medicine is rising to this challenge.

Doctor of Medicine Degree

The degree of Doctor of Medicine is awarded, upon approval by the faculty of Duke University, to those students who have satisfactorily completed the academic curriculum; demonstrated the intellectual, personal, and technical competencies to function as skilled physicians; and demonstrated their fitness to practice medicine by adherence to a high standard of ethical and moral behavior.

Duke Medical School Curriculum



¹CPX = Clinical Performance Examination; 15 standardized patients with variety of clinical challenges

The faculty of Duke University School of Medicine have developed general guidelines for technical standards for medical school admissions and degree completion. These are available on request from the Office of Admissions.

The awarding of degrees is contingent upon payment of, or satisfactory arrangements to pay, all indebtedness to the university.

In February, 2002, the Duke University School of Medicine was fully accredited for seven years by the Liaison Committee on Medical Education of the Association of American Medical Colleges.

Curriculum Revision. In January, 2002, the School of Medicine began a curriculum revision project. While every effort has been made to include decisions on changes to date, we reserve the right to make further changes. As such, the curriculum described below is subject to change.

Course Requirements—First Year. The student studies the principles of all the basic science disciplines. Rather than mastering an encyclopedic array of facts, the purpose is to acquire familiarity with the major principles of each subject. In addition, during the first three years students are required to participate in the Practice course which is designed to expand primary and continuity care experience for Duke medical students. The course is a combined clinical curricular experience which emphasizes progressive knowledge and competencies.

The first year consists of instruction in the following:

Semester 1	Credit
BAA 200B - Gross Human Anatomy	4
INTERDIS 100B – Molecules and Cells	8
CELLBIO 201B - Microanatomy	2
CELLBIO 202B - Medical Physiology	4
INTERDIS 201B - Practice I	1
Total	19
Semester 2	Credit
IMMUNOL 201B - Immunology	2
INTERDIS 201B – Practice I	2
MGM 200B - Microbiology	5
NEUROBIO 202B - Basic Neurobiology	4
PHARM 200B - Pharmacology	4
PATHOL 200B - Pathology	5
Total	22

A vacation takes place after the conclusion of the first year. In addition, every class has Labor Day, Thanksgiving and the day after, Christmas, New Year's Day, Martin Luther King, Jr. holiday, and spring break with the exact dates depending upon rotation and class schedules. Approved calendars are included in this Bulletin as well as published on the <http://registrar.mc.duke.edu> website.

Course Requirements—Second Year. Satisfactory completion of the first year curriculum is a prerequisite to the second year curriculum. The second year provides an exposure to clinical science disciplines. This permits students early in their careers to become participants in the care of patients. The acquired appreciation of the problems of the clinical areas and the opportunities to recognize the applications of the basic sciences leads to a more meaningful selection of courses for the subsequent two years.

At the beginning of the second year, students take a four-week course, Practice: Orientation to the Clinical Year, which prepares them for the core clinical rotations that

follow. The core courses include eight-week rotations in internal medicine, surgery, obstetrics/gynecology, pediatrics, either an eight-week rotation in family medicine or a four-week rotation in family medicine and a four-week rotation in neurology, and a six-week rotation in psychiatry; a clinical rotation in medical practice and health systems lasting two weeks follows the psychiatry rotation. During the clinical rotation year, second year students take another Practice course, Practice Year 2, to reflect on their rotation experiences.

In addition, after completing second-year clerkships, all students must take and pass the Clinical Performance Examination (CPX). The CPX is a standardized test of clinical performance that was developed by faculty from all four medical schools in North Carolina and is now administered at all schools. Duke students will take the CPX in September unless they will be studying away. Students studying away and leaving campus before the second week of September will take the CPX during their last clinical rotation of the second year. The purpose of the CPX is to evaluate the effectiveness of the clinical curriculum and each student's ability to respond to patient problems and concerns. Skills relating to communicating with patients, history taking, physical examination, assessment, and follow-up plans are evaluated for 15 different patients. Students performing below minimal competency on the CPX are required to complete additional structured learning during their fourth year.

Course Requirements—Third and Fourth Years. Satisfactory completion of the second year curriculum is a prerequisite to the elective curriculum. The third and fourth (elective) years of undergraduate medical education build upon the experiences in basic science and clinical medicine gained in the earlier years. The elective years consist of four semesters of 16 weeks each. In addition, the fourth year has an optional summer term, also of 16 weeks. Successful completion of 64 elective credits (32 basic science credits during the third year and 32 clinical science credits during the fourth) is required for graduation. Course offerings are described in the different departmental sections in this Bulletin. The wide selection affords an opportunity for the student, with guidance from advisers, to design a program that best satisfies her or his needs.

Third Year. The purpose of the scholarly research experience, usually occurring in the third year, is to provide the student with an opportunity to focus in an area or areas of interest and to pursue, in depth, a scholarly activity. Time may also be spent gaining strength in areas of basic science weakness.

Two different avenues to satisfying third year requirements are available. The first, which is most commonly followed, requires the student to select a home base study program for the basic science elective experience. With the aid of advisers, the individual elective program is devised to include an area of scholarly work to pursue which may or may not be an independent research project. Any combination of: (a) research preceptorship, (b) tutorials, or (c) courses inside or outside the home base study program may comprise the overall basic science elective experience. The second path open to students is participation in a combined M.D./master's degree program in clinical research, public health, business administration, public policy, or law. With rare exception, the elective experience should be taken as a block. During the third year, students are required to complete 32 basic science credits including three clinical science credits for the required Practice Year 3. The students must also complete a quantitative thesis for three credits. Specific requirements related to the thesis and third year components can be found on the third year website: <http://thirdyear.mc.duke.edu>.

Fourth Year. The clinical elective experience, usually occurring in the fourth year, should be used to: (a) aid in decision-making about the area of choice of postgraduate

training, (b) obtain experiences in areas that would not be included in that postgraduate training and, above all, (c) pursue active experiences in patient care sufficient to provide the basic skills necessary for doctor-patient interaction. To satisfy requirements for the M.D. degree, students must complete 32 clinical science credits during the fourth year. Four of these credits must be completed in an elective requiring direct patient care. In addition, all students are required to complete either a four-week, five credit subinternship at Duke or a four-week, four or five credit critical care elective at Duke or a Study Away institution.

Education Records/FERPA. In accordance with the Family Education Rights and Privacy Act (FERPA), students are granted certain rights with respect to their education records. They are:

1. The right to inspect her or his education records.
 - Education records include those records which contain information directly related to a student and are maintained as official working files by the university. They do not include records made by faculty and administrators for their own use and not shown to others; campus police records; employment records; records of physicians, psychologists, etc., made or used only for treatment purposes; and records containing information relating to a person's activities after she or he graduates or withdraws from the university.
 - Although FERPA regulations do not require institutions to provide copies of the education records, unless to do so would effectively prohibit an individual from viewing her or his records, it is the policy of Duke University Medical School to make such copies available. However, the Medical School may deny requests to release copies of the transcripts of those students in financial default. The Medical School also does not release copies of other schools' transcripts unless mandated by FERPA.
2. The right to amend the contents of the education record to ensure that they are not inaccurate, misleading, or otherwise in violation of the student's privacy or other rights.
3. The right to file a complaint with the U.S. Department of Education concerning perceived failure on the part of the school to satisfy the requirements of FERPA.

FERPA also limits the disclosure of personally identifiable information to others without the student's prior consent with the following exceptions:

Directory Information. Certain categories of information are considered to be directory information and do not require the student's prior written consent to be disclosed. However, the Medical School Registrar's Office complies with a student's request to withhold directory information if notice is submitted in writing during the first three weeks of each new academic year; such requests must be renewed annually. Students considering non-disclosure should be aware that negative repercussions may result when inquiries are made by prospective employers, educational institutions, or other interested parties. This is particularly important for graduating students whose final non-disclosure requests continue to be honored until rescinded by the student.

The following have been designated as directory information by the university: name, address, telephone listing, email address, date and place of birth, photograph, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and most recent previous educational institution attended. Class schedule is considered as directory information in the School of Medicine.

Legitimate Interests: Prior consent is not required for disclosure of education records to school officials of Duke University who have been determined to have legitimate educational interests, appropriate parties in connection with an emergency, and in response to a court order or subpoena.

The complete university policy regarding FERPA is located on the website: <http://registrar.duke.edu/registrar/ferpa.htm>.

Academic Standards. The faculty of the Duke University School of Medicine have the responsibility to define minimum acceptable standards for academic performance. In all courses, minimum passing standards are defined by the course director in collaboration with her or his department chairperson and faculty. These standards are communicated to the students at the beginning of each course. In clinical departments, acceptable professional standards of behavior and attitudes are included in performance evaluation.

Faculty have the responsibility of notifying students who are not meeting minimal standards for passing a course early enough for the student to be able to work toward achieving the minimal standard by the end of the course. In most cases, this is at the midterm of a course. Tutorial help or guidance in correcting deficiencies should be offered to any student so notified.

In addition to performance directly related to course requirements, all students must maintain a high standard of professional behavior. Examples include how a student communicates with course faculty and support staff, their manifestations of responsibility to the school, fellow students, and patients, as well as behavior off-campus that would be deemed unprofessional for students-becoming-physicians. Incidents reported to the vice-dean's office are investigated. The number of such reports, the severity of the transgression, and other aspects specific to the behavior in question can result in disciplinary action, including dismissal from medical school.

Honor Code. All entering medical students are required to sign an Honor Code attesting to high ethical standards in school performance. The rights and responsibilities of students with regard to university-wide regulations pertaining to student conduct can be found in the current Bulletin of Information and Regulations of Duke University.

- The students of the Duke University School of Medicine understand that it is a privilege to learn the practice of their chosen professions in a clinical setting. At the same time, they recognize the obligation that they have to the health and welfare of their patients and to their patients' families. As they enter professions in which they will have an extraordinary responsibility for others' lives and health, students will strive to hold themselves to the highest standards of academic integrity and conduct. As part of their education and training, students must begin to practice the ethic of service that they will uphold for the rest of their professional lives. Since training in ethical and professional behavior is integral to the education of the health professional, violations of this Honor Code will be considered as an academic issue and may jeopardize advancement and graduation in the same way as other academic matters.
- The Honor Code is written to promote a sense of intellectual honesty, trust, responsibility, and professionalism among students, faculty and staff of the School of Medicine. It should be understood that these guidelines represent standards to strive for, and that not every infraction will necessitate investigation. It should also be recognized that this honor code cannot anticipate every potential offense and that unethical behavior not specifically mentioned in this code can still be investigated. Specific incidents will be

considered in the context in which they occur. In addition, the magnitude and chronicity of infractions will be taken into account.

To uphold the honor code, the student will:

- demonstrate intellectual integrity and honesty,
- show concern for the welfare of others and act responsibly,
- demonstrate respect for the rights of others, build trust in professional relationships, and demonstrate professional demeanor.

For specifics on the honor code, students may contact the Office of Student Affairs.

Grading. Where appropriate, certification by the individual faculty person or by the delegated representative of each departmental chairman that a student has satisfactorily completed requirements for a course shall constitute grounds for a grade of Pass (*P*) or Pass with Honors (*H*). Pass with Honors is reserved for those students who have performed in an exemplary manner in the opinion of the faculty.

An Incomplete (*I*) grade is reserved for those students who have not met all of the requirements of a course because of illness or other such extenuating circumstances, or because of the inability to attain sufficient understanding of course material without additional study. Incompletes that are not satisfied within one calendar year (unless an extension is granted by an advisory dean and the registrar) automatically become grades of Fail (*F*). It is the departmental chairman's responsibility or that of the delegated representative of the departmental chairman to certify that an Incomplete has been satisfied and to so notify the registrar. A passing grade is placed alongside an Incomplete on the permanent and official transcript. Grades of *I* are not removed from the permanent record. All first year courses must be satisfactorily completed before a student may enroll in second year courses. Normally, all second year courses must be satisfactorily completed before a student may enroll in the elective curriculum.

A grade of Fail is recorded on the permanent record of a student by the registrar upon certification by the individual faculty person or the delegated representative of the departmental chairman that unsatisfactory work has been done in the opinion of the faculty. Failures cannot be erased from the permanent record, but the requirements of the course may be satisfied by repeating the course in a satisfactory manner. At that time, a passing grade is recorded on the official and permanent transcript. A grade of Honors cannot be awarded to students in courses that are successfully remediated rather than retaken.

Promotion. Each student's record is reviewed periodically by a Promotions Board composed of course directors (or their designees) and faculty from various departments. The Promotions Board is assigned to a class and will follow the student longitudinally throughout his or her career. Recommendations by these boards are made to the vice-dean who may select one of several options:

1. Promote students whose work is satisfactory;
2. Warn students whose work is less than satisfactory that they must improve their scholastic endeavor and require such students to remediate, retake, or review specific courses, or to undertake other actions that may assist in the correction of deficiencies;
3. Place on probation students whose work is unsatisfactory or who have demonstrated unprofessional behavior; or
4. Request the resignation of any student who is considered an unpromising candidate for the degree of Doctor of Medicine.

A student wishing to appeal a decision may do so to the vice-dean within two weeks of notification.

The vice-dean, with the advice of the dean of the School of Medicine, reserves the right

to require the withdrawal of any student at any time if, in his opinion, the student should not continue in the School of Medicine.

Due Process Guidelines. If a student decides to appeal a decision of a Promotions Board, he or she must submit in writing to the vice-dean the reasons for the disagreement with the decision and any extenuating circumstances he or she wishes to identify within two weeks of receiving notice of the decision. Within a week of receiving the appeal, the vice-dean appoints a Promotions Appeal Committee of three senior faculty, at least one of whom is from a basic science department. The Promotions Appeal Committee reviews the student's request and meets with other faculty or members of the Duke University Medical Center staff who have pertinent information. The student may present her or his appeal in person and may bring a friend from the faculty or student body to assist. The Promotions Appeal Committee reports its decision to the vice-dean who presents this to the student. If the student still is dissatisfied and wishes to appeal further, he or she may request a review of the whole process by the dean of the School of Medicine, with all pertinent documentation provided to that office. The dean's decision is binding.

Satisfactory Academic Progress. Satisfactory academic progress for students in the School of Medicine is defined as the successful completion of all requirements necessary for the advancement from one year to the next. These requirements are as follows:

First to Second Year. Completion of core basic science courses in one calendar year.

Second to Third Year. Completion of core clinical science courses within 14 months.

Third to Fourth Year. Completion of 32 basic science credits within eight months (12 months for master's or scholarship students).

Fourth Year to Graduation. Completion of 32 clinical science credits within one calendar year.

In unusual circumstances (including illness, remediation, or irregular sequence of courses) the determination of satisfactory progress for academic purposes is made by the vice-dean.

For financial aid purposes, federal regulations establish the maximum time frame for completion of the program at 150 percent of the minimum time required to complete the program. Any student exceeding the 150 percent maximum time frame is ineligible for Title IV (Federal Stafford Loans) student financial aid funds.

Retesting Policy for First Year Students. The associate dean for basic science curriculum regularly communicates with first year course directors following major examinations to determine which students are having significant difficulties with their studies. This information is shared confidentially with the other course directors and with the appropriate advisory dean(s). The assistance of a student tutor(s) and/or special guidance by the course director may be offered to help the student improve his/her understanding of the course material. Although it is hoped that students having difficulties can be identified early and helped, some students will occasionally fail a course. The student who fails a course may, at the discretion of the instructor, be retested if the course instructor judges the student's performance to be only slightly inadequate. Retesting may only occur within the time frame of that particular course or during the appropriate retesting period as noted below: course grades for students with slight deficiencies are not reported to the registrar's office (and thus do not become part of the official transcript) until after the respective retesting periods. The failing status of these students is considered to be provisional until after the retesting periods. Grades for students who are in good standing by cessation of the scheduled class sessions must be submitted to the registrar's office within two weeks of course completion. Students

who receive a provisional grade of “Incomplete” in any course in the first year are allowed to retest if the deficit(s) is(are) relatively minor. If the deficit(s) is(are) judged to be substantial, then the student receives a final grade of “Fail” and is required to study and retest during the remediation period (i.e., either four or eight weeks after the Orientation to Clinical Year Course, depending on the individual situation. The only periods after the termination of each course during which retesting can occur are the following:

Courses in blocks 1 and 2 —Any time during the Christmas holiday period such that the results are available to the First Year Grading and Promotions Committee prior to the beginning of Block 3. A deadline for reporting outstanding grades is provided by the registrar's office each year. Courses in blocks 3 and 4 —during the spring break at the end of Block 4 and before Block 5 begins or during the first two weeks of summer break. A deadline is provided to the course directors by the registrar's office each year. Courses in block 5 — during the first two weeks of summer break. A deadline is provided to the course directors by the registrar's office to ensure official documentation of grades prior to the first year Promotions Committee meeting. During this meeting, the committee assesses qualitative and quantitative progress of each student and promotes eligible students to the second year. If a student elects not to be retested during the designated period(s), the failing status is no longer considered provisional, and an official grade of “Fail” is reported to the registrar's office. There is no limitation to the number of courses in which a student can be retested, provided all the deficiencies are minor.

Course Load. In the first year, students typically complete certain required courses whose total weight equals 19 credits in the fall and 22 credits in the spring semester. During the second year, the normal registration for each 16-week semester is two eight-week rotations or the equivalent, four credits for the OCY course, and a total of three credits for Practice. In the elective years, the normal registration for any term is 16 credits with a maximum registration of 20 credits; no more than five credits in any four-week period may be taken. Enrollment for credit above this limit must have the written approval of the advisory dean.

Course Audit. With the consent of the appropriate instructor, fourth year students are permitted to audit one course a semester in addition to the normal program. Students who audit a course do not actively participate, submit work, or receive credit for the course. Because of the nature of an audited course, most clinical science courses cannot be audited. However, those offered in a lecture format (as indicated in the Electives Book provided to fourth year students) may be audited with the written permission of the instructor. After the first week of classes in any term, no course taken as an audit can be changed to a credited course and no credited course can be changed to an audit. Further, an audited course may not be repeated for credit. Third year students may not register for clinical courses, even on an auditing basis, except for Practice Year 3.

Study Away Policy. Students in the M.D. Program at Duke who have maintained a high level of academic performance throughout their first two to three years are eligible to study at another institution and receive academic credit at Duke for this experience. Students must have successfully completed all courses in the first two years at Duke before they are eligible to study away for credit. It is unlikely that students with any failures or marginal performances at Duke will receive permission. A student may not study away from Duke for credit during the four weeks prior to his or her graduation. Transfer students who are taking the two clinical years are not eligible to study away. Study Away applications are available either in the registrar's office or on the <http://registrar.mc.duke.edu> website. The applications for third year Study Away are forwarded to the Third Year Committee, which is notified by the Promotions Board if any second year students are ineligible, and to the Duke Risk Manage-

ment Office for approval. **All Study Away for credit (including military rotations) must be approved in advance by these three entities.** Third year students who study away are liable to pay Duke's tuition as well as any tuition at the visited school. Fourth year Study Away must be approved by the student's advisory dean and the Duke Risk Management Office. Credit toward the Duke M.D. degree is not to exceed nine units of clinical elective credit unless recommended by the Committee (exceptions, military students).

Leave of Absence. A student, after presenting a written request to his or her advisory dean, may be granted an official leave of absence for personal or academic reasons for two or more consecutive terms, but not to exceed one calendar year. If approved, the advisory dean provides written notification including applicable beginning and ending dates to the student, the registrar, and the director of financial aid. The student must apprise the advisory dean in writing of her or his wish to return to the Medical School or to extend the personal leave at least 60 calendar days prior to the anticipated date of re-entry. The student desiring an extension beyond one calendar year may be required to apply for readmission to the School of Medicine. When a leave of absence is taken, the vice-dean may require the student upon return to repeat some or all of her or his previously completed academic program. To be eligible for a voluntary leave of absence, a student must have met all financial obligations to the university.

Permission to take a leave of absence for medical reasons also must be sought in writing and is usually granted for 30 days. If additional medical leave time is desired, the student's physician is requested to submit documentation concerning the need for a continuation of the leave. A medical leave extending beyond 90 days requires a statement from the student's physician attesting to her or his fitness to return to the Medical School as a full-time student.

For purposes of deferring repayment of student loans during a school-approved leave of absence, federal regulations limit the leave to six months.

In all cases of leave of absence, the student is required to complete the full curriculum to be eligible to earn the M.D. degree.

Re-admission After Voluntary Withdrawal. Students who wish to re-enter the medical program after voluntarily withdrawing from the School of Medicine must provide the following to the associate dean for student affairs:

1. A statement detailing:
 - The reason(s) for withdrawing from the program, including relevant history leading up to the decision;
 - How the issues relating to those reasons have been addressed;
 - A discussion as to why the student is re-applying to the Medical School, including information concerning changes in situation, reasons for wishing to pursue a career in medicine, and an explanation as to the chosen time for return;
 - A chronological list and brief description of actions since withdrawing from the Medical School;
2. An updated *curriculum vitae*;
3. A transcript of any academic courses taken since the withdrawal;
4. Two letters of reference from people with whom the student worked during the withdrawal period.

The applicant is scheduled for two interviews with either administrative staff or faculty in the Medical School. After these meetings take place, a committee comprised of the vice-dean and the advisory deans convenes to review the information submitted by the applicant, the interview reports, and the student's previous, academic file and to determine if re-admis-

sion is appropriate. The decision of the committee, which is final, is provided in writing to the applicant and to the financial aid and registrar's offices.

Commencement. Graduation exercises are held once a year in May when degrees are conferred on, and diplomas are issued to, those who have completed requirements by the end of the spring semester. Those who complete degree requirements at the end of the summer or fall terms receive diplomas dated September 1 or December 30, respectively. There is a delay of about one month in the mailing of September and December diplomas because diplomas cannot be issued until they are approved by the Academic Council and the Board of Trustees.

Interinstitutional Program. Under an agreement with Bowman Gray Medical School, the East Carolina University School of Medicine, and the University of North Carolina School of Medicine, Duke Medical School allows students participating in the elective program to take courses at participating institutions for grades and credit toward the M.D. degree at Duke. Courses taken usually are not available at the home institution or are not offered at times that can be accommodated by the student's schedule. Students enrolled in interinstitutional courses are not charged the current Duke tuition and student health fees.

Medical Licensure. "The USMLE (United States Medical Licensing Exam), co-sponsored and co-owned by the NBME (National Board of Medical Examiners) and the FSMB (Federation of State Medical Boards), is a three-step examination for medical licensure in the United States. Results of the USMLE are reported to medical licensing authorities in the United States for their use in granting the initial license to practice medicine." (NBME website, 2001) "Step 1 ensures mastery of not only the sciences undergirding the safe and competent practice of medicine in the present, but also the scientific principles required for maintenance of competence through lifelong learning. Step 2 ensures that due attention is devoted to principles of clinical sciences that undergird the safe and competent practice of medicine. Step 3 provides a final assessment of physicians assuming independent responsibility for delivering general medical care." (2002 USMLE Bulletin of Information) A full license also requires appropriate application procedures and fees for the state in which the license is issued.

Duke University School of Medicine does not use any step of this examination for evaluation of students for progress through the curriculum. Passing the examinations is the responsibility of the individual, and Steps 1 and 2 may be taken whenever the individual is prepared to do so. The curriculum is not directed toward preparing students for licensure examination, but successful performance in coursework should enable all students to pass each step. Computer-based exams began in May, 1999 and are given continuously throughout the year. Call the Duke Office of Curriculum, (919) 684-5967, for more information. The new integrated website, <http://www.nbme.org/programs/usmle.htm> provides the Bulletin of Information, the application, and links to the USMLE site as well as a tracking site where students can find out the status of their application. Duke students typically take Step 1 late during third year and Step 2 either early in third year or early in fourth year. The dean's office assists students as they decide the most appropriate times during medical school to take these tests and with suggestions for preparing for the examination. Students must be enrolled in the School of Medicine to be eligible to take the USMLE and should speak with affected course directors at least two weeks prior to the test dates to make arrangements for the one or two-day absences. A clinical skills component to the USMLE Step 2 will be implemented for students graduating in 2005. This will require travel to another testing site and additional fees.

Visiting Students. The School of Medicine provides opportunities for visiting students to enroll in elective courses for a maximum period of eight weeks. However, visiting stu-

dents are permitted to enroll in courses only after the registration period for the applicable semester has concluded for Duke medical students. The School of Medicine does not offer long term or extensive clinical experience sufficient to satisfy the clinical educational requirements of foreign medical schools. Payment of a non-refundable application fee (currently \$50, subject to change), a registration fee of \$200, and a student health fee of \$120 are required. For information write to: Coordinator, Visiting Students, Box 3878, Duke University Medical Center, Durham, North Carolina 27710, or access the Medical School registrar's office at <http://registrar.mc.duke.edu>.

Admission Procedures

Maturity, strong study habits, intelligence, character, and integrity are essential qualifications for admission. Beyond this, pre-medical students should strive for an education that develops abilities to observe critically, think analytically, and work independently. Though knowledge of basic scientific principles should be secured, the competence with which pre-medical students conduct their undergraduate careers is of more importance than the specific subjects which they study.

Application for Admission. The Duke University School of Medicine participates in the American Medical College Application Service (AMCAS), and application to the School of Medicine must begin by submitting the electronic AMCAS application. The application may be accessed at the following website: <http://www.aamc.org/students/>. Applicants should adhere to Duke and North Carolina residency policies, which are available on the website: <http://www.ais.unc.edu/sis/admissions/grad/ncres.html>.

Upon receipt of the application from AMCAS, applicants receive a Duke University School of Medicine Supplemental Application. When the Supplemental Application and application fee are submitted, a favorable screen by the members of the admission screening committee of an applicant's AMCAS application and Supplemental Application materials generate an invitation for a personal interview. Applications should be submitted between June 1 and November 15, the deadline for all materials to be received by AMCAS. Applicants are urged to file their applications as early as possible. Supplemental applications should be completed and transmitted within two weeks of receipt of notification to complete the supplemental application. The final deadline for receipt of the Supplemental Application is December 1.

Requirements. Admission to the School of Medicine requires a minimum of 90 hours of approved college credit including one year of college English or a university writing course, one year of inorganic chemistry, one year of organic chemistry, one year of physics, one year of biology and/or zoology, and one year of calculus. An introductory course in biochemistry and/or microbiology during the senior year is encouraged. All science requirements must be complete not more than seven years prior to matriculation. The Medical College Admission Test, administered by the American College Testing Programs and Services, P.O. Box 414, Iowa City, Iowa 52240, is required of all applicants. This test is administered in April and August of each year at numerous colleges throughout the United States. If possible, applicants should arrange to take this test in April of the year they plan to submit applications for admission. MCAT scores dated earlier than four years prior to the year for which an applicant is seeking are not considered.

Selection. The earliest date of notification of acceptance is in early March for applicants entering the following August. Data on each candidate are screened using a computer model of previously matriculated students. Those selected to interview are carefully evaluated by the Committee on Admissions. A personal interview is conducted at Duke for those appli-

cants with competitive credentials. Candidates may have personal interviews with regional representatives of the Admissions Committee, who are Duke School of Medicine alumni. Those candidates who demonstrate the most promise for exceptional performance in their future practice of medicine are admitted on the basis of merit. In order to ensure enrollment, accepted candidates must return a signed agreement within three weeks after notification. Since admission is offered in advance of matriculation, it is provisional upon the successful completion of any incomplete, premedical, and required subjects as well as the continued demonstration of scholarship in college course work.

Transfer. Duke University School of Medicine does not accept transfer students except in unusual circumstances as determined by the director of admissions.

Advanced Placement. After acceptance to the School of Medicine, applicants who hold Ph.D. degrees in biomedical or preclinical sciences may apply to be considered for a three-year, M.D. degree program. This program consists of the core basic science courses during the first year, the core clinical rotations during the second year, and clinical electives during the third year. Students whose Ph.D.'s have not been awarded prior to expected matriculation are not eligible for this program. Applications to receive credit for the Ph.D. can be obtained at the Medical School admissions and registrar's offices, and must be submitted to the registrar's office by the end of the first year of enrollment. The Third Year Committee will review the request and make a recommendation to the vice-dean. The vice-dean will then make a final decision and inform the student, the Third Year Committee, and the registrar's office.

Re-application. Applicants who wish to re-apply should contact AMCAS to complete a new AMCAS application. Supporting information will be transferred to the new application. These documents are kept on file for three years. To be seriously considered, re-applicants must demonstrate significant additions of experience or coursework to the original application.

Immunization and Health Record. North Carolina State law and the Infection Control Committee at the Medical Center require all new students to provide, within 30 days of matriculation, evidence of immunity to certain vaccine-preventable illnesses. Upon acceptance, students receive the Student Health Immunization Form and Report of Medical History which should be completed and returned prior to the start of Duke classes to the Director of Student Health Center, Box 2899, DUMC, Durham, North Carolina 27710.

Duke University Medical Center and the School of Medicine hold the health and welfare of their students, patients, and faculty in the highest regard. Students' failure to comply with North Carolina state immunization requirements and those of the School of Medicine may result in the student not being allowed to continue coursework or to take exams until all immunization requirements are met. For questions or concerns about immunization requirements, please contact the Student Health Department at dshs_immunizations@mc.duke.edu or by phone at 919-681-WELL.

Combined Degree Programs

Medical Scientist Training Program. The Medical Scientist Training Program is designed for highly qualified students strongly motivated toward a career in medical sciences and academic medicine. It provides an opportunity to integrate graduate education in one of the sciences basic to medicine with the full clinical curriculum of the School of Medicine. The program requires, on average, six to seven years of study and leads to both the M.D. and Ph.D. degrees. Although the special emphasis of this program is on basic medical science, the trainees, because of their education in clinical medicine, have a remarkable range of ca-

reer opportunities open to them. Graduates of this program follow one of two broad paths. Some embark directly on careers in teaching and research in one of the basic medical sciences while maintaining strong ties with clinical science as a result of their combined training. Others enter residency programs before pursuing investigative and teaching careers in clinical medicine, carrying with them strong academic backgrounds which allow them to conduct fundamental research with a foundation of superior training and experience in basic sciences.

Eligibility. Applicants must meet the admission requirements of both the Medical School as a candidate for the M.D. degree and the Graduate School as a candidate for the Ph.D. degree. Most candidates apply for admission to the first year of the program but, in special cases, applications can be accepted from students who are in residence in the Medical School or Graduate School of Duke University. In addition to the minimum requirements for acceptance to the Medical School and the Graduate School, advanced course work in science and mathematics and prior research experience (or other evidence of research aptitude) counts heavily in the selection of candidates.

Financial Support. Students admitted to the first year of the program receive a traineeship award (National Research Service Award) consisting of a stipend and full tuition allowance from the National Institutes of Health. Currently the annual stipend is \$20,250 (including health insurance). Financial support from that award can be furnished for up to six years assuming normal progress. These six years need not be consecutive; this permits flexibility in funding in case more than six years are required for completion of the curriculum. Funding by the NIH is limited to citizens or permanent residents of the United States.

The Training Program. This program is designed to offer trainees great latitude in the selection of course material. Basic requirements are two academic years composed of the first basic science year and the second clinical science year of the curriculum for medical students at Duke University. Following completion of the second year, the trainee enters the graduate program to complete the requirements for the Ph.D. degree. One more academic year of elective clinical study is necessary to complete the requirements for the M.D. degree. Both degrees are awarded at the completion of the sequence. Minor variations in this schedule can be arranged if this is advantageous to the student's education.

Year 1—Core Basic Science Year. This year consists of courses in anatomy, immunology, molecules and cells, neurobiology, pathology, pharmacology, physiology, and Practice.

Year 2—Core Clinical Science Year. This year encompasses a comprehensive approach to medicine oriented to the patient as a whole. It provides fundamental training in clinical medicine with emphasis on the relationships between general biological processes from conception through birth, development and maturation, to senescence and death, as well as individual clinical states. Special consideration is devoted to the pattern of developmental sequences and to the changes in that pattern determined by genetic composition and the particular environment in which the patient lives.

The second year consists of the four-week Orientation to the Clinical Year course followed by eight-week rotations in internal medicine, surgery, obstetrics/gynecology, pediatrics, a six-week rotation in psychiatry coupled with a two-week rotation in cost effective care, and either an eight-week rotation in family medicine or a four-week rotation in family medicine and a four-week rotation in neurology, and the year-long Practice course.

Years 3, 4, 5, (6)—The Graduate Years. During the third, fourth, fifth and, if necessary, sixth year of the program, the trainee pursues graduate study to satisfy the requirements for the Ph.D. degree. These requirements include: (1) completion of necessary course work, (2)

adequate performance in the preliminary examination, (3) original research suitable for a dissertation, and (4) successful defense of the thesis in the final examination. Detailed descriptions of the other general requirements for the Ph.D. degree are stated in the *Bulletin of the Graduate School*.

The graduate curriculum of each trainee is developed in consultation with the director of graduate studies of the department in which the trainee elects to study and requires the approval of the Medical Scientist Training Program Committee. Since most of the ordering ideas and experimental techniques of all the medical sciences derive from mathematics and the physical sciences, it is essential to ensure that all students in the program have an adequate foundation in these subjects. Because of the close working relationship and geographical proximity of the departments of medical and physical sciences at Duke, the setting is unusually favorable for the achievement of that goal.

Descriptions of the graduate courses in the Departments of Biochemistry, Cell Biology, Genetics and Microbiology, Immunology, Neurobiology, Pathology, Pharmacology and Cancer Biology, Biomedical Engineering, Chemistry, and Zoology are listed in the *Bulletin of the Graduate School*. Trainees are encouraged to select courses which relate to their developing individual interests rather than follow a prescribed curriculum applied to all students in a given discipline. Such range, flexibility, and freedom are the essence of graduate education. The original research and dissertation of each trainee is supervised by a faculty adviser chosen by the trainee in consultation with the director of graduate studies in the appropriate department. The faculty adviser is the chairman of the trainee's supervisory committee, which consists of at least three members from the major department. This committee generally administers the preliminary examination before the student commences original research and the final examination after the student completes the dissertation.

Final Year—An Elective Year in Clinical Science. In this year, which is entered only after completion of all requirements for the Ph.D. degree, the student and her or his Medical School advisory dean construct an individualized curriculum which often places major emphasis on one clinical area and minor emphasis on other fields. One aim is to integrate research interests and clinical experience in such a way that the student's research competence is facilitated; therefore, the year is planned with regard to the trainee's proposed career in research as well. This elective year provides further training in clinical medicine to complement the second (core) clinical year, so that the trainee's total clinical experience is the same as that given in the regular clinical years of medical school (the third and fourth years in the majority of schools). It should be noted that since students in the program receive the M.D. degree upon completion of the final year, great care is taken by the faculty to ensure that students are competent and knowledgeable in current concepts of patient care. It is hoped that the final year provides the student with an experience which is not repeated during the residency but serves to complement later phases of training. For example, future surgeons might be exposed to fields other than surgery, since they receive intensive training in that discipline during their residency programs.

Application and Admission Procedures. The following guidelines should be observed by individuals applying to the Medical Scientist Training Program.

1. The application form for the Duke University School of Medicine should be completed and submitted as early as possible since acceptance into the Medical Scientist Training Program requires acceptance by both the Program Committee and the Medical School Admissions Committee. Applicants who cannot be accepted into the program are still fully eligible for acceptance to the Medical School if the Medical

School Admissions Committee considers them qualified and desirable.

2. The application form for the Medical Scientist Training Program should be completed and submitted no later than December 1.
3. To facilitate review of this application, the Medical College Admission Test should be taken, if possible, in April of the year in which the application is submitted.
4. Only those applicants who are accepted for the program are requested to complete an application form for the Graduate School. The Graduate Record Examination is not required for this purpose.
5. Applicants are notified about acceptance into the program on or about February 28.

Additional information may be obtained by writing Salvatore V. Pizzo, M.D., Ph.D., Director, Medical Scientist Training Program, Box 3712, Duke University Medical Center, Durham, North Carolina 27710 or by checking our website at www.mstp.duke.edu or emailing burks003@mc.duke.edu.

Primary Care Program. In September 1994, Duke University School of Medicine instituted the Primary Care Program for medical students. The goal of the program is to develop leaders in primary care disciplines of medicine. Any student matriculating in the Medical School and expressing an interest in becoming a primary care physician can apply to join this program. The program functions much as an academic society, with periodic informal meetings of generalist faculty and program students. Students are encouraged to elect the eight-week family medicine clerkship during the second year. During third year, Primary Care Program students are encouraged to participate in either the Clinical Research Study Program or the Epidemiology and Public Health Study Program during the third year. These study programs provide an opportunity for dual degrees, such as M.D./M.B.A., M.D./M.H.S., M.D./M.P.P., or M.D./M.P.H. During the fourth year, students are encouraged to take a generalist subinternship, and at least one ambulatory care rotation in a generalist discipline such as community medicine or geriatric medicine. Throughout the four years, students are assigned a primary care mentor as well as an advisory dean. Students may join the program at any time during the first three years and may withdraw from the program at any time. Participation also does not necessitate a primary care career choice. The program is jointly sponsored by the Departments of Community and Family Medicine, Medicine, Obstetrics/Gynecology, and Pediatrics. Additional information may be obtained by contacting Barbara Sheline, M.D., M.P.H., Box 3886, Duke University Medical Center, Durham, NC 27710, sheli002@mc.duke.edu.

The Clinical Research Training Program (CRTP). This five-year combined degree program is offered to meet the increasing demand for physicians trained as clinical researchers. Upon completion of the program, students are awarded the Master of Health Sciences in Clinical Research degree as well as the M.D. degree. Through the Clinical Research Training Program, this curriculum offers courses in clinical research design, research management, and statistical analysis as well as a mentored clinical research experience. The program is offered by the faculty of the Department of Biostatistics and Bioinformatics with the participation of other members of the Medical Center faculty who have expertise in relevant areas.

Course of study. Students interested in the M.D./M.H.S. program enroll in the normal course of study in the School of Medicine during the first two years and in the Clinical Research Training Program during the third and fourth years. The fifth and final year is spent completing the elective clinical science work that is tailored to the student's specialized needs.

Tuition. Students registering for this program are assessed the usual tuition and fees. The Medical School registrar's office then reimburses the CRT Program for tuition and mandatory fees for participating students for a maximum period of one calendar year. Then the student pays the CRTP rate only. Students who continue to enroll in courses in the CRTP after the expiration of one calendar year must request a leave of absence from the School of Medicine. During this period, such students are billed directly by the CRTP at the program's regular tuition rates and are responsible for making payment.

Application procedure. The Clinical Research Training Program and the Clinical Research Study Program offered to third year students through the Medical School are two distinct programs. Medical students interested in pursuing the M.H.S. degree through the Clinical Research Training Program should contact the Program Director, Eugene Z. Oddone, M.D. (oddon001@mc.duke.edu) to discuss their interests.

The Medical Historian Program. The Medical Historian Program is conducted under the auspices of the School of Medicine and the Graduate School. Individuals earning the Ph.D. degree in history from Duke may petition the vice-dean to receive transfer credit that can be applied to the medical school degree if the major subject area is one that is related to the discipline of medicine, health policy, or public health. The combined M.D./Ph.D. program typically extends for six years. Students complete the first two academic years in the School of Medicine (the required, core basic and clinical courses) prior to taking a leave of absence to enroll in the Graduate School. A range of appropriate courses is available there through the Department of History. Following the completion of the Ph.D. degree, the student resumes requirements for the M.D. degree.

Application and Admissions Procedures. Applicants must meet the requirements for admission to the School of Medicine and the Graduate School in the Department of History. Candidates who have completed two years of medical school are also considered. In addition to the minimum requirements established by the School of Medicine and the Graduate School, courses in history and in the history and philosophy of science count in the selection of candidates.

Applicants should complete and submit an application form to the Duke University School of Medicine and to the Graduate School for admission to the Department of History.

Further information may be obtained by contacting Margaret Humphreys, M.D., Ph.D., Box 90719, Department of History, Duke University, Durham, NC 27708, meh@duke.edu.

Medicine and Business Administration Program. The Duke School of Medicine and The Fuqua School of Business jointly sponsor a program of medical and business administration education. Upon satisfactory completion of the required course of study, candidates are awarded both the M.D. and the M.B.A. degrees.

Course of Study. The student in the M.D./M.B.A. program begins the program in the School of Medicine. As in the regular M.D. program, the first year is devoted to the basic medical sciences and the second year to the basic clinical disciplines.

Upon successful completion of the second year, the student takes a leave of absence from the Medical School and enters The Fuqua School of Business where the first-year core course curriculum is the same as that of other M.B.A. students in The Fuqua Health Sector Management Program.

Upon completing the first year M.B.A. curriculum, the student returns (typically in May of their third year) to the School of Medicine to begin the first half of a 12-month scholarly experience required to fulfill the Duke Medical School third year requirement. The third year study track director of the Epidemiology and Public Health Study Program

works with the students to ensure identification of an appropriate mentor and topic and thesis submission in a timely manner.

In the fall of that year (the beginning of the fourth year of the combined program), the student continues enrollment in the School of Medicine but also returns to the School of Business to complete elective course work. During the spring of this fourth year, the student completes the second half of the scholarly activity period. The student's quantitative thesis is due at the end of this fourth year and prior to the student enrolling in the fifth and final year. During this final year, the student completes the Medical School elective clinical work tailored to the student's specialized needs.

Eligibility. Applicants for the M.D./M.B.A. program must qualify for admission to both the School of Medicine and The Fuqua School of Business. The usual approach is to apply to The Fuqua School of Business during the second year of Medical School. It is helpful, however, for a student to indicate upon admission to the School of Medicine that he/she has an interest in the joint degree program of the School of Medicine and The Fuqua School of Business. Neither school gives preference to joint degree candidates in the admission process.

Application Procedures. Applications for The Fuqua School of Business may be completed online, or a paper copy may be downloaded from Fuqua's Admissions web site: www.fuqua.duke.edu/admin/daymba/admissions/appdown.html. Applications for the School of Medicine should be made by utilizing the AMCAS procedure described in this Bulletin.

Financial Aid. During the four years that students are enrolled in the School of Medicine, they are eligible for financial aid from the School of Medicine. During the year students are on leave of absence from the School of Medicine and enrolled in The Fuqua School of Business, they are eligible for loans and grants through the School of Business only.

For additional information, contact the M.D./M.B.A. Program advisor, Dr. Kevin Schulman, Director, Center for Clinical and Genetic Economics, Duke Clinical Research Institute, DUMC, Box 17969, Durham, NC 27715, schul012@mc.duke.edu or Nichole Berke, The Fuqua School of Business, Assistant Director of the Health Sector Management Program, Box 90120, Duke University, Durham, NC 27708, nberke@mail.duke.edu.

The Medicine and Juris Doctor Program. The School of Medicine and the School of Law of Duke University jointly sponsor a highly selective program of combined medical and legal education. The program provides an opportunity to acquire a full basic study of the two fields. Upon satisfactory completion of the required course of study, candidates are awarded both the M.D. and the J.D. degrees.

Course of Study. The student in the M.D./J.D. Program generally begins her or his course of study in the School of Medicine. As in the regular M.D. Program, the first year is devoted to the basic medical sciences and the second year to the core clinical disciplines. The completion of the first two years allows the individual to integrate the classroom with the clinical experience of patient care. At the time the Medical School curriculum starts a third year of research experience, the student enters the School of Law where the first-year curriculum is the same as that of other law students. During the next two years, the student takes electives in the law curriculum, including available health law courses. In addition, some students pursue legal clerkships during the two summers to gain experience in health care law or related areas. A total of 74 credits must be earned in the Law School. The final time is spent in the Medical School completing elective and required clinical science work that is tailored to the student's specialized needs and interests. Students are also required to write a quantitative thesis after their research year.

Eligibility. Applicants for the M.D./J.D. Program must qualify for admission to both the School of Medicine and the School of Law. The usual approach is to apply for both schools

simultaneously, thus reserving a place in the program prior to arrival. Applications are also accepted from members of the first and second year medical school class for admission to the School of Law and from the second year law school class for admission to the School of Medicine. Applicants should complete applications to each school separately. Neither school gives preference to joint degree candidates in the admissions process.

Tuition: Students in the M.D./J.D. Program are required to complete the entire Medical School curriculum, but are permitted to arrange their schedules such that third year requirements may be satisfied during a continuous period of enrollment. Tuition for the required, basic science "year" is assessed twice for these students during the first two semesters of a minimum enrollment of five credits of third year work in the Medical School.

Application Procedure. Application forms for the School of Law may be obtained by writing to the Office of Admissions, Duke University School of Law, Box 90393, Durham, North Carolina 27706. Applications for the School of Medicine shall be made by utilizing the AMCAS procedure described in this Bulletin.

Deadlines. For those seeking simultaneous admission to both schools: at the end of the junior year students take the Medical College Admissions Test (MCAT) and the Law School Aptitude Test (LSAT).

For admission to the Medical School, the AMCAS application procedures should be completed. Upon receipt of the supplemental application form from Duke, the box indicating M.D./J.D. Program should be checked. The deadline for the AMCAS procedure is November 1. There is no deadline for the Law School, but January 15 or earlier submission is suggested.

For additional information, contact the M.D./J.D. advisor, Paul Lee, M.D., J.D., Box 3802, Duke University Medical Center, Durham, North Carolina 27710, lee00106@mc.duke.edu, (919) 681-2793. You may find it most helpful to schedule a phone conversation to discuss your interests and the appropriateness of this program at this number.

The Medicine and Public Health Program. Students enrolled in the School of Medicine, after satisfactory completion of the first two years of the regular curriculum, may request approval to seek a Master of Public Health degree at the University of North Carolina-Chapel Hill. The program is designed to train physicians in epidemiology, biostatistics, maternal and child health, health policy and administration, environmental sciences, or in evaluating health care delivery systems. At the end of the students' third year, they are required to submit a quantitative thesis. Upon receipt of the M.P.H. degree and completion of a quantitative thesis, students are awarded a full year of basic science credit toward the M.D. degree.

Tuition. For the class entering in 2002, M.P.H. tuition policy changed to reflect North Carolina in-state/out-of-state residency status. The M.P.H. student pays tuition to Duke, and Duke pays the in-state tuition rate to UNC for North Carolina residents; however, if the student is not a North Carolina resident, Duke will only pay the in-state rate, and the student will be responsible for the difference. Students who continue to enroll in M.P.H. courses after the expiration of one calendar year must request a leave of absence from the School of Medicine. During this period, such students are billed directly by the master's program at that program's regular tuition rates and are responsible for making payment to that program. Duke will not be responsible for any payment after the one calendar year.

For additional information on the M.P.H. program, contact the Director of the M.D./M.P.H. Program, Kathryn M. Andolsek, M.D., M.P.H., Box 3951, Duke University Medical Center, Durham, North Carolina 27710, (919) 668-3883, andol001@mc.duke.edu.

The Medicine and Public Policy Program. This program is offered to meet the growing demand for persons who combine medical skills with a capacity for analytic public decision-making. It aims at training those persons with the requisite talent to be leaders in the development and implementation of health policy at all levels of government.

Utilizing the faculty and resources of the School of Medicine and the Terry Sanford Institute of Public Policy, the program offers students a multidisciplinary education that provides:

1. A complete course of study in the basic medical sciences and clinical training in the practice of medicine identical in scope and rigor with the education received by students enrolled in the Doctor of Medicine program alone;
2. Familiarity with the organization and financing of health services, with particular focus on the economics and politics of health care;
3. An understanding of the political, bureaucratic, and social processes that define public problems and limit alternative approaches to their solutions;
4. A capacity for quantitative and logical methods of analysis useful in forecasting and appraising policy consequences and in evaluating existing policies;
5. An understanding of the uses and limitations of various analytic techniques and an awareness of the value considerations and ethical choices implicit in particular policy alternatives.

After the first two years in the School of Medicine at Duke, course work shifts to the Public Policy Institute in the third year. In addition to the normal public policy curriculum, combined degree students are required to complete an epidemiology course. Between the third and fourth years, students complete a 12-week policy internship in the summer. Before the fourth year, students complete a quantitative thesis to fulfill Medical School requirements, then go on to their fourth year. When they have completed all the requirements for the two programs, both the M.D. and Master of Public Policy (M.P.P.) degrees are awarded.

Tuition: Students take a leave of absence from the School of Medicine to enroll in Duke's Graduate School for the M.P.P. Upon award of the M.P.P. degree, students are granted 32 transfer credits for fulfillment of third year M.D. program requirements. The corresponding two tuition payments for the third year are waived. Students who elect to complete the traditional third year in addition to the M.P.P. must pay the Medical School for four years of tuition and do not earn transfer credit for work completed in the alternate program.

Admissions. Students may apply for admission to the program during their first or second years.

Applications. Requests for applications and specific questions about the program should be addressed to the Director of Graduate Studies, Terry Sanford Institute of Public Policy, Box 90243, Duke University, Durham, North Carolina 27708-0243, mpp@pps.duke.edu. Inquiries and Medical School approval can be obtained from the Director of the M.D./M.P.P. Program, Kathryn M. Andolsek, M.D., M.P.H., Box 3951, Duke University Medical Center, Durham, North Carolina 27710, (919) 668-3883, andol001@mc.duke.edu.

Financial Information

TUITION AND FEES

Tuition Policy Statement. The Duke University School of Medicine's mission in medical education is to build upon our internationally-recognized tradition of excellence in training outstanding practitioners and physician-scientists who will be leaders in all fields of

medicine. By selecting outstanding and dedicated students for matriculation, the school is committed to preparing physicians to respond to societal health needs. The School of Medicine has a policy of need-blind admission and adequate financial aid for those students with financial need. Tuition is set at a level that is competitive with schools of comparable quality and selectivity for admission. This tuition policy, plus a financial aid program which protects against excessive student indebtedness, permits the School of Medicine to attract the most qualified students nationally and regionally, regardless of the student applicant's personal or family financial status. It is important that tuition and financial aid are balanced to ensure that debt does not skew career choices of medical students once they graduate from the Medical School.

Tuition. The following table represents an estimate of a student's necessary expenses in the School of Medicine. The total of these figures suggests a basic minimum budget of approximately \$43,628 for a fourth year student to \$51,095 for a first year student. These are estimated figures only. Tuition and fees are subject to change without notice. Allowances for recreation, travel, clothing, and other miscellaneous items must be added to this estimate with allowances for individual needs and tastes.

2003-2004 Cost of Education

Tuition	\$31,194
Accident and sickness insurance* (subject to change)	1,063
Technology fee	1,750
First year fees† (includes microscope rental, first year only)	994
Annual cost of books and supplies: first year	2,454
Annual cost of books and supplies: second year	1,662
Annual cost of books and supplies: third and fourth years	740
Rent, board, and miscellaneous: first year	13,520
Rent, board, and miscellaneous: second year	15,978
Rent: third and fourth years	9,832
Continuation of Research Study Fee‡ (per semester)	35
Motor vehicle registration: car	120

All individuals registered in the Duke University School of Medicine as M.D. degree candidates are considered to be full-time students if they are registered for a minimum of five credits each semester. Registration at or in excess of that is billed at the full time rate. Each student determines the number and types of courses taken with their advisory dean and, when applicable, one or more of the appropriate committees.

Tuition and fees are payable on a semester basis. Students are required to pay full tuition for four years as a requirement for graduation. Tuition rates are determined according to matriculation date and increase yearly at a rate determined by the School of Medicine financial affairs office and approved by the Board of Trustees. Students are charged for no more than the equivalent of four full years of tuition. A student who fulfills the tuition payment obligation but has not completed requirements by the end of the last payment period is not assessed additional tuition during any subsequent terms of enrollment.

*. Mandatory fees.

†. Sphygmomanometer, ophthalmoscope, otoscope, and other equipment required of each student must conform to rigid standards.

‡. The School of Medicine encourages students to interrupt their studies to pursue approved research that is complementary to the medical curriculum at Duke or elsewhere for no credit. To retain full-time student status for loan deferment purposes, students may seek approval to enroll in the Continuation of Research Study option. Only students eligible to be enrolled at Duke during the applicable time period may participate.

Remediating Students. Students who are not registered for courses but are completing required remedial work as determined by the appropriate promotions committees are considered to have full-time status. They are not assessed tuition charges and are eligible only for Duke loan to assist in meeting cost of living expenses.

Advanced Standing Matriculants. Students who enter the M.D. degree program with previously earned doctorate degrees may petition the Third Year Committee and vice-dean to receive a maximum of 32 elective, basic science credits to be applied to the third year M.D. curriculum. Students granted 16 transfer credits are given allowance for one tuition payment. Those granted 32 transfer credits are given allowance for two tuition payments. Advanced standing students who elect to register at Duke for the curricula for which they could have received transfer credit, forego the appropriate tuition waivers and are assessed tuition accordingly.

Transfer Students. Only in extraordinary circumstances are transfer students accepted into the Duke program. However, in these instances, such a student must have completed successfully two years of course work in the basic sciences to be eligible to apply. Upon entrance to the Duke M.D. program, transfer students receive credit for the first and third year curricula, and the corresponding four tuition payments are waived.

Dual Degree Students. Because of differing curricula and structures of the master's programs, tuition payment requirements vary according to the program in which a student participates. Please see the previous descriptions of dual degree programs in this Bulletin for tuition guidelines specific to each program.

Payment of Accounts. Statements for tuition, fees, and other charges are mailed by the bursar's office on a regular basis. These statements are also available on-line on the ACES website. Payment is due in full by the due date listed on the statement. As a part of the agreement of admission to Duke University, a student is required to pay all statements as presented. If full payment is not received by the statement due date, a late payment charge as described below is assessed on the next statement, and certain restrictions as stated below will be applied. Failure to receive a statement does not warrant exemption from the payment of tuition and fees nor from the penalties and restrictions. Non-registered students will be required to make payment at the time of registration for tuition and fees and any past due balance on the account.

Late Registration Fee. Failure to register during the prescribed registration periods offered by the School of Medicine will result in a \$100 fee. Any student who begins registration during the Drop/Add period of registration will be assessed this fee.

Monthly Payment Option. The Monthly Payment Option Plan allows students and their parents to pay all or part of the academic year's expenses in ten equal monthly payments from July 1 to April 1. The only cost is an annual, nonrefundable fee of \$95. Visa or MasterCard can pay the participation fee. Payments may be made by check or by bank draft. Questions regarding this plan should be directed to Tuition Management Services, 1-800-722-4867. At renewal, the plan can be extended to 12 months. The monthly payments can be increased or decreased without additional cost.

Late Payment Charge. If the "Total Amount Due" on a statement is not received by the statement due date, the next statement will show a penalty charge.

Restrictions. An individual is in default if the total amount due is not paid in full by the due date. A student in default is not allowed to register for classes, receive a transcript of academic records, have academic credits certified, be granted a leave of absence, or receive a diploma at graduation. In addition, an individual in default may be subject to withdrawal from school and have the account referred to a collection agency or credit bureau.

No credit is given for any term in which the tuition has not been paid, whether the work has been at Duke or elsewhere. It is not advisable for students to attempt outside work to defray their expenses during the academic year. Spouses of medical students desiring employment may secure information from the Office of Duke University Human Resources.

Refunds of Tuition and Fees. Tuition and fees refunds are governed by the following policy:

1. In the event of death a full refund of tuition and fees is granted.
2. Students who withdraw from the Medical School or are approved to take an official leave of absence before the end of the first week of classes (as determined by the calendar corresponding to the student's curriculum) receive a full refund of tuition.
3. Students who withdraw or take leaves of absence after the first week of classes of their particular curricula receive no refund of tuition. However, if a student returns to the School of Medicine, that tuition payment is included in the total number required by the school.

Because Duke University participates in Title IV federal aid programs, it follows federal guidelines with respect to the refund and repayment of Title IV funds. Students will have their Title IV financial aid adjusted according to the federal regulations. Additional information regarding this procedure may be obtained from the Office of Financial Aid.

Continuation of Research Study Option Fee. The School of Medicine encourages students to interrupt their studies to pursue approved research that is complementary to the medical curriculum either at Duke or elsewhere for no credit. Full-time student status can be retained for a maximum period of two years during these periods of study if approval is obtained from the appropriate officials and the student registers for and pays an enrollment fee of \$35 for each semester or part of a semester away. No refund of any portion of the fee is allowed for students who subsequently withdraw from the School of Medicine.

Students enrolled in another institution for the purpose of obtaining a dual degree do not qualify for CRS status, but must take a leave of absence until they return to the Duke School of Medicine. (MPH students, please refer to the previous MPH section in this bulletin.)

Although considered to be full-time by the Duke School of Medicine, financial aid recipients should be aware that all lenders for loan deferment purposes may not recognize such status.

Only students eligible to be enrolled at Duke during the applicable time period may participate in this option.

Transcripts. Requests for transcripts of academic records should be directed to the Office of the Medical Center Registrar, Box 3878, DUMC, Durham, NC 27710. Signed requests may be faxed to the registrar's office at (919) 684-2593. After graduation from the School of Medicine, transcripts of Medical Student Performance Evaluations (formerly known as dean's letters) may also be obtained from the Office of the Registrar. There is no charge for either service.

MERIT AWARDS FOR MEDICAL STUDENTS

Senior Scholarships are offered to third year students for use during their fourth year of study. Selection by a special committee is based on outstanding academic achievement and extracurricular activities during the first two and one-half years of medical school. These scholarships, to be paid toward tuition, are in the range of \$5,000 each for ten awards.

Financial need is not a criterion for selection; however, applicants who feel their financial need is greater than the merit award may apply for financial aid. Students who

already have Duke-sponsored, full tuition scholarships are not eligible for funds from this scholarship.

The School of Medicine offers awards based on academic excellence to students from the following scholarship funds. These funds support the Senior Scholarship Program:

William G. Anlyan, M.D. Scholarship, established 1988, by gifts from faculty, staff and friends.

Barham Endowed Merit Fund, established November, 1984, by gift from Mr. and Mrs. Joseph Barham, Oak Ridge, Louisiana.

Family Dollar Scholarship, established November, 1984, by gift from Mr. Leon Levine, Chairman of the Board, Family Dollar Stores, Inc., Charlotte, North Carolina; for minority students.

Dr. William Redin Kirk Memorial Trust for North Carolinians, established March, 1984, by bequest of Mr. Frederick H. Pierce, Owensboro, Kentucky.

Mary W. and Foster G. McGaw Scholarship, established February, 1986, by bequest from Foster G. McGaw.

School of Medicine Merit Fund, established 1984, by gifts from medical alumni, students, and American Medical Association-Education and Research Foundation.

The Dean's Tuition Scholarships. Seven Dean's Tuition Scholarships in the amount of current tuition are given to academically excellent first year under-represented minority students each year. Preference is given to residents of North Carolina; students must be U.S. citizens. Selection is made by the dean based on recommendations from the Medical School Admissions Committee. Annual renewal is contingent upon satisfactory academic progress.

The Nanaline H. Duke Scholarships. Nanaline H. Duke Scholarships valued at the current amount of tuition are awarded to academically excellent first year students. Selection is made by the dean based on recommendations from the Medical School Admissions Committee. Students must be U.S. citizens. Annual renewal is contingent upon satisfactory academic progress.

MEDICAL STUDENT RESEARCH SCHOLARSHIPS

Several groups now sponsor medical student research scholarships. In most of the scholarship programs, students selected for scholarships are eligible to receive 32 basic science credits for the experience.

Some have delegated the responsibility to the Medical School to select participants in the program; others have their own independent selection processes. For most programs, a full 12 months is required for the research experience. These scholarships are coordinated through the Scholarship Committee.

INTERNAL DUKE SCHOLARSHIPS

The Donald B. Hackel Fellowship

The Donald B. Hackel Fellowship in Cardiovascular Pathology provides for biomedical research under the direction of a full-time faculty member whose primary appointment is in the Department of Pathology. This 12-month fellowship offers an annual stipend of \$10,000. Applications using the designated format should be submitted to Dr. Salvatore V. Pizzo, M.D., Ph.D., Professor and Chairman of Pathology, Box 3712, DUMC, Durham, N.C. 27710 by March 1st.

Eugene A. Stead Student Research Scholarships

The Duke Department of Medicine sponsors the Eugene A. Stead Scholarship in honor of Eugene A. Stead, Jr., M.D., chairman of the Department of Medicine from 1947 to 1967. Three to four students are selected each year as Stead Scholars. Two of the Stead Scholarships are supported by endowments from individual patients of Dr. James Clapp: Jay D. and

Lorraine Nicewonder and the Loo Cheng Ghee family. The third scholarship is supported by an endowment comprising persons at Duke and elsewhere, who were trained by Dr. Stead in internal medicine. The Robert T. and Virginia McDaniel-Stead Scholarship is an endowed scholarship intended to support basic cardiovascular research.



Enhanced Research Training Program for Medical Students (MS3 Summer Research Fellowships)

This training grant is awarded to DUMC by the National Institute of General Medical Sciences. Its purpose is to provide three-month stipends to students who are interested in continuing their third year research during the summer months. Flexible start times during May are encouraged to allow for adequate preparation time for the Step 1 exam. The stipend is set each year by the NIH. For the application procedure, eligible students will be identified and contacted by the program director in November of the third year. Regarding eligibility, fellowships are intended for those who are not receiving other financial support for their research. In addition, the award cannot be used to support course work; students enrolled in the M.P.H. program or working toward a graduate degree are not eligible to apply for this fellowship. The fellowship research is to be conducted at a Duke University laboratory under the supervision of the applicant's current MS3 mentor. For further information, please contact James D. Reynolds, Ph.D., Assistant Professor, Department of Anesthesiology, Program Director, Enhanced Research Training Program for Medical Students, Box 3094, DUMC, (919)681-6774, reyno010@mc.duke.edu.

Medical Research Scholarships in General, Cardiac and Thoracic Surgery

The Divisions of General, Cardiac and Thoracic Surgery, Department of Surgery, are offering research scholarships in surgery for MS3 students at Duke University Medical Center. Two research scholars will be expected to complete a 12-month research project in one of the Surgical Research Laboratories. Students completing the research scholarship will be expected to publish their findings in peer-reviewed journals and to present their research at national and international scientific meetings. Available areas of research include surgical oncology, trauma and critical care, hemostasis and coagulation, sepsis, minimally invasive surgery, cardiac physiology, outcomes analysis, clinical research and physiology and pathophysiology of surgical disease. Detailed information on the different Surgical Research Laboratories and research areas can be found on the Department of Surgery website at <http://surgery.mc.duke.edu/training/general>.

Medical Research Scholarships in Orthopaedic Surgery

The Division of Orthopaedic Surgery, Department of Surgery is offering Research Scholarships in Orthopaedic Surgery for MS3 students at Duke University Medical Center. Research scholars are expected to complete a 12-month research project in one of the Orthopaedic Research Laboratories. Students completing the research scholarship will be expected to publish their findings in peer-reviewed journals and to present their research at national and international scientific meetings. The areas of research in the Orthopaedic Research Laboratories include peripheral nerve repair, microsurgery in limb salvage, cartilage and bone tissue engineering, joint and tissue biomechanics, cell physiology, spine and intervertebral disc mechanics, gait and kinematic analysis in sports medicine, outcomes studies, and avascular necrosis of the human skeleton. Detailed information on the different Orthopaedic Research Laboratories and research areas can be found on the Orthopaedic Surgery website at: <http://ortho.mc.duke.edu/msiii.html>.

EXTERNAL SCHOLARSHIPS

Doris Duke Clinical Research Fellowship Program

In 2000, the Doris Duke Charitable Foundation provided grants to seven medical schools to create Doris Duke Clinical Research Fellowship (CRF) Programs at their institutions. Each participating medical school established a CRF Program that awards a minimum of five fellowships each a year to medical students from any U.S. medical school. In Novem-

ber, 2001, three additional schools were added to the schools offering Doris Duke Clinical Research Fellowships. Each participating medical school's Doris Duke CRF Program (a) provides medical students with an outstanding one-year fellowship experience in clinical research that includes both didactic and research components; (b) solicits applications from students at any U.S. medical school; and (c) matches students to outstanding clinical research mentors. For more information and a list of participating schools, please visit the website at <http://ddcf.aibs.org>.

The Howard Hughes Medical Institute/National Institute of Health Program (Cloister)

The Howard Hughes Medical Institute offers several programs to enable selected medical students with an interest in fundamental research to spend a year of intensive work in a research laboratory. Its goal is to strengthen and expand the nation's pool of medically trained researchers. The Research Scholars Program allows an intensive year of research at any academic or non-profit research institution in the United States. Under special circumstances, HHMI also offers continued fellowship support for research/studies. Salary/stipends vary with each program offered by the HHMI. Detailed information is available from the Medical School scholarship coordinator.

Hughes Medical Research Training Fellowships

This program selects 60 students from around the United States. Hughes fellows may work in any laboratory of their choice including those within their own medical school. Application can be made to only one of the two Hughes programs. The application, which includes a research plan and a letter from the mentor, must be submitted by January. No interview is required. A small number of students from this program will also be selected for additional funding during fourth year. There is an annual meeting at the NIH where the Hughes fellows present their work. For additional information and an application, please contact the website: <http://www.hhmi.org/fellowships>.

Intramural Research Program at the National Institute of Environmental Health Sciences

The NIEHS, a division of the National Institutes of Health (NIH), offers medical students the opportunity to pursue research activities focused on environmental-related diseases and dysfunctions in areas such as carcinogenesis, reproduction and development, pulmonary and neurological disorders, and epidemiology on the NIEHS campus at Research Triangle Park. Some of these experiences provide a stipend that is similar to that awarded through the Cloister Program (another program of the NIH). Interested students can obtain additional information by contacting Dr. Steven Akiyama: akiyama@niehs.nih.gov (919) 541-3467, or <http://dir.niehs.nih.gov/dirover/home.htm>.

NIH Clinical Research Training Program

The NIH offers fellowships for training at NIH in clinically related areas in Bethesda, Maryland. Selection of preceptors is made after the award is given. For additional information and an application, please contact the website: <http://www.training.nih.gov/student/index.asp>.

Students applying for the CRTP can also request that their application be forwarded for consideration for the Interim or Year-Off IRTA Fellowship Program if they do not receive the CRTP. Although the title implies a year off is needed, this is not the case for Duke students since this scholarship is approved for the third year.

Sarnoff Society Endowment for Cardiovascular Science

The Stanley J. Sarnoff Society of Fellows for research in Cardiovascular Sciences is a national program that supports research in cardiovascular research. Ten students are chosen

for this 12-month program which is generally conducted away from but can be taken at the student's parent medical school. Duke has typically had one position in this program. There is an annual meeting held in Bethesda, Maryland, at which the fellows (many engaged in research during that year, others who have completed their research year and the newly selected students) have an opportunity to talk about their work and learn about possible research opportunities. For additional information and an application, please contact the website: <http://www.SarnoffEndowment.org>.

North Carolina Board of Governors Medical Scholarships. (BGMS). These are awarded annually to 20 first-year medical school candidates who have been accepted for admission at one of the four medical schools in North Carolina. BGMS recipients are selected from among candidates who are financially disadvantaged state residents and who have expressed an interest in practicing medicine in the State of North Carolina. The awards provide a yearly stipend of \$5,000 plus tuition and all mandatory fees. The BGMS may be renewed for three years if the recipient continues to demonstrate financial need and maintains satisfactory academic progress.

Additional opportunities and information are available by contacting the third year scholarship coordinator, Tami Tuck, at tuck0012@mc.duke.edu or 919-684-5901.

FINANCIAL AID

The Duke University School of Medicine makes financial assistance available to accepted students who due to economic circumstances could not otherwise attend the university. The school recognizes, however, the responsibility of the individual and the family to provide funds to achieve the objective of a medical education. Thus, the school does not consider parents to have discharged the full financial obligation for the continuing education of their sons or daughters upon the latter's completion of the undergraduate degree. Additional information is available at the financial aid website: <http://finaid.mc.duke.edu>.

Financial assistance is available in a combined form of grants and loans, and all awards are made on the basis of demonstrated need to eligible U.S. citizens.

Duke University School of Medicine reserves the right to decline loan applications for those applicants who do not have a satisfactory credit history. U.S. citizenship or permanent residence visa is required of all students receiving loans through the school.

It is the responsibility of recipients of financial aid to keep the Medical Center Office of Financial Aid informed of any outside financial assistance they may receive. It must be understood that the school reserves the right to reconsider its offer of financial assistance in the event of a major outside award to a recipient. No financial aid funds may be used during a period when the recipient is not involved with work toward the degree. Less than half-time or special students are not eligible for financial aid.

Financial Assistance to Incoming First-Year Students. Students should start the financial aid application process as soon as possible after January 1. Students are given information about this process at the time of their interview, and all students, regardless of their interest in financial aid, are sent information at the time of their acceptance. The economic circumstance of the applicant has no bearing on whether the applicant is accepted into the medical school.

The applicant requesting financial aid is expected to work during the summer preceding entrance into medical school and to save part of those earnings to defray a portion of the first-year expenses.

The applicant's need is determined before an award is made. The Office of Financial Aid therefore requires the *Need Access* and the *Free Application for Federal Student Aid (FAFSA)*. Copies of federal income tax returns with supplemental schedules are also

required as part of the financial aid application. An official aid award notice is sent to the accepted applicant within a few days after receipt of the required forms.

Financial Assistance to Upperclassmen. Annual reapplication is required of all need-based aid recipients.

Federal Scholarships. Armed Forces (Army, Navy, and Air Force) Scholarship programs may be available for accepted or enrolled students. The recipient receives full tuition, fees, and a monthly stipend in return for a commitment of service as a physician for each year of funding. The special application is made directly to the program in which the student is interested.

Primary Care Loan (PCL). Recipients must agree to enter and complete a residency training program in primary health care not later than four years after the date on which the student graduates from the school, and must practice in such care through the date on which the loan is repaid in full.

If the borrower fails to complete a primary health care residency and to practice in a primary health care field, the loan balance is recomputed from the date of issuance at an interest rate of 12 percent per year, compounded annually, instead of five percent.

Loans

University loans are available under the specific restrictions of the loan funds and are awarded on the basis of financial need. Awards are made as part of the regular financial aid cycle. The School of Medicine does have one emergency loan fund; the Francis and Elizabeth Swett Loan Fund is available in small amounts to any medical student on a no-interest basis for a short period of time.

There are a few loans available from external sources.

The North Carolina Student Loan Program for Health, Science, and Mathematics. These loans provide financial assistance to North Carolina residents who demonstrate need as determined by the North Carolina State Education Assistance Authority. Loans are available for study in the medical fields, mathematics, and science programs that lead to a degree. The applicant must be a domiciliary of North Carolina and accepted as a full-time student in an accredited associate, baccalaureate, master's, or doctoral program leading to a degree. Loan recipients in some professional or allied health programs may cancel their loans through approved service in shortage areas, public institutions, or private practice. Medical students may receive up to \$8,500 per year for each of the four years; master's degree students are eligible for two loans of up to \$6,500 each; bachelor's degree students are eligible for three loans of up to \$5,000 each. For application forms and more information, write: Executive Secretary, North Carolina Student Loan Program for Health, Science, and Mathematics, P.O. Box 14223, Research Triangle Park, North Carolina 27709-4223, or telephone (919) 549-8614.

Federal Stafford Student Loans. The Federal Stafford Student Loan is available to eligible students. For purposes of Federal Stafford Loans and other Title IV funds, graduate and professional students are financially independent of parents. The annual maximums for medical students are \$8,500 subsidized and \$30,000 unsubsidized. The interest is paid by the federal government on the subsidized Federal Stafford Loan until repayment begins six months after graduation. On the unsubsidized Federal Stafford Loan, the borrower is responsible for the interest that may be paid or deferred during the enrollment period. Eligibility for the subsidized and unsubsidized Federal Stafford Loan is determined by the financial aid office based on the Student Aid Report as a result of filing the FAFSA.

Additional information may be obtained by contacting the Office of Financial Aid, Box 3067, DUMC, Durham, North Carolina 27710, (919) 684-6649 or email: financial_aid@duke.edu.

Awards and Prizes

Allen Travel Award. Dr. Susan Allen (Duke alumna) has provided funds to assist a third or fourth year student in traveling to Africa for research/study of health care. Selection of an appropriate student is made by the dean; the amount of the award may be up to \$1,500.

Davison Scholarship. The Davison Scholarship award, consisting of \$2,000, is supported by the Davison Club in the memory of Dean Davison to enable a medical student to participate in a clinical science elective outside the United States in an area of primary care. Any student eligible to study away may apply for the award. For consideration for the scholarship, the elective must be approved by the Study Away Committee.

Thomas Jefferson Award. This award, consisting of \$100, a certificate, and a book recognizes a graduating senior student who has made outstanding contributions to the university or to fields which have not been traditionally confined to science and medicine. The award is given by the Awards Committee to a graduating senior.

The Joseph Eldridge Markee Memorial Award in Anatomy. This award, donated by the friends and family of the late Dr. J.E. Markee, James B. Duke Professor of Anatomy and chairman of the Department of Anatomy from 1943 to 1966, consists of a certificate, medalion, and cash award of \$200. It is presented by the Department of Anatomy to the most outstanding student in anatomy during the first year in the Medical School.

C.V. Mosby Book Award. Three graduating senior students are selected by the Awards Committee for active participation in service to the students, community, and medical school. The award is a Mosby book of the student's selection.

E. Eugene Owen, M.D. Clinical Awards. Four graduating seniors are selected for a cash award based on excellence in the clinical sciences in the second and fourth years. The Owen Award honors Dr. E. Eugene Owen, a distinguished diagnostician of the Watson Clinic in Lakeland, Florida. The Watson Clinic Foundation makes these annual awards.

Trent Prize. An annual award of \$100 is given to a Duke medical student for the best essay on any topic in the history of medicine and allied sciences. Mary Trent Semans established this award in memory of the late Josiah C. Trent to encourage students to undertake independent work in the history of medicine and to utilize the resources of the Trent Collection.

Upjohn Award. The award consists of \$200 cash and a certificate and is presented to a Duke graduating senior for excellence in community health science projects and service to the community.

Sandoz Award. This award is given to a senior student who has done distinguished work in basic science research or clinical research. Students are nominated for this award by departmental chairmen with whom their work has been done. The work must have been presented at the AOA symposium and voted upon by the Awards Committee. It consists of a plaque and a check for \$100 and is limited to one student.

Ciba Award. This award is given to a third year student who has contributed to the health care of the community. Students are nominated by the student body and voted upon by them. The award consists of the complete set of medical illustrations and text by Frank Netter.

Other Awards. Throughout the year, Duke Medical School receives notification of awards consisting of books, money, and/or plaques or medals to be awarded to students in a variety of fields at all medical schools on a national competitive basis selected by committees of the sponsoring organizations. These awards are screened by the dean's office and publicized appropriately.

Student and Professional Organizations

Alpha Omega Alpha Medical Honor Society. Alpha Omega Alpha, founded in 1902, is the national medical honor society. The society works to promote scholarship and research in medical schools as well as high standards of character and comportment toward patients among students and physicians. The Duke chapter of AOA was founded in 1931 and has since played an important role in the medical center. For the past 30 years, AOA has sponsored an original studies symposium where third year medical students present their research findings. The symposium consistently attracts speakers of national prominence to deliver the keynote address. Election into the honor society is restricted to one-sixth of the graduating class. Members are elected in both the third and fourth years of medical school. The primary criterion for election in the third year is superior academic performance as demonstrated by excellent grades in the first two years of medical school. Election in the fourth year is still primarily based on outstanding academic achievement in courses; but additional factors such as comportment towards patients and colleagues, community service, significant research activities, and other similar accomplishments are accorded greater weight. AOA membership is also conferred upon physicians, including alumni and faculty members who have distinguished themselves in research, teaching, and practice.

Duke University Chapter Councillor: Edward C. Halperin, M.D.

President: Julie Baker-LePain

Davison Society. All medical students are dues-paying members of the Davison Society, named for the first dean of Duke University School of Medicine. The society is governed by the Davison Council which consists of elected officers (president, service vice-president, social vice-president, secretary, and treasurer) and elected representatives from each class. Primary responsibilities of the council include: chartering of medical student groups, budgeting funds for student groups and medical school activities, organization of medical school service activities and social events, appointment of medical students to Medical Center and University committees, coordinating the selection of faculty and resident awards for excellence in teaching, and representing student views to pertinent faculty and administration. The Davison Council also coordinates medical student projects with community service groups such as Habitat for Humanity, Share Your Christmas, Durham Public Schools, Durham Community Kitchen, Adopt-A-Grandparent, Women's Health Focus Group, and Health Education in Durham Public Schools (HEY Durham).

Medical student groups affiliated with, and in the past funded by, the Davison Society include: the Association of American Medical Colleges (Organization of Student Representatives), the American Medical Association (Medical Student Section), the American Medical Women's Association, the American Medical Student Association, the North Carolina Student Rural Health Coalition, the North Carolina Medical Society Student Chapter, the Student National Medical Association, the Christian Medical and Dental Society, the Gay-Straight Alliance, the Asian-American Medical Student Association, the Duke Jewish Medical Student Association, Student Curriculum Committee, Duke Comprehensive Cancer Center Volunteer Network, AIDS Education Roadshow, Lenox Baker Children's Hospital Program, Duke Medical Gleaning Program, Homeless Shelter Clinic, Children's Miracle Network Fair, the *Aesculapian* (yearbook), HuMed, Family Medicine Interest Group, the Mind-Body Interest Group, Geriatrics Interest Group, OB-GYN Interest Group, Emergency Medicine Interest Group, International Health Interest Group, Pediatrics Interest Group, Palliative Care Interest Group, Orthopedics Interest Group, Cardiology Interest Group, Neurology Interest Group, the N.C. Wilderness Club, and the Medical Ethics and Humanities Lecture Series.

Meetings of the council occur every two weeks during the academic year. Minutes of

council meetings and information pertinent to the student body are posted on the medical students' Internet site, <http://www.duke.edu/web/medstudent>. The members of the council are elected in the spring of each year except for the first year class representatives who are elected during the first fall after matriculation. An annual formal dance, the Davison Ball, is held in the fall.

President: Julius Wilder
Social Vice-President: Susan Kansagra
Service Vice-President: Aruni Jayatilleke
Secretary: Asha Payne
Treasurer: Chuck Scales

The Engel Society. The Engel Society, established in 1966 as a memorial to Professor Frank L. Engel, is designed to promote intellectual and social interaction between students and faculty. Membership is limited to six junior students and six senior students who have demonstrated an inquisitive nature, humanitarian interests, and high scholastic ability. Four faculty members are selected annually by members of the society for three-year terms. Four to six programs are held each year, and all students may be invited to participate in lecture programs sponsored by the Society.

Engel Society Moderator: Delbert L. Wigfall, M.D., Box 3959, Duke University Medical Center, Durham, North Carolina 27710.

Duke Medical Alumni Association. The Duke Medical Alumni Association seeks to support and promote the interests of Duke University Medical Center and its extended community and to nurture life-long relationships and learning. The Duke Medical Alumni Association contributes a framework through which the Medical Center family continues to thrive, alumni concerns are addressed, and alumni participation in the life and vitality of Duke University Medical Center is encouraged. Our membership reaches back to 1932 and embraces those just now beginning their first year in medical school. Today, the Duke Medical Alumni Association includes more than 11,000 Duke School of Medicine graduates and former house staff members who live and work in every state across the nation and in 46 countries around the globe; encompasses future physician alumni, with a roster of some 400 current students and some 800 house staff officers; and seeks the involvement of nearly 1,000 faculty members at Duke University Medical Center. Each year the Duke Medical Alumni Association sponsors events and activities including the Duke Medical Alumni Association Fitness Center; Medical Families Weekend; the Davison Ball; programs during Medical Alumni Weekend, student orientation activities, including the annual Freshman Orientation Picnic as well as a copy of *Davison of Duke*, the memoirs of the Medical School's first dean; graduation gifts and distribution of the publications, *DukeMed Magazine* and *DukeMed Alumni News*.

President: Calvin R. Peters, M.D., H.S. 1972-75, F.A.C. 1975-78, Orlando, Florida
President-Elect: Lawrence J. D'Angelo, M.D. 1973, M.P.H., 1972, Bethesda, Maryland
Ellen R. Luken, Executive Director, Medical Alumni Affairs

Courses of Instruction



Courses of Instruction

ANESTHESIOLOGY

Professor Mark F. Newman, M.D. (Louisville, 1985), Chairman.

Professors: Peter B. Bennett, Ph.D., D.Sc. (Southampton, 1984); D. Ryan Cook, M.D. (Pittsburgh, 1966); Francis J. Keefe, Ph.D. (Ohio State, 1975); Frank H. Kern, M.D. (Pennsylvania, 1987); Jonathan B. Mark, M.D. (Stanford, 1978); Richard E. Moon, M.D., C.M. (McGill, 1973); Debra A. Schwinn, M.D. (Stanford, 1983); David S. Warner, M.D. (Wisconsin, 1980).

Clinical Professors: Fiona Clements, M.D. (Duke, 1975); Norbertus P. de Bruijn, M.D. (Groningen, 1976); Sugantha Ganapathy, M.B.B.S.; (Jawaharlal Inst., 1971).

Adjunct Professor: Kwen Jen Chang, Ph.D. (New York-Buffalo, 1972).

Associate Professors: Cecil O. Borel, M.D. (Hahnemann, 1977); T.J. Gan, M.B., B.S., D.A., F.C.Anes. (London Hospital Med. Coll., 1986); Brian Ginsberg, M.B., Ch.B. (Witwatersrand, 1975); Hilary Grocott, M.D. (Saskatchewan, 1991); Madan M. Kwatra, Ph.D. (Montreal, 1977); Catherine K. Lineberger, M.D. (North Carolina, 1987); Joseph P. Mathew, M.D. (Southwestern, 1986); Rebecca A. Schroeder, M.D. (Virginia, 1989); Scott R. Schulman, M.D. (George Washington, 1982); Sidney A. Simon, Ph.D. (Northwestern, 1973); Mark Stafford Smith, M.D., C.M. (McGill, 1983);

Associate Clinical Professors: Guy de Lisle Dear, M.B., F.R.C.A. (St. George's Hospital, 1979); John B. Eck, M.D. (Duke, 1992); Joel S. Goldberg, M.D. (Duke, 1977); Katherine P. Grichnik, M.D. (Tufts, 1987); Steven Hill, M.D. (Vanderbilt, 1986); Peter C. Huttemeier, M.D., Ph.D. (Copenhagen, 1977, 1989); John C. Keifer, M.D. (North Carolina, 1979); Kerri M. Robertson, M.D., F.R.C.P.(C) (British Columbia, 1980); Allison K. Ross, M.D. (Marshall, 1988); Dianne L. Scott, M.D. (North Carolina, 1978); Susan Steele, M.D. (Illinois, 1983); Christopher C. Young, M.D. (New York Med. Coll., 1987).

Associate Consulting Professor of Anesthesiology: Francine D'Ercole, M.D. (Med. Coll. of Pennsylvania, 1989).

Adjunct Associate Professors: Helene Drewsen Benveniste, M.D., Ph.D. (Copenhagen, 1986, 1991); Randall L. Carpenter, M.D. (Michigan, 1978); Roy A. Greengrass, M.D., F.R.C.P.(C) (Manitoba, 1973).

Assistant Professors: John V. Booth (Glasgow, 1989); Terrance W. Breen, M.D. (British Columbia, 1985); Randall P. Brewer, M.D. (Louisiana State, 1993); Lisa Faberowski, M.D. (Ohio State, 1990); Stuart Grant, M.B.B.Ch. (Glasgow, 1989); Ashraf Habib, M.B.B.Ch. (Ain Shams, 1987); M.Stephen M. Klein, M.D. (New Jersey Med. Sch. 1992); Daniel T. Laskowitz, M.D. (Duke, 1991); Holly A. Muir, M.D., F.R.C.P.(C) (Dalhousie, 1983); Laura Niklason, M.D. (Chicago, 1988), Ph.D. (Michigan, 1991); Moeen Panni, M.B.B.Ch. (Cambridge, 1995); Claude Piantadosi, M.D. (Johns Hopkins, 1975); James D. Reynolds, Ph.D. (Queen's, 1994); Mark W. Sebastian, M.D. (Rush Med. Coll., 1987); Jacques Somma, M.D. (Montreal, 1991); Gautam Sreeram, M.D. (Emory, 1993); Jeffrey M. Taekman, M.D. (Wake Forest, 1991); Marcy Tucker, M.D. (Chicago, 1997); Steven N. Vaslef, M.D. (Virginia, 1984), Ph.D. (Northwestern, 1990); Ian J. Welsby, M.B.B.S., BSc., F.R.C.A. (Middlesex Hosp. Med. Sch., 1990).

Assistant Clinical Professors: Dara S. Breslin, M.B., B.Ch. (Dublin, 1993); Peter DeBalli, M.D. (Pittsburgh, 1996); Peter D. Dwane, M.D., C.M. (McGill, 1967); Jennifer T. Fortney, M.D. (Maryland, 1978); John J. Freiburger, M.D. (Southwestern, 1979); Veeraindar Goli, M.D. (Osmania Med. Coll., 1978); H. David Hardman, M.D. (Minnesota, 1981); Lewis R. Hodgins, M.D. (New York-Downstate, 1985); Kathryn P. King, M.D. (North Carolina, 1988); Nancy W. Knudsen, M.D. (Missouri, 1991); Marcella Lanzinger, M.D. (Univ. of Munich, 1995); Frederick W. Lombard, M.B., B.Ch. (Stellenbosch, 1992); David B. MacLeod, M.B., B.S., F.R.C.A. (London, 1987); Judith Margolis, M.D. (Colorado, 1984); Gavin Martin, M.B., Ch.B., F.R.C.A. (Univ. of Cape Town with Association Groote Schuur Hospital, 1989); Andrew F. Meyer, M.D. (New York-Downstate, 1969); Eugene W. Moretti, M.D. (Temple, 1993); Karen C. Nielsen, M.D. (Federal Do Parana, 1995); Ronald P. Olson, M.D. (Calgary, 1986); Adeyemi J. Olufolabi, M.B., B.S., F.R.C.A. (Univ. of Ibaden, 1986); Stephen Parrillo, M.D. (Bologna, 1982); Ziaur Rahman, M.B., B.S. (Prince of Wales Med. Ctr., 1968); John R. Schultz, M.D. (Loma Linda, 1991); Allan B. Shang, M.D. (Vermont, 1993); Bryant W. Stolp, M.D. (North Carolina, 1988); Edward D. Thalmann, M.D. (Georgetown, 1970); Madhav Swaminathan, M.D. (Univ. Coll. of Med. Science and Gru Teg Bahadur Hosp., 1988); Dana N. Wiener, M.D. (Duke, 1989); David R. Wright, B.M., F.R.C.A. (Southampton, 1990).

Assistant Research Professors: Nadia M. Agopyan, Ph.D. (McGill, 1990); Barry W. Allen, Ph.D. (Duke, 1984); Lieju Liu, M.D., M.B., M.S. (Tongji Med., 1978, 1981); Gregory A. Michelotti, Ph.D. (South Carolina, 1992); Barbara Phillips-Bute, Ph.D. (Duke, 1988); Ricardo Pietroban, M.D. (Federal Univ. of Parana, 1995); Huazin Sheng, M.D. (Nantong Med. Coll., 1984); Hagir B. Suliman, D.V.M, M.V.Sc., Ph.D. (Sch. of Veterinary Med., Univ. of Khartoum, 1980); Richard Vann, Ph.D. (Duke, 1976).

Adjunct Assistant Professors: Wayne A. Gerth, Ph.D. (California-San Diego, 1979); Fritz F. Klein, Ph.D. (Duke, 1973); Mohammed Maroof, M.B., B.S. (Liaquat Med. Coll., 1964); Timothy H. Webb, M.D., Ph.D. (Texas-San Antonio, 1980).

Assistant Consulting Professors: John D. Buckwalter, M.D. (North Carolina, 1982); Frederick J. Carpenter, M.D. (Wisconsin, 1982); David Martin Hendricks, M.D. (Med. Univ. of South Carolina, 1988) Scott T. Howell, M.S., M.D. (Duke, 1986, 1990); James R. Jacobs, M.D. (Duke, 1985), Ph.D. (Alabama, 1987); Moyra E. Kileff, M.D. (Birmingham, 1973); Gerald A. Maccioli, M.D., F.C.C.M., (Nevada, 1984); Edward B. McKenzie, Jr., M.D. (North Carolina, 1985); William Patterson Norcross, M.D. (Pennsylvania Statey, 1998); C.P. Reddy Parvata, M.D. (Inst. of Med. Sciences, 1966); Gary L. Pellom, M.D. (North Carolina, 1984); Earl Stacy Ransom, M.D. (Bowman

Gray, 1986); Edward G. Sanders, M.D. (North Carolina, 1985); Paul V. Stankus, M.D. (North Carolina, 1976); Thomas E. Stanley, III, M.D. (Duke, 1981); Barbara E. Tardiff, M.D. (Yale, 1983); Cathy W. Thomas, M.D. (North Carolina, 1984); Rolf B. Wallin, M.D. (North Carolina, 1984).

Associates: Anne Marie Fras, M.D. (Michigan, 1993); Richard Ing, M.B., Ch.B., F.A.(S.A.) (Witwatersrand, 1988); Richard L. Jacobs, II, M.D. (Michigan, 1985); David R. Lindsay, M.D. (Maryland, 1994); Iain Sanderson, M.A., M.Sc., F.R.C.A. Anaes. (Oxford, 1985);

Clinical Associates: Jeffrey A. Clark, M.D. (Ohio State, 2003); William Corkey, M.D. (Duke, 1999); Daniel D. De Meyts, B.S.E., M.D. (North Carolina, 1999); Daphne Jones, M.D. (George Washington, 1999); John Daniel Mitchell, M.D. (Michigan, 1999); Trenton Pierce, M.D., (Loma Linda, 1999).

Visiting Associates: Shahar Bar-Yosef, M.D. (Tel Aviv, 1991); Charles S. Brudney, M.B., B.Ch. (Wales, 1990); Stephanie Fischer, M.B.B.C.H., FCA(SA), (Witwatersrand, 1993); Matthew Varghese Patteril, M.B.B.S., D.A., M.D., F.R.C.A., F.C.A.R.C.S.I (Royal Coll. of Anaesthetists, 1999); Tony Roche, M. B. Ch.B., (Stellenbosch, 1993).

Consulting Associates: David S. Bacon, M.D. (Duke, 1990); James L. Caruso, M.D. (Illinois, 1988); James M. Chimiak, M.D. (North Carolina, 1986).

Research Associates: Toshimasa Akazawa, M.D. (Okayama, 1993); Ivan T. Demchenko, Ph.D. (Inst. of Physiology, 1970), D.Sc. (Inst. of Evolutionary Physiology, 1979); Petar J. Denoble, M.D. (Zagreb, 1975); Hazem E. Elersy, M.B., B.Ch., (Menoufiya, 1992); Jason D. Kilts, Ph.D. (North Carolina, 1998); Beilei Lei, M.D. (Hunan Med., 1997), Ph.D. (Beijing Med., 2000); Daniel P. Morris, Ph.D. (North Carolina, 1995); Neal W. Pollock, Ph.D. (Florida State, 1996); Mark D. Richardson, Ph.D. (Univ. Texas Health Ctr., 1994); Jorge Valles, M.D. (Barcelona, 1982); Hong Yang, M.D. (Hebei Med. Coll., 1990); Noriko Yokoo, M.D. (Akita, 1995).

Associate in Research: Douglas Marshall Brinkley, B.A. (Duke, 2002), Kui-ran Jiao, M.D. (Peking Union Med. Coll.-Beijing-PRC, 1997); Sean James Lyman, A.B., Ph.D.; (Harvard, 1996) (Duke, 2002); Lucian Radulescu, M.D. (Carol Davila Univ., 1980).

Visiting Scholar of Anesthesiology: Diana Gutsaeva, Ph.D. (St. Petersburg State, 1998).

Emeriti: Edmond C. Bloch, M.B., Ch.B.; Elisabeth J. Fox, M.B., B.S.; Merel H. Harmel, M.D.; Lloyd F. Redick, M.D.; Kenneth Sugioka, M.D.; Bruno J. Urban, M.D.; Stanley W. Weitzner, M.D.

Clinical Science Electives

ANESTH-240C. CLINICAL ANESTHESIOLOGY. This course is designed to directly expose students to the clinical practice of anesthesiology. Throughout the rotation, each student is assigned on a weekly basis to an individual resident or attending physician who supervises the student's active participation in the pre-, intra-, and post-operative anesthetic care and management of patients. Opportunities exist for students to participate in the various subspecialty areas of anesthesiology including pediatric, obstetric, cardiac, and neurosurgical anesthesia as well as the recovery room, ICU, and pain clinic. While initial assignments are made prior to the first day of the rotation, there is flexibility with regard to students' particular areas of interest. The evaluation of patients pre-operatively is taught with emphasis placed upon formulating a plan of anesthetic management that is appropriate for the individual patient. The consequential impact of anesthetics and surgical procedures upon particular disease states is stressed also. Students review the clinical pharmacology of anesthetic and adjuvant drugs as well as apply the principles of pharmacology, physiology, and anatomy to the clinical anesthetic management of patients. Didactic information regarding principles of airway management including endotracheal intubation is presented and reinforced with application in the clinical setting. Participants are exposed to basic methods of administering anesthetics and monitoring the depth of anesthesia through physiologic responses of the patient. Instruction in the appropriate techniques and complications of obtaining vascular access for administering drugs and monitoring hemodynamic status is provided, although not all cases may be suitable for student involvement in technical procedures. In addition to this clinical work, students attend various lectures, including an introductory series (covering preoperative assessment, airway management, and anesthesia equipment), grand rounds and resident lecture series, and various subspecialty conferences (cardiac, pediatrics). No drops or adds are accepted during the week before the course begins. Students wishing to drop or add two weeks prior to the start of the course must contact the course director, Peter Dwane, M.D. (beeper #9433). The course is available for three students per section in fall 41, 42, and 43 and for six students in fall 44. In the spring, it is available for six students

each section in sections 41, 42, 43, and 44. It is recommended that only those students seriously interested in a career in anesthesia take the fall courses. Permission of course director required for student to be absent on the first day of the course. *Dwane and staff*

ANESTH-241C. SURGICAL INTENSIVE CARE. This course is designed to broaden the student's knowledge and experience in managing critically ill surgical patients. Under supervision, students function as subinterns in the Surgical Intensive Care Unit (SICU). Students are reassigned their own patients and actively participate in daily rounds as part of the SICU team. There is a daily lecture on aspects of critical care. Students take call one night in four and work on a one-on-one basis with SICU house staff in the supervised management of critically ill patients. Time may be spent in the SICU at Duke University Medical Center (trauma, vascular surgery, liver-kidney-pancreas transplantation, general surgery) and/or the SICU at the Durham VA Medical Center (cardiothoracic and vascular surgery, general surgery). There is emphasis on teaching of procedures and techniques necessary for the management of all critically ill patients including hemodynamic assessment and monitoring, cardiovascular resuscitation and use of vasoactive drugs, ventilator management including ARDS, prevention and management of nosocomial infections, and ethical decision-making in ICU. Students are formally evaluated by the SICU house staff and the attending physician. C-L: SURGERY 241C. Credit: 5. Enrollment: max 8. *Young and staff*

ANESTH-242C. ANESTHESIOLOGY RESEARCH. Selected students participate actively in assigned research projects. These well-focused segments of ongoing work in the Department of Anesthesiology are designed to provide an intensive exposure to the process of new investigation in applied pharmacology and physiology. Most students are based in the Anesthesiology Research Laboratories and are strongly oriented toward personal involvement in the clinical research settings in the Duke Medical Center operating rooms, obstetrical delivery areas, post-operative and intensive care units, the Hyperbaric Laboratories, the pain clinic, or the Human Pharmacology Laboratory. An important goal of this experience consists of guiding the student to take conceptual information and to change it into concrete scientific presentation and publication. This course is designed primarily for the student who wishes to consider seriously a career in academic anesthesiology. Credit: 4-8. Enrollment: max 2. *King and staff*

Elective

ANESTH-245B or C. PHYSIOLOGY AND MEDICINE OF EXTREME ENVIRONMENTS. Advanced topics in the physiology and medicine of ambient pressure, immersion, gravity, temperature, and gas composition. Environments considered include: diving and hyperbaric medicine; hot/cold terrestrial and water operations; microgravity and high-g acceleration; high altitude. Basic mechanisms and medical management of associated diseases are examined including: decompression sickness; altitude sickness; hypothermia and hyperthermia; hypoxia; carbon monoxide poisoning; oxygen toxicity. An optional laboratory includes topics in the design and operations of pressure vessels for human occupancy, life support equipment, and sham treatment of medical problems. Prerequisites: Human anatomy and physiology; and instructor permission. Credit: 3 without lab; 4 with lab. Enrollment: max 12. *Vann, Thalmann, Stolp*

BIOCHEMISTRY

George Barth Geller Professor Christian R.H. Raetz, M.D., Ph.D. (Harvard, 1973), Chairman.

Professors: Michael D. Been, Ph.D. (Washington, 1982); G. Vann Bennett, M.D., Ph.D. (Johns Hopkins, 1975); Patrick Casey, Ph.D. (Brandeis, 1986); Arno Greenleaf, Ph.D. (Harvard, 1974); Gordon Hammes, Ph.D. (Wisconsin, 1959); Michael Hershfield, M.D. (Pennsylvania, 1967); James B. Duke Professor Robert L. Hill, Ph.D. (Kansas, 1954); Tao Hsieh, Ph.D. (California-Berkeley, 1976); Kenneth Kreuzer, Ph.D. (Chicago, 1978); James B. Duke Professor Robert Lefkowitz, M.D. (Columbia, 1966); James B. Duke Professor Paul Modrich, Ph.D.

(Stanford, 1973); James B. Duke Professor K.V. Rajagopalan, Ph.D. (Madras, India, 1957); David Richardson, Ph.D. (Mass. Inst. of Tech, 1967); James B. Duke Professor Jane S. Richardson, M.S., M.S.T. (Harvard, 1966); Lewis M. Siegel, Ph.D. (Johns Hopkins, 1965); George Barth Geller Professor and Chair of Chemistry John Simon, Ph.D. (Harvard, 1983); Leonard Spicer, Ph.D. (Yale, 1968); Jonathan Stamler, M.D. (Mount Sinai, 1985); Deborah Steege, Ph.D. (Yale, 1974); Robert Webster, Ph.D. (Duke, 1965).

Associate Professors: Lorena Beese, Ph.D. (Brandeis, 1984); Ronald Greene, Ph.D. (California Inst. Tech, 1954); Homme Hellinga, Ph.D. (Cambridge, 1986); Terrence Oas, Ph.D. (Oregon, 1986); Eric Toone, Ph.D. (Toronto, 1988); John D. York, Ph.D. (Washington, 1993).

Assistant Professors: Daniel Gewirth, Ph.D. (Yale, 1988); Meta Kuehn, Ph.D. (Washington, 1993); Johannes Rudolph, Ph.D. (Mass. Inst. of Tech, 1993); Pei Zhou, Ph.D. (Harvard, 1998).

Assistant Research Professor: Jean L. Johnson, Ph.D. (Duke, 1974).

Adjunct Professor: Perry Blackshear, M.D. (Harvard, 1977) Ph.D. (Oxford, 1974).

Adjunct Assistant Professor: Per-Ottor Hagen, F.H.W.C. (Watt Univ. Scotland, 1961).

Research Assistants: William Arendall, Ph.D.; Ines Batinic-Haberle, Ph.D.; Keith Bljornson, Ph.D.; Leonard Blackwell, Ph.D.; Steven Breazeale, Ph.D.; Vickers Burdett, Ph.D.; Stacy Chamberlin, Ph.D.; Sihong Chen, Ph.D.; Shean-Tai Chiou, Ph.D.; Kent Christiansen, Ph.D.; David Conrad, Ph.D.; Nicoleta Constantino, Ph.D.; Robert De Lorimier, Ph.D.; William Doerrier, Ph.D.; Kathleen Dudas, Ph.D.; Leonid Dzantiev, Ph.D.; Jochen Genschel, Ph.D.; Ravi Iyer, Ph.D.; Stefan Liotchev, Ph.D.; Dan Liu, Ph.D.; Steve Long, Ph.D.; Ayako Matsumoto, Ph.D.; Donald Mika, Ph.D.; Jeffrey Myers, Ph.D.; Erin O'Reilly, Ph.D.; Anna Pluciennik, Ph.D.; Michael Prisant, Ph.D.; Nanette Que, Ph.D.; Mike Reynolds, Ph.D.; Anthony Ribeiro, Ph.D.; James Smith, Ph.D.; Claudia Spampinato, Ph.D.; Ivan Spasojevic, Ph.D.; Zeljko Svedruzic, Ph.D.; Hope Taylor, Ph.D.; Jeffrey Taylor, Ph.D.; Rafael Tasado-Acevedo, Ph.D.; Stephen Trent, Ph.D.; Ronald Venters, Ph.D.; Joshua Warren, Ph.D.; Jianhong Wu, Ph.D.; Margot Wuebbens, Ph.D.; Jae-Sung Yu, Ph.D.

Emeriti: James B. Duke Professor Irwin Fridovich, Ph.D.; Samson R. Gross, Ph.D.; Walter R. Guild, Ph.D.; Jerome S. Harris, M.D.; Kenneth S. McCarty, Sr., Ph.D.; Harvey Sage, Ph.D.; Robert W. Wheat, Ph.D.

Basic Science Electives

BIOCHEM-357B. RESEARCH IN BIOCHEMISTRY. In a limited number of cases, a student is permitted to participate in the research program of a faculty member. Acceptance is by individual arrangement with the proposed faculty preceptor. Credit: 1-16. *Staff*

BIOCHEM-358B. RESEARCH IN BIOCHEMISTRY. A student may obtain first hand research experience by participating in the research program of a faculty member. Acceptance is by individual arrangement with the proposed faculty preceptor. Credit: 1-16. *Staff*

BIOCHEM-417B. MEMBRANES, RECEPTORS, AND CELLULAR SIGNALING. Basic and current concepts of the biological membranes, membrane proteins and organization; mechanism of action of hormones at the cellular level including hormone-receptor interactions, secondary messenger systems for hormones, mechanism of regulation of hormone responsiveness, regulation of growth, differentiation and proliferation, cellular electrophysiological mechanisms of transport and ions channels, secretory and sensory stimulus sensing and transduction. Some lectures stress the clinical correlation of the basic concepts in the course. C-L: CELLBIO-417B; Graduate School. Credit: 3. *Caron, Casey, and invited lecturers*

Advanced courses in Biochemistry listed in the Graduate School Bulletin may be appropriate as electives for certain individuals.

BIOLOGICAL ANTHROPOLOGY AND ANATOMY

Professor Richard F. Kay, Ph.D. (Yale, 1973), Chairman.

Professors: Matthew Cartmill, Ph.D. (Chicago, 1970); Kenneth Glander, Ph.D. (Chicago, 1975); William L. Hylander, D.D.S. (Illinois, 1963), Ph.D. (Chicago, 1972); James B. Duke Professor Elwyn L. Simons, Ph.D. (Princeton, 1956), D. Phil. (Oxford, 1959); John Terborgh, Ph.D. (Harvard, 1963); Carel van Schaik, Ph.D. (Utrecht, 1985).

Associate Professor: V. Louise Roth, Ph.D. (Yale, 1982).

Assistant Professors: Susan C. Alberts, Ph.D. (Chicago, 1992); Frank H. Bassett III, M.D. (Louisville, 1957); Steven Churchill, Ph.D. (New Mexico, 1994); Christine M. Drea, Ph.D. (Emory, 1991); Daniel Schmitt, Ph.D. (SUNY-Stony Brook, 1995).

Associate Research Professor: Theresa R. Pope, Ph.D. (Florida, 1989).

Assistant Research Professors: Diane K. Brockman, Ph.D. (Yale, 1994); Leslie J. Digby, Ph.D. (California at Davis, 1994); Christine Wall, Ph.D. (SUNY-Stony Brook, 1995); Blythe A. Williams, Ph.D. (Colorado, 1994).

Adjunct Professor: Clark Larsen, Ph.D. (Michigan, 1980).

Adjunct Assistant Professor: Thomas Anderson, Ph.D. (Duke, 1971).
Research Associates: Friderun Ankel-Simons, Ph.D. (Copenhagen, 1963); Brigitte Holt, Ph.D. (Missouri-Columbia, 1999); Pierre Lemelin, Ph.D. (SUNY-Stony Brook, 1996); Richard Madden, Ph.D. (Duke, 1990); Christopher J. Vinyard, Ph.D. (Northwestern, 1999); Anne Weil, Ph.D. (California-Berkeley, 1999).
Instructor: Kirk Johnson, M.A. (Duke, 1981).
Lecturing Fellow: Prithijit Chatrath, B.S. (Punjab, 1964).

Required Course

BAA-200B. Gross Human Anatomy. First-year medical students are required to take gross anatomy. The course includes the complete dissection of a cadaver; laboratory work is supplemented by conferences which place emphasis upon biological and evolutionary aspects. Credit: 4. *Cartmill*

Basic Science Electives

BAA-214B. ANATOMY OF THE HEAD AND NECK. This course is designed to be a review of the head and neck, emphasizing its phylogenetic and ontogenetic development along with clinically important features of the anatomy of this region. Credit: 2. Enrollment: min 5, max 12. *Staff*

BAA-221B. ANATOMY OF THE TRUNK. Emphasis is on the anatomy of the thoracic, abdominal, and pelvic organs including relationships, blood supply, and innervations and, where practical, developmental and microscopic anatomy. The dissections are supplemented with audiovisual presentations and discussions with such prosections as are available. Credit: 2. Enrollment: min 8, max 20. *Staff*

BAA-224B. TUTORIAL IN GROSS ANATOMY. A detailed review of selected regions of the human body in the context of the "core" gross anatomy sequence. The student plans prosections, special presentations, etc., with staff. The student also elects to study one or more selected regions in consultation with staff. Credit: 1-5. Enrollment: min 1, max 5. *Staff*

BAA-231B. ANATOMY OF BACK AND EXTREMITIES. The course includes complete dissection of back and the extremities including pectoral and pelvic girdles. Visual aids are used extensively. Course planned for orthopaedics, general practice, or neurosurgery. Credit: 3. Enrollment: min 6, max 20. *Bassett and staff*

BIostatistics and Bioinformatics

Professor: William E. Wilkinson, Ph.D. (North Carolina, 1968), Interim Chair.
Professor: Stephen L. George, Ph.D. (Southern Methodist, 1969).
Research Professor: James Rochon, Ph.D. (North Carolina, 1985).
Associate Professors: Elizabeth R. DeLong, Ph.D. (North Carolina, 1979); James E. Herndon, II, Ph.D. (North Carolina, 1988); Kerry L. Lee, Ph.D. (North Carolina, 1974); Gregory P. Samsa, Ph.D. (North Carolina, 1988).
Associate Professor: Sin-Ho Jung, Ph.D. (Univ. of Wisconsin- Madison, 1992).
Associate Research Professors: Victor Hasselblad, Ph.D. (UCLA, 1967); Barry K. Moser, Ph.D. (Purdue, 1985).
Assistant Professors: Andrew S. Allen, Ph.D. (Emory, 2000); Susan Halabi, Ph.D. (Texas, 1994); Daohai Yu, Ph.D. (Michigan, 2000).
Assistant Research Professors: Kevin Anstrom, Ph.D. (North Carolina State, 2002); Laura P. Coombs, Ph.D. (Oklahoma State, 1999); David M. DeLong, Ph.D. (North Carolina, 1977); Alaattin Erkanli, Ph.D. (Carnegie Mellon, 1991); Steven C. Grambow, Ph.D. (Kentucky, 1998); Cynthia L. Green, Ph.D. (North Carolina State, 1999); Edwin S. Iversen, Ph.D. (Yale, 1995); Maragatha Kuchibhatla, Ph.D. (Texas A & M, 1992); Simon Lin, M.D., M.S., (Peking Univ., 1996); North Carolina, 1999); Lawrence H. Muhlbaier, Ph.D. (North Carolina, 1981); Donna Niedzwiecki, Ph.D. (Yale, 1984); Maren K. Olsen, Ph.D. (Pennsylvania State, 1999); Kourou Owzar, Ph.D. (North Carolina, 2002); Bercedis L. Peterson, Ph.D. (North Carolina, 1986); Carl F. Pieper, Dr.P.H. (Columbia, 1990); Jennifer S. Shoemaker, Ph.D. (North Carolina State, 1998); Sandra S. Stinnett, Dr.P.H. (North Carolina, 1993); Minje Sung, Ph.D. (George Washington, 2001).
Adjunct Professors: Marie Davidian, Ph.D. (North Carolina, 1987); Gary L. Rosner, Sc.D. (Harvard, 1985); Anastasios A. Tsiatis, Ph.D. (California-Berkeley, 1974).

Adjunct Associate Professor: Frank E. Harrell, Jr., Ph.D. (North Carolina, 1979);
Adjunct Assistant Professor: Lauren M. McIntyre, Ph.D. (North Carolina State, 1995).
Research Associate: Cynthia J. Coffman, Ph.D. (North Carolina State, 1997).

CELL BIOLOGY

Professor Brigid L.M. Hogan, Ph.D., F.R.S. (Cambridge, 1968), Chair.

Professors: James B. Duke Professor G. Vann Bennett, M.D., Ph.D. (Johns Hopkins, 1976); Celia Bonaventura, Ph.D. (Texas-Austin, 1968); Joseph Bonaventura, Ph.D. (Texas-Austin, 1968); James B. Duke Professor Marc G. Caron, Ph.D. (Miami, 1973); Sharyn Endow, Ph.D. (Yale, 1975); James B. Duke Professor Harold P. Erickson, Ph.D. (Johns Hopkins, 1969); Richard G. Fehon, Ph.D. (Washington, 1986); Pascal Goldschmidt, Ph.D. (Universite Libre de Bruxelles, 1980); Daniel P. Kiehart, Ph.D. (Pennsylvania, 1979); Margaret Kirby, Ph.D. (Arkansas, 1972); Thomas J. McIntosh, Ph.D. (Carnegie Mellon, 1973); R. Bruce Nicklas, Ph.D. (Columbia, 1958); Michael K. Reedy, M.D. (Washington, 1962); James Siedow, Ph.D. (Indiana, 1972); Jo Rae Wright, Ph.D. (West Virginia, 1981).

Associate Professors: Blanche Capel, Ph.D. (Pennsylvania, 1989); Jonathan Cohn, M.D. (Rockefeller, 1978); Joseph M. Corless, M.D., Ph.D. (Duke, 1972); Haifan Lin, Ph.D. (Cornell, 1990); Christopher V. Nicchitta, Ph.D. (Pennsylvania, 1987); Don Rockey, M.D. (Med. Coll. of Virginia, 1984); Frederick H. Schachat, Ph.D. (Stanford, 1974); David W. Schomberg, Ph.D. (Purdue, 1965); Steven R. Vigna, Ph.D. (Washington, 1978).

Associate Research Professors: Emma Jakoi, Ph.D. (Duke, 1973); E. Ann LeFurgey, Ph.D. (North Carolina, 1976); Timothy Oliver, Ph.D. (North Carolina, 1995).

Assistant Professors: Page A.W. Anderson, M.D. (Duke, 1963); Catherine Bowes Rickman, Ph.D. (California, 1989); Michael Ehlers, M.D. (John Hopkins, 1998); James M. Grichnik, M.D., Ph.D. (Harvard, 1990); John A. Klingensmith, Ph.D. (Harvard, 1993); William E. Kraus, M.D. (Duke, 1982); Yin Xiong Li, Ph.D. (Peking Union Med. Coll.); Erik Meyers, M.D. (California-San Diego, 1990); Patricia M. Saling, Ph.D. (Pennsylvania, 1979).

Associate: Bryant W. Stolp, M.D. (North Carolina, 1988), Ph.D. (Duke, 1985).

Assistant Research Professors: Lawrence Barak, M.D., Ph.D. (Michigan, 1982); Rodney Folz, M.D. (Washington, 1989); Raul Gainetdinov, M.D. (Moscow Med., 1988), Ph.D. (Russian Academy of Med. Sci., 1992); Bruce M. Klitzman, Ph.D. (Virginia, 1979); Bruce Lobaugh, Ph.D. (Pennsylvania State, 1981); Emmanuel C. Opara, Ph.D. (London, 1984); Howard Rockman, M.D., C.M. (McGill, 1983); Katherine I. Swenson-Field, Ph.D. (Univ. of Washington, 1983); William Wetsel, Ph.D. (Mass. Inst. of Tech, 1983).

Adjunct Assistant Professors: Elizabeth Murphy, Ph.D. (Pennsylvania, 1980).

Emeriti: Nels C. Anderson, Ph.D.; J. Joseph Blum, Ph.D.; Sheila J. Counce, Ph.D.; Frans F. Jöbsis, Ph.D.; Edward A. Johnson, M.D.; Thomas J. McManus, M.D.; George Padilla, Ph.D.; Jacqueline A. Reynolds, Ph.D.

Required Courses

CELLBIO-201B. MICROANATOMY. Lectures on the structural organization of the organs of the body, as determined by light and electron microscopy, with emphasis on the relation of structure to function at the cellular level. Laboratory sessions are used to study histological preparations of mammalian tissues. Credit: 2. *McIntosh and staff*

CELLBIO-202B. MEDICAL PHYSIOLOGY. Lectures, labs, and clinical symposia on organ systems function. Computer simulations of organ functions complement lecture and lab material. The course ends with a live animal cardiovascular reflex lab. Credit: 4. *Jakoi and staff*

Basic Science Electives

CELLBIO-212B. THE CELL AND MOLECULAR BIOLOGY OF REPRODUCTION. During the last decade, cell, molecular, and neurobiological investigations have dramatically advanced our understanding of reproduction. In this course, we aim to focus on these recent findings to present an integrated view of the reproductive process in males and females. The general areas to be covered include neuroendocrinology, reproductive endocrinology, gametogenesis, and fertilization, although recent studies in areas such as gene regulation; intercellular communication; hormones, growth factors, and signaling; and early development and differentiation are emphasized. C-L: Graduate School. Credit: 3. Enrollment: min 6, max 20. *Saling and Schomberg.*

CELLBIO-251B. MOLECULAR CELL BIOLOGY. Current research topics in cell biology presented in a lecture and discussion format based on recent research papers. Topics include: protein secretion and trafficking; the nucleus; cytoskeleton and cell motility; extracellular matrix and cell adhesion; growth factors and signaling; cell cycle. C-L: Graduate School. Credit: 4. *Bennett and staff*

CELLBIO-417B. CELLULAR SIGNALING. Basic and current concepts of mechanism of action of hormones at the cellular level including hormone-receptor interactions, second messenger systems for hormones, plasma membrane receptor signaling (G protein-coupled receptors, receptor tyrosine kinases, phospholipid signaling, ion channels), intracellular signaling pathways (calcium, cyclic nucleotides, nuclear receptors, phosphatases), regulation of growth and differentiation and pathophysiology involving signaling pathways. Credit: 3. Spring. Enrollment: 50. *Caron, Casey, Pendergast, York, VanDongen, Heitman, McDonnell, Means, Shenolikar, and Kornbluth*

COMMUNITY AND FAMILY MEDICINE

Clinical Professor: J. Lloyd Michener, M.D. (Harvard, 1978), *Chairman*.

Professor: Truls Ostbye, M.D. (Univ. of Bergen, Norway, 1979), M.P.H. (Harvard, 1983), Ph.D. (Univ. of Bergen, 2000); George R. Parkerson, Jr., M.D. (Duke, 1953), M.P.H. (North Carolina, 1977).

DIVISION OF COMMUNITY HEALTH

Assistant Clinical Professor: Susan D. Epstein, M.P.A. (New Hampshire, 1974), *Division Chief*.

Clinical Professor: Kathryn M. Andolsek, M.D. (Northwestern, 1975).

Assistant Consulting Professor: Gwendolyn C. Murphy, Ph.D. (North Carolina, 1993).

Clinical Associate: Michelle Lyn, M.B.A. (Pfeiffer, 1998).

DIVISION OF CLINICAL INFORMATICS

Assistant Professor: David Lobach, M.D., (Duke, 1987), Ph.D. (Duke, 1986), M.S. (Duke, 1994), *Division Chief*.

FAMILY MEDICINE PROGRAM

Associate Clinical Professor: Margaret Gradison, M.D. (Cincinnati, 1981), *Division Chief*.

Clinical Professors: J. Lloyd Michener, M.D. (Harvard, 1978), *Chair*; Kathryn M. Andolsek, M.D. (Northwestern, 1975); William Christmas, M.D. (Boston, 1965); Victoria Kaprielian, M.D. (California-Los Angeles, 1985).

Associate Professors: Robert J. Sullivan, Jr., M.D. (Cornell, 1966), M.P.H. (North Carolina, 1973).

Associate Clinical Professors: Joseph Green, Ph.D. (Illinois, 1975); Kimberly S. Yarnall, M.D. (Florida, 1985); Lawrence R. Wu, M.D. (Duke, 1982).

Assistant Clinical Professors: Andrew A. Bonin, M.D. (Duke, 1975); Joyce A. Copeland, M.D. (North Carolina, 1975); Richard T. Ferro, M.D. (Robert Wood Johnson, 1994); Janet H. Keating, M.D. (Missouri, 1987); Ronald P. Olson, M.D. (Calgary, 1986); William Purdy, M.D. (Case Western, 1977); Sarah Ro, M.D. (Loma Linda, 1991); Barbara L. Sheline, M.D., M.P.H. (North Carolina, 1984).

Clinical Associates: Chika Akeru, M.D. (Minnesota, 1995); Franca Alphin, M.P.H. (North Carolina, 1989); Warren A. Blackburn, M.D. (Uniformed Svcs. Hlth. Sciences, 1982); Jeffrey R. Bytomski, D.O. (Kirksville College of Osteopathic Medicine, 1998); Katie B. Dore, PA-C (Duke, 1991); Vivek Padha, M.D. (Univ. of Jammu, 1995); Sarita Sharma, M.D. (Univ. of Jammu, 1995); Almaz Smith, M.D. (Texas-San Antonio, 1992); Anthony Smith, Ph.D. (Southern Illinois-Carbondale, 1996); Philip E. Stover, M.D. (Eastern Virginia, 1980).

Associate Consulting Professor: James C. Leist, Ed.D. (Indiana, 1972).

Associate: Catherine M. Severns, R.N.P. (Yale, 1971).

DIVISION OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE

Associate Clinical Professor: Samuel D. Moon, M.D. (Virginia, 1975), M.P.H. (North Carolina, 1991), *Division Chief*.

Associate Professors: John Dement, Ph.D. (North Carolina, 1980); Hester J. Lipscomb, Ph.D. (North Carolina, 1995).

Associate Clinical Professor: George W. Jackson, M.D. (Western Reserve, 1968).

Assistant Clinical Professors: Dennis Darcey, M.D., M.S.P.H. (North Carolina, 1986, 1988); Gary N. Greenberg, M.D. (Northwestern, 1978), M.P.H. (North Carolina, 1983); Debra Hunt, Dr.P.H. (North Carolina, 1984); Craig R. Stenberg, Ph.D. (Denver, 1982); Woodhall Stopford, M.D. (Harvard, 1969), M.S.P.H. (North Carolina, 1980); Edward D. Thalmann, M.D. (Georgetown, 1970); Wayne R. Thomann, Dr.P.H. (North Carolina, 1983).

Assistant Research Professor: Lisa A. Pompeii, Ph.D. (North Carolina, 2002).

Assistant Consulting Professor: Carol Epling, M.D. (Virginia, 1989), M.S.P.H. (Colorado, 1994).

Associate: Thomas O. Brock, III, Ph.D. (Wake Forest, 1980).

Clinical Associates: Judith Holder, Ph.D. (Southern Illinois, 1995); Tamara James, M.A. (George Mason, 1990); Andrew S. Silberman, M.S.W. (North Carolina, 1982)

Research Associates: Larry L. Cook, Ph.D. (North Carolina State, 1986); Karen Hendry, Ph.D. (Duke, 1987); Mary Anne McDonald, Dr.P.H. (North Carolina, 1999); James M. Schmidt, B.H.S. (Duke, 1974).

DIVISION OF PHYSICAL THERAPY

Professor of Practice: Jan K. Richardson, Ph.D. (Pittsburgh, 1983), *Division Chief*.

Associate Professor: Ted W. Worrell, P.T. (Med. Coll. of Virginia, 1975), M.Ed., Ed.D. (Virginia, 1988, 1990).

Associate Clinical Professors: Daniel E. Erb, P.T., Ph.D. (Med. Coll. of Virginia, 1987, 1989); Carol Figuers, P.T. (Duke, 1981); Janet L. Gwyer, Ph.D., P.T. (North Carolina, 1984, 1977).

Assistant Professors: Andrea B. Taylor, Ph.D. (Pittsburgh, 1992); Leonard E. White, M.B.S. (Oral Roberts, 1987).

Assistant Clinical Professors: Daniel V. Dore, P.T. (Pennsylvania, 1979), M.P.A. (Maine, 1985), Ed.D. (North Carolina State, 1995); Eric J. Hegedus, M.P.T., D.P.T. (Slippery Rock, 1991, 1998); Linda M. Lawrence, P.T. (SUNY-Buffalo, 1976), M.S. (North Carolina, 1994); Corrie J. Odum, P.T. (Florida State, 1979), M.P.T. (Slippery Rock, 1995), D.P.T. (Slippery Rock, 1998); Mary Ellen Riordan, P.T., M.S. (Wisconsin-Madison, 1969, 1975).

Clinical Associates: Laura E. Case, M.S., P.T. (North Carolina, 1992); Rebecca H. Crouch, M.S. (North Carolina, 1986).

Associates in Research: Helga MacAller, P.A. (Oskar Helene Heim Free, 1977), R.A.C. (Duke, 1978); Kathy M. Shipp, M.H.S. (Duke, 1998).

DIVISION OF PHYSICIAN ASSISTANT EDUCATION

Assistant Clinical Professors: Justine Strand, PA-C (Duke, 1981), *Division Chief*; Joyce A. Copeland, M.D. (North Carolina, 1975), *Medical Director*.

Associate Clinical Professor: Reginald D. Carter, Ph.D. (Bowman Gray, 1970) PA-C (Duke, 1978); Patricia A. Dieter, M.P.A. (Pennsylvania State, 1983).

Assistant Clinical Professors: Lovest T. Alexander, M.H.S. (Duke, 1991); Margaret Schmidt, Ed.D. (Duke, 1988).

Clinical Associates: Thomas Colletti, PA-C (Nebraska, 1999); Robert Giggey, PA-C (Maine Medical Center, 1991); Paul C. Hendrix, M.H.S. (Duke, 1991); Karen Hills, M.S. (American Univ, 1988), PA-C (Wake Forest, 1999); Peggy R. Robinson, M.H.S., PA-C (Duke, 1992).

DIVISION OF PREVENTION RESEARCH

Associate Professor: Colleen McBride, Ph.D. (Minnesota, 1990), *Division Chief*.

Associate Professor: Joellen Schildkraut, Ph.D. (Yale, 1987).

Assistant Professor: Patricia Moorman, Ph.D. (North Carolina, 1993).

Assistant Research Professors: Cathrine Hoyoy, Ph.D. (North Carolina, 1998), M.P.H. (California-Berkeley, 1992). Kathryn I. Pollack, Ph.D. (Houston, 1996).

DUKE DIET AND FITNESS CENTER

Assistant Clinical Professor: Howard Eisenson, M.D. (Duke, 1979), *Division Chief*.

Assistant Clinical Professor: Ronald S. Sha, M.D. (Minnesota, 1972).

ADJUNCT FACULTY

Adjunct Professor: Barbara K. Rimer, Dr. P.H. (Johns Hopkins, 1981).

Adjunct Associate Professors: James F. Gifford, Jr., Ph.D. (Duke, 1969); Jan Victoria Scott, M.H.S. (Duke, 1991).

Adjunct Assistant Professors: James D. Bernstein, M.H.A. (Michigan, 1968); Brian A. Boehlecke, M.D. (SUNY-Buffalo, 1970), M.P.H. (North Carolina, 1981); Patricia M. Eiff, M.D. (Wisconsin, 1983); Joseph W. Hales, Ph.D. (Utah, 1991); Lars C. Larsen, M.D. (SUNY-Syracuse, 1973); Megan Levin, Pharm.D. (South Dakota State, 1998); Gretchen Purcell, M.D., Ph.D. (Stanford, 1996, 1997); Benjamin Reese, Ph.D. (Rutgers, 1978); Clare J. Sanchez, M.D. (Colorado, 1975); Katherine M. Shea, M.D. (Oregon Health Sciences, 1978), M.P.H. (North Carolina, 1995); Bonnie Yankaskas, Ph.D. (North Carolina, 1982), M.P.H. (Yale, 1973).

Adjunct Associates: David J. Kirby, M.S. (North Carolina, 1982); Susan Lieff, Ph.D. (North Carolina, 1996); Alan A. Stone, Ph.D. (Washington, 1974).

COMMUNITY FACULTY

Consulting Professors: Roger O. McClellan, D.V.M. (Washington State, 1960), Durham, NC; Samuel W. Warburton, Jr., M.D. (Pennsylvania, 1969), Durham, NC.

Associate Consulting Professors: Albert A. Meyer, M.D. (SUNY-Brooklyn, 1975), Cary, NC; Robert W. Richardson, P.T. (Pittsburgh, 1958), M.Ed. (Pittsburgh, 1975); Katherine M. Simon, Ph.D. (Iowa, 1979), St. Louis, MO.

Assistant Consulting Professors: Anne M. Akwari, M.D. (Howard, 1976), Durham, NC; Powell Anderson, M.D. (Duke, 1949), Waynesboro, VA; Daniel H. Barco, M.D. (Duke, 1972), Durham, NC; Don W. Bradley, M.D. (Virginia, 1976), Durham, NC; David K. Broadwell, M.D. (Baylor, 1976), M.P.H. (Texas, 1986), Charleston, NC; Jack R. Cahn, M.D. (Penn. State-Hershey, 1972), Sparta, NC; Jane T. Carswell, M.D. (Virginia, 1958), Lenoir, NC; John Cromer, Jr., M.D. (Nebraska, 1972), M.S.P.H. (North Carolina, 1980), Wilmington, NC; Charles Davant, III, M.D. (North Carolina, 1972), Blowing Rock, NC; John D. Davis, Jr., M.D. (North Carolina, 1978), Blowing Rock, NC; Allen Dobson, M.D. (Bowman Gray, 1980), Concord, NC; Curtis J. Eshelman, M.D. (Michigan, 1971), Durham, NC; Lawrence L. Fleenor, Jr., M.D. (Virginia, 1966), Big Stone Gap, VA; Henry A. Fleishman, M.D. (Emory, 1974), Eden, NC; Raymond A. Gaskins, Jr., M.D. (North Carolina, 1975), Fayetteville, NC; Andrea R. Gravatt, M.D. (Pittsburgh, 1979), Asheville, NC; Wilson Griffin, III, M.D. (Duke, 1977), Jonesville, NC; James K. Hartye, M.D. (Vanderbilt, 1977), North Wilkesboro, NC; Paul O. Howard, M.D. (Virginia, 1955), Sanford, NC; Peter Jacobi, M.D. (Western Reserve, 1979), Durham, NC; Lane E. Jennings, M.D. (Miami, 1975), Port Orange, FL; Pamela H. Jessup, M.D. (Bowman Gray, 1977), Sanford, NC; Eric M. Johnsen, M.D. (Wayne State,

1977), Albermarle, NC; Charles W. Lapp, M.D. (Albany, 1974); Raleigh, NC; Melvin T. Pinn, Jr., M.D. (Virginia, 1976), Charlotte, NC; Jessica Sax-Schorr, M.D. (Tufts, 1977), Charlotte, NC; Evelyn D. Schmidt, M.D. (Duke, 1951), M.P.H. (Columbia, 1962), Durham, NC; Greg Stave, M.D., J.D. (Duke, 1984) M.P.H. (North Carolina, 1989) Research Triangle Park, NC; Babafemi O. Taiwo, M.B.B.S. (Ibadan, Nigeria, 1991); Elizabeth C. Tilson, MD (Johns Hopkins, 1993); William B. Waddell, M.D. (Duke, 1962), Galax, VA.

Consulting Associates: Susan R. Andersen, M.D. (Southern Florida, 1992), Concord, NC; Paul E. Austin, M.D. (North Carolina, 1989), Durham, NC; Erin Baldwin, MD (Uniformed Svcs. Hlth. Sci., 1996), Fayetteville, NC; Clarence H. Beavers, M.D. (West Virginia, 1982), Eden, NC; Mary Jo Bondy, Pa-C, M.H.S. (Duke, 1993), Wilmington, NC; Peter K. Brady, M.D. (Mississippi, 1989), Durham, NC; Charles Brown, M.D. (Louisville, 1995), Fayetteville, NC; Peter A. Cardinal, M.D. (Uniformed Svcs. Hlth. Sci., 1984), Fayetteville, NC; Sandra Carr, M.D. (Texas -Houston, 1996), Fayetteville, NC; Karol Cheek, M.D. (South Carolina, 1987), Concord, NC; Mary Ann Chiodo, M.D. (West Virginia, 1989), Dunn, NC; Vincent Chiodo, M.D. (West Virginia, 1989), Dunn, NC; Young S. Choi, M.D. (Oklahoma, 1985), Fort Bragg, NC; David L. Christopherson, M.D. (Michigan, 1974), Concord, NC; Kiara S. Eily Cofield, M.D. (Bowman Gray, 1991), Durham, NC; Bruce A. Cohen, M.D. (St. George's Hosp., 1981), M.P.H. (North Carolina, 1997), Durham, NC; James F. Cummings, M.D. (Georgetown, 1993), Fayetteville, NC; R. Joseph Cutler, PA-C (South Carolina, 1974, Kannapolis, NC; Terry G. Daniel, M.D. (West Virginia, 1988), Eden, NC; Anthony Daniels, M.D. (Uniformed Svcs. Hlth. Sci., 1993), Fayetteville, NC; Mars F. Davis, M.P.H. (Oklahoma, 1989); Douglas Degler, M.D. (Georgetown, 1995), Fort Bragg, NC; Victor Dewey, M.D. (Med. Coll. of Virginia, 1996), Fayetteville, NC; Mary Carol Digel, M.D. (Duke, 1987), Sparta, NC; Tommy K. Earnhardt, PA-C (Emory, 1984), Mt. Pleasant, NC; William J. Edenfield, M.D. (Miami, 1992), Fort Bragg, NC; Nathan Erteschik, M.D. (George Washington, 1979), Fort Bragg, NC; Conrad L. Flick, M.D. (Duke, 1989), Raleigh, NC; Lawrence L. Golusinski, M.D. (Virginia, 1989), Atlanta, GA; Gordon S. Hardenberg, M.D. (Brown, 1991), Durham, NC; Ruppert A. Hawes, M.D. (Ohio State, 1991), Concord, NC; Jeffrey D. Hoffman, M.D. (North Carolina, 1984), Concord, NC; Kevin P. Howard, M.D. (Wayne State, 1982), Reidsville, NC; Gloria Jordan, PA-C (Duke, 1988), Fayetteville, NC; Edward N. LaMay, M.D. (Bowman Gray, 1988), Durham, NC; Glen R. Liesegang, M.D. (Kentucky, 1983), Blowing Rock, NC; Matthew M. McCambridge, M.D. (Georgetown, 1992), Fort Bragg, NC; Ronald K. McLearn, M.D. (Ohio State, 1975), Durham, NC; Ofelia N. Melley, M.D. (Guadalajara, 1984), Southern Pines, NC; James A. Mergy, M.D. (California-San Francisco, 1987), Fayetteville, NC; Richard Michal, M.D. (Duke, 1980), Rocky Mount, NC; David Nave, Jr., M.D. (Bowman Gray, 1981), Sanford, NC; J. T. Newton, M.D. (North Carolina, 1981), Clinton, NC; Malcolm H. Pannill, B.H.S. (Bowman Gray, 1988), Fayetteville, NC; Ronald A. Pollack, M.D. (Virginia, 1986), Charlotte, NC; Gwendolyn Powell, M.D. (Miami, 1981), M.P.H. (North Carolina, 1986), Durham, NC; Michael A. Rave, M.D. (Uniformed Svcs. Hlth. Sci., 1989), Fort Bragg, NC; Charles W. Rhodes, M.D. (Bowman Gray, 1980) Mt. Pleasant, NC; Rebecca S. Rich, M.D. (Brown, 1983), Durham, NC; Mark D. Robinson, M.D. (Pennsylvania, 1983), Concord, NC; Lenard Salzberg, M.D. (Albany, 1988), Fayetteville, NC; Devdutta Sangvai, M.D. (Med. Coll. of Ohio, 1998), Durham, NC; Paul W. Sasser, M.D. (California-Los Angeles, 1984), Eden NC; Lori J. Seymour, PA-C (Duke, 1992), Mt. Pleasant, NC; David Siebens, M.D. (Washington, 1983), Chapel Hill, NC; Christopher Snyder, III, M.D. (Virginia, 1975), Concord, NC; Erika A. Steinbacher, M.D. (North Carolina, 1992), Kannapolis, NC; Dennis O. G. Stuart, M.D. (Virginia, 1982), Elkin, NC; Edward Taylor, M.D. (Hahnemann, 1982), Lumberton, NC; Michael J. Trombley, M.D. (Rochester, 1991), Concord, NC; Albert A. Verilli, III, M.D. (Case Western Reserve, 1984), Faison, NC; Mark A. Vincent, M.D. (Virginia, 1992), Concord, NC; Eugene Wade, M.D. (Howard, 1981), Burlington, NC; Jeffrey L. Warhaftig, M.D. (Pittsburgh, 1994), Ft. Bragg, NC; Karen L. Weaver, M.D. (Michigan, 1993), Wilmington, NC; Gwendolyn R. Whitley, M.D. (South Carolina, 1987), Concord, NC; Paul H. Wiegand, M.D. (Bowman Gray, 1982), Durham, NC; Carol R. Young, Jr., M.D. (Georgetown, 1992), Fort Bragg, NC.

Duke University Affiliated Physicians

Assistant Clinical Professors: William S. Friedman, M.D. (Tulane, 1972); Elisabeth B. Nadler, M.D. (New York, 1985).

Assistant Consultant Professor: William Tucker, M.D. (North Carolina, 1966).

Consulting Associates: John B. Anderson, M.D. (Cincinnati 1980); Gillian A. Aylward, M.D. (Canada, 1983); Katherine Bliss, M.D. (North Carolina, 1989); Anita Blosser, M.D. (Kentucky, 1991); Catherina Bostelman, M.D. (Ohio-Toledo, 1998; W. Kevin Broyles, M.D. (Florida, 1986); Isa Cheran, M.D. (Bowman Gray, 1988); Daniel Crummett, M.D. (Wayne State, 1982); Thomas Curtis, D.O. (Texas Coll. of Osteopathic Med., 1993); Denise Dechow, M.D. (Virginia, 1996); William A. Dennis, M.D. (ECU, 1999); Jenny Franczak, M.D. (West Virginia, 1988); Joanne Fruth, M.D. (Ohio, 1987); Allison K. Gard, M.D. (Illinois-Chicago, 1990); Robert S. Hanser, D.O. (North Texas, 1998); Jon Paul Heiderscheit, M.D. (North Carolina, 1995); Craig A. Hoffmeier, M.D. (Louisiana State, 1986); Suzanne E. Jones, M.D. (Duke, 1996); Robert Juer, M.D. (Tennessee, 1979); Joel R. Kann, M.D. (Eastern Virginia, 1989); Patrick Kavanaugh, M.D. (East Carolina, 1995); Richard Kennedy, M.D. (Illinois, 1983); David Klein, M.D. (North Carolina, 1986); Thomas Koinis, M.D. (Case Western Reserve, 1980); Soon Kwark, M.D. (Louisiana State, 1984); James S. McGrath, M.D. (Tulane, 1980); Douglas B. McKee, M.D. (Indiana, 1995); Kimberly D. McKee, M.D. (South Florida, 1995); Janet McKeown, M.D. (Toronto, 1990); John Mills, M.D. (Bowman Gray, 1982); Cheryl J. Monical, M.D. (Minnesota, 1990); George H. Moore, M.D. (East Carolina, 1981); Mary Sherwyn Mouw, M.D. (Michigan, 1996); Jane Murray, M.D. (North Carolina, 1984); Julia Nelson, M.D. (North Carolina, 1997); T. Andrew O'Donnell, M.D. (Med. Coll. of Ohio, 1993); Coin Page, M.D. (North Carolina, 1983); Enas Pruitt, M.D. (Iowa, 1997); Sarah Cornwell Ringel, M.D. (Duke, 1985); Jane Satter, M.D. (Rochester, 1977); Todd Shapley-Quinn, MD (Wayne State, 1984); Carlos Sotolongo, M.D. (Autonoma De Guadalajara, 1981); Tamra H. Stall, M.D. (Case Western Reserve, 1987); Margaret Stetson, M.D. (Rochester,

1977); Bradley A. Torok, M.D. (Michigan, 1998); Amy Walsh, M.D. (Georgetown, 1997); Kelvin E. Wynn, M.D. (Howard, 1988).

Emeriti: Robert Charles Bartlett; E. Harvey Estes, Jr., M.D.; Michael A. Hamilton, M.D.; William E. Hammond, Ph.D.; Siegfried H. Heyden, M.D.; Jerry J. Tulis, Ph.D.; Elia E. Villanueva, P.T., A.M., David G. Warren, J.D.

Required Courses

During the second year, non-primary care students may select either COMMFAM 205C or a combination of COMMFAM 207C and MEDICINE 207C, the four-week neurology clerkship. Primary care students may complete the neurology clerkship during their fourth year.

COMMFAM-205C. FAMILY MEDICINE. This basic course in family medicine consists of an eight-week clinical clerkship in the second year. The course goal is to provide students with an understanding of the principles of family medicine and how these apply in community practice. The course emphasizes continuous and comprehensive health care for people of both sexes and all ages within the context of their social groups and communities. Particular attention is paid to the diagnosis and treatment of common medical problems and to health maintenance, ambulatory care, continuity of care, and the role of consultants in primary care. Other topics covered include social factors such as the doctor-patient relationship, the role of the physician in the community, and the economics of health care delivery. Students are placed with community-based faculty who are practicing family physicians in communities outside of Durham, principally within North Carolina. Most of these preceptorship sites are in rural communities, providing students with exposure to many issues of rural health care such as farming and other occupational injuries, transportation difficulties, and local customs. The eight-week sites are scheduled based on the availability of the preceptors. These sites may not be available every rotation. Students gain extensive experience in diagnosing and managing patient problems in an ambulatory care setting under the guidance of the department's faculty. In addition, the clerkship provides students with opportunities to see patients in a variety of other settings, including home, nursing home, and community hospital. There is also the opportunity for medical students to be paired with physician assistant students at a community practice site for the purpose of working with mid-level practitioners in a team practice setting. Note: COMMFAM-205C is strongly recommended for all students in the primary care program. Changes in the rotation are not made less than 12 weeks prior to the start of the rotation. Credit: 8. *Copeland*

COMMFAM-207C. FAMILY MEDICINE PRECEPTORSHIP. Students may opt for a shorter Family Medicine experience. This course is similar to COMMFAM-205C, described above, but lasts only four weeks. This shorter clerkship provides good exposure to the diagnosis and treatment of common problems in ambulatory family medicine; due to time limitations, less experience is available in prevention, community medicine, and continuity of care. Preceptorship sites are located across the state of North Carolina. Availability of sites is dependent upon approval of the preceptor. Most sites involve living in the community for the duration of the clerkship. Students are expected to complete this clerkship outside of Durham. Changes in the rotation are not made less than 12 weeks prior to the start of the rotation. Credit: 4. *Copeland*

Basic Science Electives

COMMFAM-238B. TUTORIAL IN COMMUNITY AND FAMILY MEDICINE. An individually arranged experience in which the student participates in the research program of a faculty member. The subject matter, course credit, and meeting time are arranged with the faculty member. Each student meets regularly with his/her faculty preceptor and carries out a project related to the preceptor's work. Through these discussions and the

project, the student is able to develop an understanding of the discipline involved. Possible areas include community health, health education, geriatrics, family dynamics, occupational health, functional health and quality of life assessment, severity of illness assessment, case-mix adjustment, medical education, management sciences, economic aspects of health care, computer technology, biostatistics and epidemiology, clinical decision-making, diagnosis and management of common problems, alcoholism, and social support systems. Because of the variety of projects available and the necessity of prior arrangements, it is essential that interested students consult with the instructor and staff at least two months before the beginning of the term selected. Prerequisite: permission of instructor. Credit: 1-16. *Parkerson and Ostbye*

Clinical Science Electives

COMMFAM-243C. OCCUPATIONAL AND ENVIRONMENTAL MEDICINE.

This elective is designed to enhance the student's basic science skills in three important areas related to occupational medicine: clinical toxicology, industrial hygiene, and epidemiology. During this four-week rotation, students will complete readings related to these three areas, participate in lectures and seminars, learn to conduct computerized database searches concerning industrial toxicology issues and cases, and visit industrial sites as part of the experience. Students will also be given at least one project which will involve evaluation of chemical, physical, or biologic exposures in the work environment and medical evaluation of suspected cases of occupational disease. Upon completion of the rotation, students can expect to have practical and useful skills in evaluating occupational and environmental exposures and making a reasonable risk assessment of those exposures. Credit: 4. Enrollment: max 2, min 1. *Epling, Darcey and staff*

COMMFAM-251C. INTEGRATIVE MEDICINE: RESEARCH AND CLINICAL PERSPECTIVES. This month-long elective will provide an evidenced-based and experiential understanding of complementary and alternative medicine. There will be reviews of the literature by Duke faculty members and critiques of the best available randomized, controlled trials by the students. Credentialing and training issues will be discussed, as well as possible risks and hazards. Small groups of students will make visits to the offices of community practitioners. During these sessions, one of the students will undergo an evaluation and lifestyle assessment, while the other students act as observers. The students will give presentations about their experiences, and there will be a final exam. Prerequisites: None. Credit: 4. Enrollment: min 5, max 10. *Burk and Moon*

COMMFAM-255C. HEALTH PROMOTION AND DISEASE PREVENTION.

This elective is an intensive clinical experience in health promotion and disease prevention. Students see patients in the Duke Family Medicine Center and participate in a variety of activities designed to help them provide excellent health maintenance care. Specific content areas addressed include counseling skills in nutrition, safe sex practices, and smoking and alcohol cessation, as well as screening tests and immunizations. Prerequisite: permission of instructor. Credit: 4. Enrollment: min 1, max 1. *Yarnall and staff*

COMMFAM-256C. ETHICAL ISSUES IN MEDICINE. This seminar examines ethical questions raised by modern medical science and technology with special attention to their implications for clinicians and their patients. It includes both historical and philosophical analyses of these questions as well as coverage of selected practice-related issues (e.g., truth-telling, confidentiality, informed consent). Credit: 1. Enrollment: min 6, max 12. *Sugarman and staff*

COMMFAM-259C. ADVANCED CLERKSHIP IN FAMILY MEDICINE. This course provides intensive instruction and practice in the care of primary care patients in the

community setting. Students may select from three sites: the Duke Family Medicine Center on the Duke campus, the Duke-SRAHEC Family Medicine Center in Fayetteville, or the Duke-Cabarrus Family Medicine Residencies in Concord. This course has an outpatient focus and is recommended for students who would like to improve their skills in the care of ambulatory patients, especially those with common problems. Students are involved with day-to-day patient care under the supervision of family physician faculty and residents. Because of restrictions on the number of students allowed at each site, preference is given to those students entering Family Medicine Residencies. Students are advised to contact the department as early as possible for course approval (at least eight weeks in advance). No drops are permitted within 60 days of the first day of the rotation. Prerequisite: permission of instructor. Credit: 2-8. Enrollment: max 4. *Gradison and staff*

COMMFAM-260C. SUBINTERNSHIP IN FAMILY MEDICINE. This course provides senior medical students with an intense inpatient clinical rotation with responsibilities and autonomy similar to that of an intern. The student acts as the primary medical provider for inpatients on the family medicine service at Durham Regional Hospital and follows outpatients at the Duke Family Medicine Center in the setting of a residency program. Clinical instruction and supervision on each patient encounter are afforded by senior level housestaff and faculty members of the Department of Community and Family Medicine. Individual reading on patient problems encountered in the daily work routine is expected. Frequent balanced feedback is provided to students. Students are advised to contact the department as early as possible for course approval (at least eight weeks in advance). No drops are permitted within 60 days of the first day of the rotation. Prerequisite: permission of instructor. Credit: 4. Enrollment: max 2. *Bonin and staff*

COMMFAM-261C. FAMILY MEDICINE CONTINUITY EXPERIENCE. Students manage a panel of patients over an extended period of time at the Duke Family Medicine Center under the supervision of one family physician faculty member. Patient care is scheduled for one to two half-days a week for two to four months. The rotation may be repeated to provide further continuity. With permission, this course can be audited; a project is required for course credit. Due to the need for clinic schedule arrangements, students are advised to contact the department as soon as possible for course approval (at least eight weeks in advance). Priority will be given to primary care track students. Prerequisite: permission of instructor. Credit: 2-8. *Copeland and staff*

COMMFAM-271C. THE COMPUTER TEXTBOOK OF MEDICINE. Students participate in the ongoing development of a computerized database in cardiovascular disease. They participate in research concerning the diagnosis, treatment, and prognosis of patients with coronary artery disease. And, they learn how to make predictions about outcome based on test results of patients on the cardiology service. Prerequisite: permission of instructor. Credit: 2-4. Enrollment: max 5. *Califf, Lee, Peterson, and Jollis*

COMMFAM-299C. ADVANCED PRECEPTORSHIP IN COMMUNITY AND FAMILY MEDICINE. An individually tailored preceptorship which allows students to observe and participate in aspects of the broad scope of Community and Family Medicine, including delivery of care to individuals, families, and populations within the context of the community in which they live. The rotation supplements and complements the second-year core clerkship, and allows the student further exploration of specific areas of interest. A wide variety of practice types and geographic locations is available; students may choose from an extensive list or nominate a new site. Opportunities are also available within the Duke system, including:

Occupational and Environmental Medicine	Sam Moon, M.D. Carol Epling, M.D.
Sports Medicine	Jeff Bytomski, M.D. Andrew Bonin, M.D.
Lifestyle Management	Howard Eisenson, M.D. Kathryn Andolsek, M.D., M.P.H.
Managed Care	Victoria Kaprielian, M.D. Lloyd Michener, M.D.

All interested students should contact the coordinator of Medical Student Programs at (919) 681-3066 to arrange a rotation in their area of interest. Because of the necessity for site approval and prior arrangements with preceptors, it is essential that this contact be made as soon as possible and at least three months prior to the desired rotation. Drops are not accepted. Prerequisite: permission of instructor. Credit: 4. *Copeland and staff*

COMMFAM-453C. COMMUNITY HEALTH. This elective will introduce students to the concepts and practice of community-based and population-based health care. Students will participate in an ongoing health project run in collaboration between Duke and the community. Permission of instructor required. Students must contact Dr. Susan Epstein at least six weeks prior to start date. Credit: 4. Enrollment: max 2. *Sheline, Epstein, Lyn, and Kaprielian*

DIVISION OF CLINICAL INFORMATICS

Basic Science Electives

MEDINFO-233B. INTRODUCTION TO MEDICAL INFORMATICS. An in-depth study of the use of computers in biomedical applications. Important concepts related to hardware, software, and applications development are studied through analysis of state-of-the-art systems involving clinical decision support, computer-based interviewing, computer-based medical records, departmental/ancillary systems, instructional information systems, management systems, national data bases, physiological monitoring, and research systems. Permission of the instructor required. C-L: BME-243 (Graduate School). Credit: 3. *Staff*

MEDINFO-234B. ARTIFICIAL INTELLIGENCE IN MEDICINE. An introduction to basic concepts of Artificial Intelligence (AI) and an in-depth examination of medical applications of AI. The course includes heuristic programming, a brief examination of the classic AI programming languages (LISP and PROLOG), and a study of rule-based systems and cognitive models. Specific applications examined in detail include MYCIN, ONCO-CIN, PIP, CASNET, ILIAD, QMR, and DXPLAIN and selected EXPERT systems. Permission of the instructor required. C-L: BME-241 (Graduate School). Credit: 3. *Staff*

MEDINFO-236B. CLINICAL INFORMATION MANAGEMENT. This course will include a look at computer-based patient records, including current state and direction of research; decision support and knowledge extraction; networking; the Internet and web-based design; legislative issues relating to information management; and new concepts and direction in health information management. The course will also deal with such current topics as distance learning, telehealth, consumer informatics, and home health. Data warehousing and data sharing issues will also be discussed. Opportunity for some hands-on experience will be provided. Credit: 2. Enrollment: max 10, min 4. *Staff*

MEDINFO-399B. PRECEPTORSHIP IN MEDICAL INFORMATICS. An individualized research program under the direction and supervision of a member of the faculty of the Clinical Informatics Program. Credit: 1-16. *Staff*

FREE TIME

FREETIME-300C. FREE TIME. Students with no classes scheduled for a particular section may sign up for free time.

IMMUNOLOGY

Professor Thomas F. Tedder, Ph.D. (Alabama, 1984), Chairman.

Professors: R. Randall Bollinger, M.D. (Tulane, 1970), Ph.D. (Duke, 1977); Rebecca H. Buckley, M.D. (North Carolina, 1958); Jeffrey R. Dawson, Ph.D. (Case Western Reserve, 1969); Michael M. Frank, M.D. (Harvard, 1960); Eli Gilboa, Ph.D. (Weizmann Inst., 1977); Barton F. Haynes, M.D. (Baylor, 1973); Garnett Kelsoe, D.Sc. (Harvard, 1979); David R. McClay, Jr., Ph.D. (North Carolina, 1971); David S. Pisetsky, Ph.D. (Albert Einstein, 1972); Hilliard F. Seigler, M.D. (North Carolina, 1960); Ralph Snyderman, M.D. (SUNY-Downstate, 1965).

Associate Professors: Michael S. Krangel, Ph.D. (Harvard, 1982); Kent J. Weinhold, Ph.D. (Thomas Jefferson, 1979).

Associate Research Professor: Kay H. Singer, Ph.D. (Duke, 1977).

Assistant Professors: Russell P. Hall, M.D. (Missouri, 1975); You-Wen He, Ph.D. (Miami, 1996); Maureen Hoffman, M.D., Ph.D. (Iowa, 1982); Montonari Kondo, M.D. (Tohoku, 1992), Ph.D. (Tohoku, 1995); Herbert Kim Lyerly, M.D. (California-Los Angeles, 1983); Mary Louise Markert, M.D. (Duke, 1982), Ph.D. (Duke, 1981); Dhavalkumar D. Patel, M.D., Ph.D. (Duke, 1989); Clay Smith, M.D. (Texas-Southwestern, 1984); J. Brice Weinberg, M.D. (Arkansas, 1969); Weiguo Zhang, Ph.D. (Albert Einstein, 1994); Yuan Zhuang, Ph.D. (Yale, 1989).

Assistant Research Professors: Donna D. Kostyu, Ph.D. (Duke, 1979); Joel R. Ross, Ph.D. (Texas-Southwestern, 1991); Marcella Sarzotti-Kelsoe, Ph.D. (Torino, 1980); Herman F. Staats, Ph.D. (South Alabama, 1992); Douglas A. Steeber, Ph.D. (Wisconsin-Madison, 1995); Minghua Zhu, Ph.D. (Albert Einstein, 1995).

Emeriti: D. Bernard Amos, M.D.; Charles E. Buckley, III, M.D.; Richard S. Metzgar, Ph.D.; Wendell F. Rosse, M.D.; Frances E. Ward, Ph.D.

Required Course

IMMUNOL-201B. IMMUNOLOGY. A short core course in immunology for first-year medical students. The course includes a general introduction to special areas of immunology such as immunochemistry, immunohematology, and immunogenetics including transplantation and tumor immunology. The initial lectures describe the properties of antibodies, the characteristics of antigens, classes of reactive lymphocytes and accessory cells, the biology of cytokines, and the complement system. The course is enriched with patient oriented problem-solving sessions. Credit: 2. *Dawson*

Basic Science Electives

IMMUNOL-252B. GENERAL VIROLOGY AND VIRAL ONCOLOGY. The first half of the course is devoted to a discussion of the structure and replication of mammalian and bacterial viruses. The second half deals specifically with tumor viruses which are discussed in terms of the virus-cell interaction, the relationship of virus infection to neoplasia, and the application of retroviruses in molecular and developmental biology. C-L: MICROBIO-252B; Graduate School. Credit: 3. Enrollment: min 5. *Keene and staff*

IMMUNOL-291B. COMPREHENSIVE IMMUNOLOGY. An intensive course in the biology of the immune system and the structure and function of its component parts. Major topics discussed are: properties of antigens; specificity of antibody molecules and their biologic functions; cells and organs of the lymphoid system; structure and function of complement; inflammation and non-specific effector mechanisms; cellular interactions and soluble mediators in lymphocyte activation, replication, and differentiation; regulation of immune responses, neoplasia and the immune system; molecular structure and genetic organization of immunoglobulins, histocompatibility antigens, and T cell receptor. C-L: MICROBIO-291B, Graduate School. Credit: 3. Enrollment: max 10. *Krangel and staff*

IMMUNOL-399B. PRECEPTORSHIP IN IMMUNOLOGY. An individual reading and/or laboratory course in specialty areas supervised by an individual faculty member. Acceptance, nature of topic, and amount of credit by individual arrangement with proposed faculty member. Prerequisites: to be determined by instructor. Credit: 1-16. *Staff*

INTERDISCIPLINARY COURSES

Required Courses

INTERDIS-100B. MOLECULES AND CELLS. A course designed for first year medical students that focuses on the molecular and cellular principles of human disease. The course has four components, which are tightly integrated: biochemistry, cell biology, genetics, and a series of clinical correlations. The biochemistry component re-emphasizes the relationship between structure and function of the major classes of macromolecules in living systems including proteins, carbohydrates, lipids, and nucleic acids. The metabolic interrelationships and control mechanisms are discussed as well as the biochemical basis of human diseases. The cell biology component emphasizes the structure and function of the cells and tissues of the body. The laboratory provides practical experience with light microscopy studying and analyzing the extensive slide collection of mammalian tissues. The genetics component emphasizes molecular aspects of the human genome, the structure of complex genes, regulation of gene expression, experimental systems for genetic analysis, human genetics, including population genetics and genetic epidemiology, the use of genetic analysis for the identification of disease causing genes, cytogenetics, cancer genetics, and genetic diagnosis and counseling. The series of clinical correlations links the material covered in the basic science lectures to clinical problems. Many of the correlations include an interview with a patient. Also included are a day symposium on nutrition and a day symposium on aging. Credit: 8. Enrollment: max 105. *Garcia-Blanco, Nicchitta, Raetz, and staff*

INTERDIS-201B. PRACTICE YEAR 1. The Practice courses are required in years one, two, and three. Practice emphasizes clinical skills development using lecture and small group teaching, and outpatient clinical work once a week. In year one, Practice introduces students to interviewing and physical diagnosis skills with emphasis on the doctor/patient relationship. Practice uses a problem-based learning technique to expose students to life cycle, human development, and clinical reasoning. Students practice interviewing and counseling on the wards and with standardized patients. Students work with preceptors in outpatient clinics in spring of year one where they continue to practice their new skills. Fall, Credit: 1. Spring, Credit: 2. *Sheline, McLeod, and Dell*

INTERDIS-204C. PRACTICE: ORIENTATION TO CLINICAL YEAR. Prior to beginning clerkships, students participate in the "Orientation to Clinical Year". Four weeks are devoted to preparing students to function well as clinical clerks. Students use problem-based learning to improve clinical problem-solving skills and review basic disease processes. They interview and examine patients on the wards and practice written and oral presentation skills. Summer, Credit: 4. *Sheline, Chatterjee, and Dell*

INTERDIS-205C. PRACTICE YEAR 2. During year two, students use the Practice course to reflect on their experiences on the clinical rotations. Discussion topics include ethics, suffering, spirituality, pain, professionalism, and end of life issues. Students develop skills in giving bad news and counseling around advance directives. Fall, Credit: 1. Spring, Credit: 1. *Sheline, McLeod, and Dell*

MPS-206C. MEDICAL PRACTICE AND HEALTH SYSTEMS/MPS. This two-week required clerkship uses lectures, small group discussions, practical projects, and readings to improve students' awareness and understanding of the complexity of the physician's role in rapidly changing systems of healthcare delivery. The course emphasizes the professional and ethical tensions that emerge while striving to optimize care for individuals and the populations of individuals. Consideration of cost focuses on the nature and behavior of costs relevant to health care and explores the ambiguities inherent in assessing cost effectiveness

of interventions from the divergent viewpoints of payors, managed care organizations, physicians, and individual patients. Interdepartmental faculty additionally provide perspective on past and present patterns of medical practice and offer possible models of future physician practices. Credit: 2. *Bredehoeft and staff*

INTERDIS-305C. PRACTICE YEAR 3. A continuity ambulatory (outpatient) care experience, the course is required of most third year students and is designed to teach students patient outcomes over time. Study away and scholarship students who may not be able to take the course in their third year must take its equivalent in their fourth year. The outpatient clinic experience is 34 weeks, one-half day a week. Twenty-two weeks are required in an approved continuity ambulatory site, primary care sites being the most likely to be approved. Specialty care sites (medicine or surgery) may be approved, if at least 50 percent of the patients are seen on a continuing basis with typical follow-up in 1-3 months. Approval for this is required by the Practice office. Students may arrange to use 12 of the 34 weeks to pursue non-continuity outpatient clinic experiences (e.g., specialty clinics that do not see patients back before 3 months, if at all). Notification of the Practice office is required prior to starting, and attendance must be documented by the preceptor. A student may choose to do all 34 weeks at the same approved site. Credit: 1.5. Enrollment: max 100. *Sheline*

Basic Science Electives

INTERDIS-307B. 20TH CENTURY AMERICAN MEDICINE. This course in medical history will examine how some of the major trends in American medicine in the twentieth century have changed the doctor-patient relationship. Topics will include: technology, therapeutics, practice organization, genetics, and changing patterns of disease. Credit: .5. Enrollment: min 1. *English*

INTERDIS-308B. ABORTION IN AMERICAN CULTURE. Few issues have cleaved American society as deeply as abortion. This seminar explores the American experience with abortion—before and after *Roe v. Wade*—examining issues of religion, politics, law, medicine, gender, and ethics. We will study aspects of fertility and family planning, the experiences of women both as abortionists and undergoing abortions, unwed mothers, teenage pregnancy and young parenthood, and the rise of advocacy groups in favor of and opposed to abortion. The seminar will draw also from the practices of Britain, Europe, and Japan. Credit: .5. Enrollment: min 1. *English*

INTERDIS-309B. MEDICINE BEFORE 1900. This course in medical history will explore the history of medicine before the twentieth century. It will include discussions of ancient, medieval, and Renaissance medicine as well as the origins of scientific medicine in the eighteenth and nineteenth centuries. A major part of this course will be using the Josiah Charles Trent Historical Collection of Rare Medical Books. Credit: .5. Enrollment: min 1. *English*

INTERDIS-310B. 20th CENTURY EPIDEMICS. This course in medical history will explore some of the major "plagues" of the twentieth century. Included will be influenza, polio, rheumatic fever, heart disease, cancer, anorexia nervosa, shell shock, and AIDS. Credit: .5. Enrollment: min 1. *English*

Clinical Science Electives

INTERDIS-302C. EXPLORING MEDICINE: CROSS-CULTURAL CHALLENGES TO MEDICINE IN THE 21ST CENTURY. The purpose of this course is to promote understanding of the cultural background that frames how the practice of medicine

can benefit the people of Latin America—particularly Honduras. The course content is designed to understand how art, political history, literature, music, and religion impact the medical lives of people in a foreign country. The seminar will facilitate understanding the meaning of medicine for the student in a different culture and the need to modify what and how medical issues are treated. The classes will be given by a multidisciplinary faculty. A trip to Honduras is planned for the spring with a limited number of students invited. They will meet Honduran students and faculty as well as offer medical care to patients during the visits. Spanish is not required but recommended. The course will be held as ten (10) two-hour seminars with the trip to Honduras as an optional laboratory experience. There will be approximately 20 hours of instruction. The course can be found on the web at <https://courses.duke.edu/courses/IND302C.01-S2003>. Credit: 2. Enrollment: Maximum 15. *Clements*

INTERDIS-304C. HEALING IN THE DEVELOPING WORLD AND CARE OF THE UNDERSERVED. This course examines healing from the perspective of individuals and communities around the world who live in poverty. Students examine the complex relationships between individuals and communities, medicine and theology where resources are scarce. The class is structured as a didactic classroom experience (January-May, Mondays 4-6 pm) with guest lecturers from the CDC in Atlanta, international nutrition experts, Haitian pastors, etc., and one week in Haiti that coincides with Duke University's spring break. The class addresses issues of cultural conflict, social justice, conducting research in developing countries, collateral damage that results from providing culturally relevant assistance, malnutrition, public policy, and theological considerations of intercultural ministries. In addition, some rudimentary knowledge of the Kreyol language and Haitian culture is introduced. While in Haiti, students observe programs that are being run by Haitians in collaboration with mission organizations. Seven classes are held in preparation for the trip and seven classes are held after the trip to provide a personal perspective to the didactic discussions. The goal of the course is to examine and challenge some of our basic values and assumptions about health and healthcare which we have acquired from living in the United States. For more information, go to www.familyhm.org. Credit: 2. *Walmer* (Med) and *Berger* (Divinity)

MEDICAL GENOMICS

Basic Science Elective

MGP-308B. INTRODUCTION TO PROTEOMICS. This course introduces the platform technologies and computational methodologies for protein profiling and interaction analysis. The platform technologies to be covered include mass spectroscopy, 2D gel electrophoresis, surface plasmon resonance, protein arrays and flow cytometry. Structural biology and high throughput screening methods will also be discussed. Prerequisite: Permission of instructor. C-L: CRP 255, MGP 208. Credit: 1. Enrollment: min 10, max 50. *Patel and staff*

MEDICINE

Edward S. Orgain Professor of Cardiology Pascal J. Goldschmidt, M.D., F.A.C.C. (Universite Libre de Bruxelles, Belgium, 1980), Chair.

Associate Professor: Dhavalkumar Patel, M.D. (Duke, 1989), Chief.

DIVISION OF CARDIOLOGY

Professor Thomas J. Ryan, M.D. (Indiana, 1981), Acting Chief.

Professors: Thomas M. Bashore, M.D. (Ohio, 1972); Victor S. Behar, M.D. (Duke, 1961); Donald F. Fortin, M.D. Professor of Cardiology Robert M. Califf, M.D. (Duke, 1978); Fred R. Cobb, M.D. (Mississippi, 1964); Augustus O. Grant, M.D. (Edinburgh, 1971); James B. Duke Professor of Medicine Joseph C. Greenfield, Jr., M.D. (Emory, 1956); Robert A. Harrington, M.D. (Tufts, 1986); J. Kevin Harrison, M.D. (New York, 1984); Joseph R. Kisslo, M.D. (Hahnemann, 1967); James B. Duke Professor of Medicine Robert J. Lefkowitz,

M.D.(Columbia, 1966); Daniel B. Mark, M.D. (Tufts, 1978); James J. Morris, M.D. (SUNY, 1959); Robert H. Peter, M.D. (Duke, 1961); Harry R. Phillips, M.D. (Duke, 1975); Howard A. Rockman, M.D. (McGill, 1983); Ursula Geller Professor for Research in Cardiovascular Diseases Gary Stiles, M.D. (Vanderbilt, 1975); R. Sanders Williams, M.D. (Duke, 1974).

Associate Professors: Brian H. Annex, M.D. (Yale, 1985); Christopher B. Granger, M.D. (Connecticut, 1984); Michael B. Higginbotham, M.D. (Melbourne, 1973); James G. Jollis, M.D. (Ohio, 1986); Robert M. Judd, Ph.D. (SUNY-Buffalo, 1990); Raymond J. Kim, M.D. (Columbia, 1990); William E. Kraus, M.D. (Duke, 1982); Mitchell W. Krucoff, M.D. (George Washington, 1980); Carolyn K. Landolfo, M.D. (Texas-Southwestern, 1988); Kenneth W. Mahaffey, M.D. (Washington, 1989); Kenneth Morris, M.D. (Ohio, 1972); L. Kristin Newby, M.D. (Indiana, 1987); Eric D. Peterson, M.D. (Pittsburgh, 1988); Michael H. Sketch, M.D. (Creighton, 1984); James Tchong, M.D. (Johns Hopkins, 1988); Galen S. Wagner, M.D. (Duke, 1965); Robert Waugh, M.D. (Pennsylvania, 1966); Andrew Wang, M.D. (Duke, 1990); James P. Zidar, M.D. (Loyola, 1985).

Associate Research Professor: Doris A. Taylor, Ph.D. (Texas-Southwestern, 1987).

Assistant Professors: John H. Alexander, M.D. (Pennsylvania, 1993); Karen P. Alexander, M.D. (Duke, 1992); Sana M. Al-Khatib, M.D. (Beirut, 1993); Tristram D. Bahnson, M.D. (California-at San Francisco, 1984); Michael A. Blazing, M.D. (California-San Francisco, 1987); Christopher H. Cabell, M.D. (Duke, 1994); Lawrence E. Crawford, M.D. (Virginia, 1987); Michael S. Cuffe, M.D. (Duke, 1991); G. Michael Felker, M.D. (Duke, 1993); Neil J. Freedman, M.D. (Harvard, 1985); M. Dee Gunn, M.D. (Southwestern, 1983); David E. Kandzari, M.D. (Duke, 1995); David F. Kong, M.D. (Johns Hopkins, 1993); Christopher D. Kontos, M.D. (Med. Coll. of Virginia, 1989); Matthew T. Roe, M.D. (Duke, 1993); Paul B. Rosenberg, M.D. (New Jersey, 1992); Stuart D. Russell, M.D. (Univ. Washington, 1991); Monica R. Shah, M.D. (Brown, 1994); Eric J. Velazquez, M.D. (Albert Einstein, 1994); David J. Whellan, M.D. (Washington, 1994).

Assistant Clinical Professors: Wendy A. Gattis, Pharm. D. (Campbell, 1995); Ruth Ann Greenfield, M.D. (Duke, 1985); Robert A. Sorrentino, M.D. (Albany Med. Coll. 1985).

Assistant Research Professors: EnnLing Chen, Ph.D. (Pennsylvania, 1998); Patricia A. Cowper, Ph.D. (California-Davis, 1984); Chunming Dong, M.D. (Shandong Med., 1984); Eric L. Eisenstein, D.B.A. (Cleveland State, 1995); Lan Mao, M.D. (Beijing Med., 1979); Karsten Peppel, Ph.D. (SUNY-Albany, 1990); Sathyamangla V. Naga Prasad, Ph.D. (Jawaharlal Nehru, 1996); Tao Wang, M.D., Ph.D. (Tongji Med., 1986); Zhen Yan, M.D., Ph.D. (Jiangsu Med., 1986).

Associates: Judy K. Battle, M.D. (Louisiana, 1993); Dipan J. Shah, M.D. (Wisconsin, 1994); Thomas R. Gehrig, M.D. (Florida, 1994).

DIVISION OF CLINICAL PHARMACOLOGY

Professor Christopher M. O'Connor, M.D. (Maryland, 1983), Chief.

DIVISION OF DERMATOLOGY

Professor Russell P. Hall, M.D., J. Lamar Callaway Professor of Dermatology, (Missouri, 1975), Chief.

Professor: Elise A. Olsen, M.D. (Baylor, 1978).

Associate Professors: Claude S. Burton, M.D. (Duke, 1979); James M. Gricchnik, M.D. (Harvard, 1990); John C. Murray, M.D. (Duke, 1977); Sarah C. Myers, M.D. (Duke, 1989); Neil S. Prose, M.D. (New York, 1975).

Associate Clinical Professor: Jonathan L. Cook, M.D. (Med. Univ. of South Carolina, 1992).

Associate Research Professor: Heather N. Yeowell, Ph.D. (North Carolina, 1983).

Assistant Professor: Caroline Hebert Rao, M.D. (Ohio State, 1996).

Assistant Clinical Professor: Navjeet K. Sidhu-Malik, M.D. (Duke, 1986).

Associate: Linda H. Lee, M.D. (Duke, 1998).

DIVISION OF ENDOCRINOLOGY, METABOLISM, AND NUTRITION

Professor Mark N. Feinglos, M.D. (McGill, 1973), Chief.

Professor: Warner M. Burch, M.D. (Wake Forest, 1971).

Associate Professors: John R. Guyton, M.D. (Harvard, 1973); Louis Luttrell, M.D. (Virginia, 1989).

Assistant Professors: Ann J. Brown, M.D. (Stanford, 1988); Thomas J. Weber, M.D. (Pritzker, 1989).

Assistant Clinical Professor: Jennifer B. Green, M.D. (Virginia, 1993).

Assistant Research Professors: Thomas C. Becker, Ph.D. (Texas-Dallas, 1996); Hans-Ewald Hohmeier, Ph.D. (Max-Planck Institute, 1991); Deborah Muoio, Ph.D. (North Carolina, 1999).

Associate: Susan E. Spratt, M.D. (Harvard, 1995).

DIVISION OF GASTROENTEROLOGY

Professor Paul G. Killenberg, M.D. (Pennsylvania, 1963), Acting Chief.

Professors: John Baillie, M.B. (Glasgow, 1977); Jonathan A. Cohn, M.D. (Rockefeller, 1978); Rodger A. Liddle, M.D. (Vanderbilt, 1978); Don C. Rockey, M.D. (Med. Coll. of Virginia, 1984); Joanne A. P. Wilson, M.D. (Duke, 1973).

Clinical Professor: Naurang M. Agrawal, M.B.B.S. (Grant Med. Coll., India, 1968).

Associate Professors: M. Stanley Branch, M.D. (Med. Coll. of Georgia, 1984); Paul S. Jowell, M.D. (Capetown, 1983); Dawn Provenzale, M.D. (Albany, 1984).

Assistant Professors: Wendy Z. Davis, M.D. (Duke, 1989); Michael Heneghan, M.D. (Coll. of Dublin, 1992);

Andrew J. Muir, M.D. (Duke, 1993); John F. O'Connor, M.D. (National Univ. of Ireland, 1983); Jane E. Onken, M.D. (George Washington, 1987).

Assistant Clinical Professor: David A. Tendler, M.D. (Yale, 1993).
Assistant Research Professors: Richard T. Premont, Ph.D. (CUNY, 1992); Zengdun Shi, M.D. (Xian Med., 1985).
Associates: Crystal Bernstein, M.D. (Duke, 1996); Michael F. Byrne, M.D., Ch.B. (Liverpool, 1992); Deborah A. Fisher, M.D. (Vanderbilt, 1996); Henning Gerke, M.D. (Hamburg, 1996); R. Michael Mitchell, M.D., Ch.B. (Queens, 1992).
Instructor Temporary: John G. McHutchison, M.D. (Melbourne, 1981).

DIVISION OF GENERAL INTERNAL MEDICINE

Associate Professor Eugene Z. Oddone, M.D. (Colorado, 1985), Chief.
Professor of Practice of Medical Ethics and Humanities: Angela Holder, L.L.M. (Yale, 1975).
Professors: David B. Matchar, M.D. (Maryland, 1980); Kevin Schulman, M.D. (New York, 1988); David L. Simel, M.D. (Duke, 1980); Jeremy Sugarman, M.D. (Duke, 1986).
Research Professor: Ronnie Horner, Ph.D. (Ohio State, 1984).
Associate Professors: Lori A. Bastian, M.D. (Emory, 1987); Douglas C. McCrory, M.D. (Miami, 1986); James A. Tulsy, M.D. (Illinois, 1987); Eric C. Westman, M.D. (Wisconsin, 1986); John W. Williams, Jr., M.D. (North Carolina, 1984).
Associate Clinical Professor: Lawrence H. Greenblatt, M.D. (Northwestern, 1990).
Associate Research Professor: Hayden B. Bosworth, Ph.D. (Pennsylvania State, 1996).
Assistant Professors: Rowena J. Dolor, M.D. (Duke, 1991); David E. Edelman, M.D. (Baylor, 1991); Linda H. Harpole, M.D. (Duke, 1992); Sheri A. Keitz, M.D. (Mt. Sinai, 1991); John D. Whited, M.D. (West Virginia, 1990).
Assistant Clinical Professors: Martha B. Adams, M.D. (Virginia, 1976); Charles O. Beauchamp, M.D. (Duke, 1975); Lisa A. Giannetto, M.D. (Loyola, 1986); Scott V. Joy, M.D. (Pittsburgh, 1992); Judith M. Kramer, M.D. (North Carolina, 1977); Evangeline R. Lausier, M.D. (Vermont, 1979); Richard S. Liebowitz, M.D. (Rutgers, 1980); Michael W. Meredith, M.D. (North Carolina, 1994); Robert W. Paterson, M.D. (Duke, 1979); Amy W. Shaheen, M.D. (Washington, 1989); Kathleen A. Waite, M.D. (Duke, 1990).
Assistant Research Professors: Carol Smith Hammond, Ph.D. (Florida, 1993); Teresa L. Kauf, Ph.D. (Illinois at Champaign, 1995); Shelby D. Reed, Ph.D. (Maryland, 1998); Karen Steinhauser, Ph.D. (Duke, 1996).
Associates: Swati Agrawal, M.D. (Miami, 1997); Cheryl A. Baker, M.D. (Albany 1995); Cedric M. Bright, M.D. (North Carolina, 1990); S. Tublu Chatterjee, M.D. (Boston, 1990); Marisa R. D'Silva, M.D. (North Carolina, 1992); Edward A. Evans, M.D. (UMDNJ, 1998); Kenneth C. Goldberg, M.D. (Med. Coll. of Wisconsin, 1994); Amanda L. Green, M.D. (Baylor, 1998); Emily E. Hass, M.D. (Pennsylvania State, 1994); Michael N. Hayden, M.D. (Duke, 1995); Donald D. Hegland, M.D. (Florida, 1999); Nicole E. Jelesoff, M.D. (Georgetown, 1991); Catherine P. Kaminetzky, M.D. (Duke, 1998); Jacob P. Laubach, M.D. (Duke, 1999); Sabina M. Lee, M.D. (Alabama-Birmingham, 1989); Anne F. Phelps, M.D. (Michigan, 1998); Amy J. Rosenthal, M.D. (Med. Coll. of Virginia, 1987); Vernice Royal, M.D. (Duke, 1992); Jeannette F. Stein, M.D. (North Carolina, 1981); Nadine D. Tanenbaum, M.D. (Miami, 1998); Melissa G. Teitelman, M.D. (Temple, 1999); Ralph L. Wall, Jr., M.D. (North Carolina, 1978); Kevin B. Waters, M.D. (New Mexico, 1984); William S. Yancy, M.D. (East Carolina, 1995).
Clinical Associate: Carol Saur, M.S.N., R.N., C.S. (Georgetown, 1963).

DIVISION OF GERIATRICS

Professor Harvey Jay Cohen, M.D. (SUNY, 1965), Chief.
Professor: Kenneth W. Lyles, M.D. (Med. Coll. of Virginia, 1974).
Associate Professors: Anthony N. Galanos, M.D. (South Alabama, 1986); Helen Hoenig, M.D. (Arizona, 1985); Kenneth E. Schmader, M.D. (Wake Forest, 1980).
Associate Clinical Professors: Toni Cutson, M.D. (Med. Coll. of Virginia, 1980); Jack I. Twersky, M.D. (Hahnemann, 1982).
Associate Research Professor: Connie Bales, Ph.D. (Tennessee, 1981).
Assistant Professor: Heidi K. White, M.D. (Washington, 1989).
Assistant Research Professors: Pao-Hwo Lin, Ph.D. (Texas-Austin, 1990); Miriam Morey, Ph.D. (North Carolina, 1997); Christine Ruby, Pharm.D. (Pittsburgh, 1994); Gregory A. Taylor, Ph.D. (Duke, 1995).
Associates: Cathleen Colon-Emeric, M.D. (Johns Hopkins, 1994); Mitchell T. Heflin, M.D. (Virginia, 1994); Kimberly S. Johnson, M.D. (Hopkins, 1997); Pearl Seo, M.D. (Cornell, 1995).

DIVISION OF HEMATOLOGY

Wellcome Clinical Professor of Medicine in Honor of R. Wayne Rundles Marilyn J. Telen, M.D. (New York, 1977), Chief.
Professors: Charles S. Greenberg, M.D. (Hahnemann, 1976); J. Brice Weinberg, M.D. (Arkansas, 1969).
Associate Professors: William H. Kane, M.D. (Washington, 1982); Thomas L. Ortel, M.D. (Indiana, 1985).
Assistant Professors: Murat O. Arcasoy, M.D. (Aegean, 1987); Gowthami Arepally, M.D. (Vanderbilt, 1989); John R. Pawloski, M.D. (St. Louis, 1994).
Assistant Research Professors: Dipak K. Ghosh, Ph.D. (Calcutta, 1984); Thung Lai, Ph.D. (Kent State, 1990); Qin Zen, Ph.D. (Ohio State, 1996).
Associates: Laura M. De Castro, M.D. (Autonoma de Santo Domingo, 1986); Susan I. O'Shea, M.D. (Univ. Coll. Cork, 1993).

DIVISION OF INFECTIOUS DISEASES

Professor John D. Hamilton, M.D. (Colorado, 1964), Chief.

Professors: John A. Bartlett, M.D. (Virginia, 1981); G. Ralph Corey, M.D. (Baylor, 1973); John Perfect, M.D. (Med. Coll. of Ohio, 1975); Daniel J. Sexton, M.D. (Northwestern, 1971); Kenneth H. Wilson, M.D. (North Carolina, 1974).

Associate Clinical Professor: Charles B. Hicks, M.D. (George Washington, 1979).

Assistant Professors: Barbara D. Alexander, M.D. (East Carolina, 1993); J. Andrew Alspaugh, M.D. (Duke, 1991); Gary M. Cox, M.D. (Virginia, 1989); Vance G. Fowler, Jr., M.D. (North Carolina, 1993); Richard Frothingham, M.D. (Duke, 1981); Carol Dukes Hamilton, M.D. (Utah, 1985); Keith S. Kaye, M.D. (Pennsylvania, 1994); Nathan M. Thielman, M.D. (Duke, 1990); Christopher Woods, M.D. (Duke, 1994).

Assistant Research Professors: Richard H. Drew, Pharm.D. (North Carolina, 1999); Dena L. Toffaletti, Ph.D. (North Carolina, 1977).

Associates: John A. Crump, M.D. (Otago, 1993); Melissa D. Johnson, Pharm.D. (Campbell, 1997); Jason Stout, M.D. (SUNY-Syracuse, 1996).

DIVISION OF MEDICAL ONCOLOGY

James B. Wyngaarden Professor of Medicine Keith M. Sullivan, M.D. (Indiana, 1971), Chief.

Professors: Nelson J. Chao, M.D. (Yale, 1981); William W. Shingleton Professor of Cancer Research O. Michael Colvin, M.D. (Washington, 1961); Jeffrey Crawford, M.D. (Ohio State, 1974); Jon P. Gockerman, M.D. (Chicago, 1967); Andrew T. Huang, M.D. (Taiwan, 1965); Joseph O. Moore, M.D. (Johns Hopkins, 1971).

Associate Professors: Frank R. Dunphy, II (Louisiana-Shreveport, 1979); Matthew J.C. Ellis, M.D. (Royal Postgraduate Med. School, 1991); Jared A. Gollob, M.D. (Columbia, 1989); Michael Kelley, M.D. (Michigan, 1985); Victoria L. Seewaldt, M.D. (California-Davis, 1989); James J. Vredenburg, M.D. (Vermont, 1983).

Associate Clinical Professor: Gwynn D. Long, M.D. (Wake Forest, 1983).

Associate Research Professors: David Adams, Ph.D. (Nebraska, 1979); Susan M. Ludeman, Ph.D. (Catholic Univ., 1979).

Assistant Professors: Kimberly L. Blackwell, M.D. (Mayo, 1994); Gerard C. Blobe, M.D. (Duke, 1995); Carlos de Castro, M.D. (Southwestern, 1985); Cristina Gasparetto, M.D. (Rome, 1986); Jennifer L. Garst, M.D. (Med. Coll. of Georgia, 1990); Herbert I. Hurwitz, M.D. (Jefferson, 1988); Susan J. Littman, M.D. (Albany, 1989); Michael Morse, M.D. (Yale, 1990); David Rizzieri, M.D. (Rochester, 1991); Linda M. Sutton, M.D. (Massachusetts, 1987); Yiping Yang, M.D. (Zhejiang, 1985).

Assistant Research Professors: Jun Chen, M.D. (Sun Yat-Sen Univ., 1994); Adrianus G.W. Domen, Ph.D. (Amsterdam, 1993); Michael P. Gamesik, Ph.D. (Edinburgh, 1983); Junichi Nishimura, M.D., Ph.D. (Osaka Univ.); Joel R. Ross, Ph.D. (Texas-Dallas, 1991); Robert W. Storms, Ph.D. (Texas-Austin, 1991); YingFu Su, Ph.D. (Colorado, 1979).

Associates: Radhika Khwaja, M.D. (Maulana Azad, 1992); P. Kelly Marcom, M.D. (Baylor, 1989); Heather S. Shaw, M.D. (Duke, 1993).

Clinical Associate: Ashley Morris Engemann, Pharm. D. (North Carolina, 1993).

DIVISION OF NEPHROLOGY

James R. Clapp Professor of Medicine Thomas M. Coffman, M.D. (Ohio, 1980), Chief.

Professors: Steve J. Schwab, M.D. (Missouri, 1979); Laura P. Svetkey, M.D. (Harvard, 1979); William E. Yarger, M.D. (Baylor, 1963).

Clinical Professor: Arthur Greenberg, M.D. (Washington, 1975).

Associate Professors: Michael S. Berkoben, M.D. (Pennsylvania, 1986); David W. Bütterly, M.D. (Duke, 1987); Mary H. Foster, M.D. (North Carolina, 1982); Eugene C. Kovalik, M.D. (McGill, 1987); L. Darryl Quarles, M.D. (Alabama, 1979); Stephen R. Smith, M.D. (Duke, 1985); Robert F. Spurney, M.D. (Ohio, 1983).

Assistant Professors: Krairerk Athirakul, M.D. (Prince of Sojgkla, 1986); Thu H. Le, M.D. (Georgetown, 1993); Michael I. Oliverio, M.D. (West Virginia, 1990); Donal Reddan, M.D. (Univ. Coll. of Dublin, 1992); Lynda A. Szczech, M.D. (Jefferson Med., 1991); Michelle P. Winn, M.D. (East Carolina, 1992).

Assistant Research Professors: Charles E. Burnham, II, Ph.D. (Alabama, 1982); Min Pi, Ph.D. (Univ. of Tsukuba); Zhousheng Xiao, M.D. (Hengyang, 1987).

DIVISION OF NEUROLOGY

Professor Warren J. Strittmatter, M.D. (Duke, 1973), Chief.

Professors: Larry B. Goldstein, M.D. (Mt. Sinai, 1981); Janice M. Massey, M.D. (Georgetown, 1978); Rodney A. Radtke, M.D. (Northwestern, 1980); Donald B. Sanders, M.D. (Harvard, 1964); Donald Schmechel, M.D. (Harvard, 1974); Jeffery M. Vance, M.D. (Duke, 1984).

Research Professor: Carol A. Colton, Ph.D. (Rutgers, 1973).

Associate Professors: James R. Burke, M.D. (New York-Brooklyn, 1985); Barrie H. Hurwitz, M.D. (Witwatersrand, 1968); Daniel T. Laskowitz, M.D. (Duke, 1991); Joel C. Morgenlander, M.D. (Pittsburgh, 1986).

Associate Clinical Professors: E. Wayne Massey, M.D. (Texas-Galveston, 1970); Mark B. Skeen, M.D. (Miami, 1982); Kevan VanLandingham, M.D. (Virginia, 1985).

Associate Research Professors: Ann Saunders, Ph.D. (Duke, 1987); Michael P. Vitek, Ph.D. (Dartmouth, 1983).

Assistant Professors: Richard S. Bedlack, M.D. (Connecticut, 1995); Aatif M. Husain, M.D. (Rawalpindi,

1989); Martin J. McKeown, M.D. (Toronto, 1990); Jennifer A. Quinn, M.D. (East Carolina, 1994); Jeremy N. Rich, M.D. (Duke, 1993).

Assistant Clinical Professors: Carmelo Graffagnino, M.D. (West-Ontario, 1985); Burton L. Scott, M.D. (Miami, 1990).

Assistant Research Professors: Hana N. Dawson, Ph.D. (South Florida, 1996); XiaoPing He, Ph.D. (Shanghai Med., 1987); Enhui Pan, M.D. (Tianjin Med., 1982); Ram S. Puranam, Ph.D. (Indian Institute, 1986); Patrick M. Sullivan, Ph.D. (North Carolina, 1993).

Associates: Cheryl D. Bushnell, M.D. (Med. Coll. of Wisconsin, 1995); Vani R. Chilukuri, M.D. (Andhra Med. 1982); Melvin W. Kong, M.D. (Calgary, 1991); John R. Lynch, M.D. (Duke, 1994).

DIVISION OF PULMONARY AND CRITICAL CARE MEDICINE

Walter Kempner Professor of Medicine David A. Schwartz, M.D. (California-San Diego, 1979), Chief

Professors: William J. Fulkerson, M.D. (North Carolina, 1977); Neil R. MacIntyre, M.D. (Cornell, 1972); Claude Piantadosi, M.D. (Johns Hopkins, 1975); Jonathan Stamler, M.D. (Mt. Sinai, 1985); Stephen L. Young, M.D. (California-San Francisco, 1968).

Research Professors: W. Michael Foster, Ph.D. (New York, 1975); Fredrick J. Miller, Ph.D. (North Carolina State, 1977).

Associate Professors: Rodney J. Folz, M.D. (Washington, 1989); Victor F. Tapson, M.D. (Hahnemann, 1982).

Associate Clinical Professors: Peter S. Kussin, M.D. (Mt. Sinai, 1985); Michael L. Russell, M.D. (North Carolina, 1985); Mark P. Steele, M.D. (Illinois, 1982).

Assistant Professors: Martha S. Carraway, M.D. (Wake Forest, 1988); Jerry Eu, M.D. (Chicago, 1992); Joseph A. Govert, M.D. (California-Irvine, 1989); Harvey E. Marshall, M.D. (Wake Forest, 1991); Douglas G. Kelling, M.D. (Harvard, 1972); Timothy J. McMahon, M.D. (Tulane, 1993); Scott M. Palmer, M.D. (Duke, 1993); Loretta G. Que, M.D. (Chicago-Pritzker, 1989); Karen Welty-Wolf, M.D. (Duke, 1986).

Assistant Clinical Professor: Angela M. Davis, M.D. (Med. Univ. of South Carolina, 1995).

Assistant Research Professors: Barbara Buckley, Ph.D. (Johns Hopkins, 1985); Donald N. Cook, Ph.D. (McGill, 1990); Alfred Hausladen, Ph.D. (Virginia Polytechnic, 1992); Douglas T. Hess, Ph.D. (Mass. Inst. of Tech, 1987); John Q. Liu, M.D. (Xuzhou Med. Coll., 1982); Julia Walker, Ph.D. (Queen's, 1996); Yun Zhao, Ph.D. (Shanghai Med., 1990).

Associates in Medicine: Gregory Ahearn, M.D. (Hahnemann, 1995); Debra L. Miller, M.D. (Albert Einstein, 1994); Michael F. Reidy, M.D. (George Washington, 1990).

DIVISION OF RHEUMATOLOGY

Professor David S. Pisetsky, M.D. (Albert Einstein, 1973), Chief

Professors: Nancy B. Allen, M.D. (Tufts, 1978); Frederic M. Hanes Professor of Medicine Barton F. Haynes, M.D. (Baylor, 1973); Michael S. Hershfield, M.D. (Pennsylvania, 1967); Nicholas M. Kredich, M.D. (Michigan, 1962); Ralph Snyderman, M.D., James B. Duke Professor of Medicine (New York-Downstate, 1965); E. William St. Clair, M.D. (West Virginia, 1980).

Clinical Professor: Rex M. McCallum, M.D. (Vanderbilt, 1980).

Associate Professors: David S. Caldwell, M.D. (Wake Forest, 1967); Virginia B. Kraus, M.D. (Duke, 1982); John R. Rice, M.D. (Miami, 1968).

Associate Research Professors: Feng Gao, M.D. (Harbin Med. Coll., 1984); Hua-Xin Liao, Ph.D. (North Carolina, 1991); Kay H. Singer, Ph.D. (Duke, 1977).

Assistant Professors: Marc C. Levesque, M.D. (Yale, 1989); John S. Sundry, M.D. (Hahnemann, 1991).

Assistant Research Professors: S. Munir Alam, Ph.D. (Glasgow, 1992); Alan Fong, Ph.D., (California-San Diego, 1990); Gregory D. Sempowski, Ph.D. (Rochester, 1997); Herman F. Staats, Ph.D. (Southern Alabama, 1992); John F. Whitesides, Ph.D. (Auburn, 1990).

SECTION OF MEDICAL GENETICS

James B. Duke Professor of Medicine Margaret Pericak-Vance, Ph.D. (Indiana, 1978), Chief

Research Professor: John R. Gilbert, Ph.D. (North Carolina, 1982).

Associate Research Professors: William K. Scott, Ph.D. (South Carolina, 1996); Marcy Speer, Ph.D. (Duke, 1993).

Assistant Research Professors: Allison Ashley-Koch, Ph.D. (Emory, 1997); Elizabeth Hauser, Ph.D. (Michigan, 1998); Michael A. Hauser, Ph.D. (Johns Hopkins, 1990); Yi-Ju Li, Ph.D. (North Carolina State, 1996); Eden R. Martin, Ph.D. (North Carolina State, 1997); Judith Stenger, Ph.D. (SUNY-Stony Brook, 1994).

Visiting Associate: Goldie S. Byrd, Ph.D. (Meharry, 1986).

ADJUNCT FACULTY

Professor of Experimental Medicine: James E. Nidel, M.D. (Miami, 1973).

Adjunct Professors: Richard D. Bukoski, Ph.D. (Baylor, 1982); Nicolas Chronos, M.D., (Univ. Coll. of London, 1987); Steven R. Kleeburger, Ph.D. (Kent State, 1982); Edmund G. Lowrie, M.D. (Wayne State, 1963); Elizabeth J. Mutran, Ph.D. (Indiana, 1977); William F. Owen, Jr., (Tufts, 1980); Paddy A. Phillips, M.D. (Adelaide, 1979); Hugh H. Tilson, M.D. (Washington, 1964); Morris Weinberger, Ph.D. (Purdue, 1978).

Adjunct Associate Professors: Scott D. Berkowitz, M.D. (Jefferson, 1979); Edward Breitschwerdt, D.V.M. (Georgia, 1974); David A. Hosford, M.D. (Emory, 1983); Tony Huang, M.D. (National Taiwan, 1983); David J.

Kroll, Ph.D. (Florida, 1989); David Peden, M.D. (West Virginia, 1984); John S. Penta, Ph.D. (Purdue, 1967); Walter J. Rogan, M.D. (California-San Francisco, 1975); Sandra L. White, Ph.D. (Michigan, 1974).

Adjunct Assistant Professors: Nicholas M. Anstey, M.D. (Western Australia, 1985); Linda A. Charles, M.D. (North Carolina, 1991); Gang Cheng, M.D. (West China, 1983); Padmaja R. Kaul, Ph.D. (Alberta, 2000); Richard Kent, M.D. (California-San Diego, 1975); Michael E. McCullough, Ph.D. (Virginia Commonwealth, 1995); Kimberly S. Mohs, M.D. (Uniformed Services, 1996); William P. Petros, Pharm.D. (Philadelphia Coll. of Pharm., 1987); M. Audrey Rudd, Ph.D. (Wake Forest, 1983); Jack A. Taylor, M.D. (Wisconsin, 1984); Chirayu Udomsakdi-Auewarakul, M.D. (Mahidol, 1988).

Adjunct Assistant Professor of Experimental Medicine: John J. O'Neil, Ph.D. (California-San Francisco, 1974).

Adjunct Associate: Preston S. Klassen, M.D. (Nebraska, 1994).

CONSULTING FACULTY

Consulting Associates: David J. Ahr, M.D. (Georgetown, 1969); Sangeeta Amin, M.D. (Med. Coll. of India, 1988); Faye T. Banks, M.D. (Virginia, 1982); L. Thomas Barber, M.D. (George Washington, 1982); Habib Bassil, M.D. (St. Joseph, 1980); Kenneth R. Beer, M.D. (Pennsylvania, 1989); Polly A. Beere, M.D. (Chicago, 1986); Alfonso E. Bello, M.D. (Chicago, 1990); Ira M. Bernstein, M.D. (Wake Forest, 1970); Alan M. Blaker, M.D. (Maryland, 1984); Charles R. Bokesch, M.D. (Emory, 1973); James F. Boyd, M.D. (Duke, 1974); Garrett Bressler, M.D. (Duke, 1978); Louis L. Brunetti, M.D. (Mt. Sinai, 1983); Robert A. Buchanan, M.D. (Wake Forest, 1969); A. Gray Bullard, M.D. (North Carolina, 1985); Dwayne D. Callwood, M.D. (Med. Coll. of Virginia, 1989); Paul Campbell, M.D. (Temple, 1985); Stefani L. Capone, M.D. (Tulane, 1991); John F. Carr, M.D. (Tennessee, 1968); Raul G. Castillo, M.D. (Ponce Sch. of Med., 1985); Geoffrey S. Chapman, M.D. (California at San Francisco, 1975); Ajit S. Chauhan, M.B.B.S. (BJ Med. Sch., 1978); Ambrose Chiang, M.D. (Taipei Med. Coll., 1981); Paul R. Conkling, M.D. (Ohio, 1982); Henry Y. Chow, M.D. (Eastern Virginia, 1991); Thomas A. Dalton, M.D. (Maryland-Baltimore, 1987); James D. Daniels, M.D. (Med. Coll. of Virginia, 1966); Daryl C. Emery, M.D. (Bowman Gray, 1981); Richard B. Everson, M.D. (Rochester, 1972); Joseph M. Falsone, M.D. (SUNY-Buffalo, 1994); Kenneth A. Fath, M.D. (Ohio State, 1986); Janet K. Gafford, M.D. (Indiana, 1983); Carl E. Gessner, M.D. (Maryland, 1990); Richard Goulah, M.D. (St. George, 1982); James N. Harris, M.D. (Emory, 1973); Douglas L. Hill, M.D. (Vanderbilt, 1987); John D. Hunter, M.D. (Duke, 1976); Dennis C. Kasaban, M.D. (Graz, 1977); Roger Karam, M.D. (Los Andes, 1980); Shaikat A. Khan, M.D. (King Edward Med. Coll., 1986); Gerrit A. Kimmey, M.D. (Med. Univ. of South Carolina, 1979); Joseph M. Kmonicek, M.D. (Jefferson, 1980); Fred M. Krainin, M.D. (Boston, 1981); Bruce J. Kowalski, M.D. (Marshall, 1991); Stanley Levy, M.D. (Georgetown, 1971); Richard N. Lind, M.D. (Illinois, 1977); Robert P. Lineberger, M.D. (North Carolina, 1984); Jimmy Locklear, M.D. (North Carolina, 1980); Linda F. Lukman, M.D. (St. George, 1990); Martin D. Mark, M.B., Ch.B. (Cape Town, 1979); Elisabeth A. McKeen, M.D. (Albany, 1974); Gary P. Miller, M.D. (Virginia, 1976); David C. Molthrop, Jr., M.D. (Louisiana State, 1987); A. Dean Morgan, M.D. (Duke, 1975); Alexander Paraschos, M.D. (Med. Coll. of Virginia, 1986); Robert E. Pryor, M.D. (Baylor, 1986); Michael A. Rave, M.D. (Uniformed Services, 1989); Veronica J. F. Ray, M.D. (North Carolina, 1979); David F. Rhodes, M.D. (Vanderbilt, 1985); David N. Robinson, M.D. (Florida-Gainesville, 1989); Vera Ann Rose, M.D. (East Tennessee, 1985); Neal A. Rothschild, M.D. (UMDNJ, 1981); Manfred Rothstein, M.D. (Duke, 1974); Peter Rubin, M.D. (Calgary, 1988); Augustin J. Schwartz, M.D. (Jefferson, 1971); Roger L. Seagle, M.D. (Wake Forest, 1979); Jeffrey T. Seder, M.D. (CETEC, 1982); Willie J. Sessions, M.D. (Tufts, 1985); Patrick J. Simpson, M.D. (North Carolina, 1993); Daniel L. Spitz, M.D. (Med. Univ. of South Carolina, 1980); Robert K. Stack, M.D. (Wayne State, 1981); Thomas A. Steffens, M.D. (Tufts, 1982); Jean-Francois Tanguay, M.D. (Montreal, 1987); Thomas F. Trahey, M.D. (Wake Forest, 1984); Tony L. Walden, M.D. (North Carolina, 1981); Donald K. Wallace, M.D. (Duke, 1959); Robert A. Warner, M.D. (SUNY-Syracuse, 1969); Diane M. Williams, M.D. (Minnesota, 1987); Boshra George Zakhary, M.D. (Ain Shams, 1981); William J. Zimmer, M.D. (Wisconsin, 1986).

Consulting Associates: DUKE UNIVERSITY AFFILIATED PHYSICIANS (DUAP): Lori C. Abel-Meyerhoffer, M.D. (South Florida, 1994); Susan P. Blackford, M.D. (Duke, 1991); Arnett Coleman, M.D. (Duke, 1975); Nurum Erdem, M.D. (Michigan, 1996); Ron D. Fleming, M.D. (Vanderbilt, 1984); Elaine Hart-Brothers, M.D. (Tufts, 1976); Jan Anita Leigh-Fleming, M.D. (Georgetown, 1986); Carlton David Miller, M.D. (North Carolina, 1987); Colleen P. Ramsey, M.D. (New Jersey Med. Sch., 1992); Michael B. Shipley, M.D. (Duke, 1974); Raymond J. Toher, M.D. (Duke, 1975); William F. Uthe, M.D. (Med. Coll. of Ohio, 1974); Mei Wang-Casey, M.D. (North Carolina, 1998); John W. Whelan, M.D. (Jefferson, 1990).

Consulting Associates: COMMUNITY PDC PHYSICIANS (CPDC): Melissa Y. Allan, M.D. (Wisconsin, 1997); Russell Anderson, M.D. (Duke, 1984); Timothy A. Collins, M.D. (Wayne State, 1988); Mohamed A. Effat, M.D. (Cairo, 1985); Maria M. Fakadej, M.D. (West Virginia, 1996); David E. Guyer, M.D. (Case Western, 1972); Gail A. Leget, M.D. (Faculte Libre de Medecine, 1992); Sharon L. Taylor, M.D. (New York, 1982); Brian C. Torgerson, M.D. (Minnesota, 1978); Susan E. Whelan, D.O. (Philadelphia Coll. of Osteopathic Med., 1995).

Emeriti: C. Edward Buckley, M.D.; James R. Clapp, M.D.; George J. Ellis, M.D.; Jerome M. Feldman, M.D.; Walter L. Floyd, M.D.; John T. Garbutt, M.D.; J. Caulie Gunnells, M.D.; Byron B. Hamilton, M.D.; Albert Heyman, M.D.; Jacqueline C. Hijmans, M.D.; Charles Johnson, M.D.; Russel Kaufman, M.D.; Yi-Hong Kong, M.D.; Johannes A. Kylstra, M.D.; Thomas T. Long, M.D.; Michael McLeod, M.D.; Harry T. McPherson, M.D.; Francis A. Neelon, M.D.; Barbara Newborg, M.D.; Thomas F. Newcomb, M.D.; J. Lamar Callaway Professor of Dermatology Sheldon R. Pinnell, M.D.; Robert A. Rosati, M.D.; Florence McAlister Professor of Medicine Wendell F. Rosse, M.D.; Marvin Rozear, M.D.; Herbert A. Saltzman, M.D.; Herbert O. Stieker, M.D.; Harold R. Silberman, M.D.; Richard S. Stack, M.D.; Eugene A. Stead, Jr., M.D.; Ara Tourian, M.D.; Malcolm P. Tyor, M.D.; Robert E. Whalen, M.D.; James B. Wyngaarden, M.D.

Required Courses

MEDICINE-205C. MEDICINE (DUKE/DURHAM REGIONAL/VAMC). During the second year clerkship in medicine, students will be assigned for four weeks each to a team taking care of patients on the Internal Medicine Wards at Duke Hospital or the Durham Veterans Administration Hospital. Functioning within these teams allows students to observe, practice, acquire, and refine basic humanistic and clinical skills, and some of the factual information used in the practice of medicine. It is a time for students to consolidate what has been learned during the first year and apply it to the study of their "own" patients. Since it is not possible to cover systematically the entire body of internal medicine during the eight weeks, students are provided with a series of representative learning experiences based on the case-study method. The goals are to teach a method of patient evaluation and care and to provide a firm foundation in medical problem-solving that will be helpful throughout the student's future career. It is specifically expected that students will: (1) Perform and record a complete history and physical examination on each patient they admit. (During the first four weeks, this should be a minimum of two patients per week; thereafter, at least three patients per week). (2) Discuss their plan(s) for the evaluation and care of the patient after the resident has also assessed the patient, with both returning to the bedside to resolve any discrepant historical or physical examination findings. (3) Have their complete written work-up including analysis of primary data (e.g. peripheral blood smear, urinalysis, sputum gram stain, ECG, etc.) in the chart by 8:00 a.m. the next day. It is important during the clerkship to learn to evaluate primary data in a timely fashion. (4) Take primary responsibility for the care of their patients, following them daily, writing progress notes in the chart, knowing what has happened to their patients since last seen, as well as knowing the rationale for and outcomes of all diagnostic tests and therapeutic interventions. (5) Participate in various diagnostic/therapeutic procedures (e.g., lumbar puncture, thoracentesis, paracentesis, arthrocentesis, arterial blood gas drawing, placement of intravenous line), and perform these procedures under appropriate supervision. (6) See each of their patients on a daily basis before morning work rounds, review what has happened since last seen, formulate a preliminary plan of care and treatment for each patient and then present these formulations to their ward teams during morning work rounds. (7) Prepare for their bedside case presentations by reading, at a minimum, relevant sections in a standard textbook of medicine. (8) Present their patients to an attending physician within 24 hours of admission, knowing all pertinent medical information as well as the rationale for their ongoing plan(s) for care and evaluation. (9) Not miss any attending rounds without prior permission from their attending physician. (10) Attend all Chair's Conferences, Physical Diagnosis Teaching Rounds, Medical Grand Rounds, and the Student-Lecture Series, and other site-assigned teaching activities/conferences unless urgent ward duties preclude doing so. Methods of evaluation: During week four and week eight, a grading committee composed of the resident(s) and the attending physician(s) with whom the student has worked, the Chief/Assistant Chief Medical Resident and the Course Director meet and evaluate each student based on the standard course evaluation form. A copy of the evaluation form is distributed to each student during the initial orientation to the clerkship. The final grade is a weighted average of the mid-term grade, the final grade, and, depending on circumstances, a practical and/or written examination. Weight: 8. *Waugh and staff*

MEDICINE-207C. NEUROLOGY. This course, which is restricted to second year students, provides a firm understanding of the neurological examination, formulation of clinical neurological problems, and practice with written and oral communications in a hospital setting. The student has the opportunity to apply the neuroanatomy, neurophysiology, neurochemistry, and neuropathology learned in the first year to the evaluation and care of his

or her patients. Each student is assigned patients from the neurology services at Duke Hospital or the Durham VA Medical Center. The student elicits a history and performs a physical examination. The student records the findings in the hospital charts and presents the findings at regular staff rounds. The student then participates with a clinical team of faculty and house officers in the hospital evaluation of the patients. The student is encouraged to participate in all diagnostic procedures such as lumbar puncture. The student has the opportunity to follow patients through neuro-radiological and neuro-surgical procedures forming part of evaluation and treatment.

The specific expectations for the sophomore student are: (1) to perform and record a competent neurological and history examination on each admitted patient, (2) to be competent in the hospital management of neurological patients including diagnostic appropriate electrical studies, (3) to assume responsibility as the primary care person for his or her patients, to include daily progress notes on hospital charts, and to be familiar with the results of all therapeutic interventions and diagnostic tests performed on patients, (4) to participate in daily work rounds with an assigned team of house officers and faculty, (5) to be sufficiently knowledgeable to be able to participate in patient care decisions, (6) to attend faculty attending rounds and to present patients to faculty within 24 hours after admission, and (7) to participate in neurology service rounds and conferences during the course.

The course includes faculty lectures. A written evaluation is provided to the students by faculty and house staff. There is an examination.

During the second year, non-primary care students may select either COMMFAM-205C or a combination of COMMFAM-207C and MEDICINE 207C. Primary care students may complete the neurology clerkship during their fourth year. Weight: 4. *Chilukuri*

Clinical Science Electives

MEDICINE-210C. ADVANCED GENERAL MEDICINE (DUKE). (1) Course Goals: To expand the experience and knowledge gained during the second year medicine clerkship. Primary-To provide additional experience in the management of hospitalized patients with a wide variety of general internal medical problems. Secondary-To develop a comprehensive understanding of the pathophysiology of the common problems encountered on an internal medicine inpatient service. This course is recommended for visiting students and Duke students who receive a grade of straight Pass in MEDICINE 205C. (2) How Goals Are Achieved: Students are assigned to one of the general medical wards at Duke Hospital. They are assigned patients in rotation with the second year students on the service and are expected to perform and complete an initial evaluation, develop a care plan, write the orders (to be countersigned by the intern), present the patient at teaching rounds, and follow the patient throughout the hospital course. Students are assigned three to five patients per week and are expected to do outside reading on each. Students may be advanced to the subinternship level during the eight-week period at the recommendation of their resident, attending, and chief medical resident. (3) Methods of Evaluation: The evaluation form is made available to each student at the beginning of the rotation. There are formal mid-term and final evaluations. No final exam is given. Prerequisite: permission of instructor. Credit: 10. Enrollment: max 6. *Muir and staff*

MEDICINE-211C. INTERNAL MEDICINE SUBINTERNSHIP (DUKE/DURHAM REGIONAL HOSPITAL). (1) Course Goals: To provide an internal medicine inpatient care experience at the intern level. (2) How Goals Are Achieved: Students are assigned to an inpatient service at Duke or Durham Regional Hospital. These services include

the general medicine services at both hospitals, and internal medicine residents supervise the students. Alternative services include the MICU, Liver Service, Cardiology, and Hematology/Oncology. Internal medical residents and subspecialty fellows provide supervision on these services. The student functions as an intern on that service with the exception that orders must be countersigned by a medical house officer. A pager and sleep-in facilities are available. The supervising resident or fellow determines the number of patients assigned with anticipated increases over the four weeks. (3) Methods of Evaluation: Students are evaluated by their residents, fellows, and senior staff attending. The evaluation form is made available to each student at the beginning of the rotation. There is a formal evaluation at four weeks. No final exam is given. Prerequisites: Available only to Duke medical students who receive grades of Honors or Pass+ in MEDICINE 205C. Prerequisite: permission of instructor. Credit: 5. Enrollment: max 17. *Muir and staff*

MEDICINE-213C. TUTORIAL IN MEDICAL PDC. (1) Course Goals: Primary - To broaden student exposure to ambulatory care in internal medicine and allow students to work intensively with a single, seasoned medical practitioner. Students learn the informational content relevant to the discipline, but also have the opportunity to observe how one doctor goes about daily practice. (2) How Goals Are Achieved: Students work in a one-to-one relationship with a faculty member in the Department of Medicine who sees patients regularly in the Private Diagnostic Clinic. Students evaluate patients and develop plans for treatment and follow-up under the guidance of the preceptor. Students may follow patients admitted to the hospital. Students may select preceptors from General Internal Medicine or any of the medical subspecialties. (3) Methods of Evaluation: On a regular basis, the preceptor will observe student interactions with patients, noting the quality of that interaction as well as the resulting evaluation, including the assessment/differential diagnosis as well as plans for further evaluation, treatment, and follow-up. A copy of the evaluation form will be provided to students at the beginning of their tutorial. Prerequisites: Students must prearrange their elective with an individual preceptor and communicate the preceptor's approval to Dr. Waugh (919)681-6745) in advance of the starting date of the planned tutorial. At the end of the experience, the preceptor will then fill out a standard evaluation form. Credit: 2 (10 hrs/wk for 8 weeks or 20 hrs/wk for 4 weeks), 4 (20 hrs/wk for 8 weeks or 10 hrs/wk for 16 weeks). The minimum number of credits is two working with one physician. Students may not mix and match four or eight different physicians over eight weeks to come up with two credits. *Waugh and staff*

MEDICINE-214C. INTRODUCTION TO OUTPATIENT PRIMARY CARE INTERNAL MEDICINE. (1) Course Goals: At the end of the experience, students should be able to 1) Diagnose and manage a number of common internal medicine and primary care problems including a wide variety of diseases that are generally seen only in the ambulatory setting 2) Competently and efficiently take a problem-focused history, perform a directed physical exam and perform some office-based procedures. (2) How Goals Are Achieved: The student works with one or more faculty mentors within the Division of General Internal Medicine spending one or more days per week seeing patients in the Medical Private Diagnostic Clinic (MPDC) and/or Lincoln Community Health Center. A highly diverse mix of patients is seen and might include persons with diabetes, heart disease, orthopaedic conditions, skin disease, common mental health problems, or neurologic disease. Patients also present for preventive health services. In the DGIM practice, patients routinely present with symptoms that have not been previously evaluated or diagnosed, allowing students to truly sharpen their clinical skills. In all cases, the student sees the patient first, then discusses the case with the attending. The student must outline in writing five goals that he or she wishes

to accomplish during this rotation. The student's goals should be delivered to Dr. Cathleen Colon-Emeric at least three weeks before the rotation begins. (3) Methods of Evaluation: The faculty mentor who works directly with the student does the student evaluation. Grades are based on the student's interactions with patients, his or her clinical thinking regarding diagnosis and management of their problems, and documented records. Professionalism, fund of knowledge, and commitment to learning are highly weighted. Prerequisites: Third year and fourth year students who successfully completed the second-year medicine clerkship. Credit: 1 (10 hrs/wk for 4 weeks), 2 (20 hrs/wk for 4 weeks), or 4 (20 hrs/wk for 8 weeks). Enrollment: max 2. *Colon-Emeric and general internal medicine staff*

MEDICINE-223C. INTENSIVE CARE MEDICINE SUBINTERNSHIP (DUKE). (1) Course Goals: Primary-To introduce the student to a pathophysiologic approach to critically ill adults. Secondary-To provide an opportunity for students to perform selected procedures. (2) How Goals Are Achieved: Students function as subinterns in a very active intensive care unit. Patient evaluations, procedures, diagnostic planning, and treatment planning are performed by students under the direct supervision of the junior assistant resident, critical care fellow, and attending physician. Night call occurs every third night. Regular didactic lectures on topics related to the diagnosis and treatment of the critically ill are given by the attending staff. The physiological and biochemical approach to critical care medicine is stressed. A syllabus of selected reprints from the critical care literature is provided to each student. Emphasis is placed on access to attending physicians and critical care fellows for the discussion of specific patient-oriented questions. Preferences for the month of rotation are honored, if possible. Questions should be directed to Dr. Govert, 681-5919. (3) Methods of Evaluation: Each student's performance is assessed by the unit director through direct observation of the student in the clinical and didactic environments. Input from the residents, fellows, and other attending physicians is also obtained. Prerequisites: permission of instructor for all summer sections and fall sections 41 and 42. Credit: 5. Enrollment: max 3. *Govert and critical care staff*

MEDICINE-224C. INTENSIVE CARE MEDICINE SUBINTERNSHIP (DURHAM VA HOSPITAL). (1) Course Goals: Primary-To provide training in clinical physiologic and pharmacologic principles of the care of the critically ill. Secondary-To develop students' skills in performance and interpretation of diagnostic procedures. (2) How Goals Are Achieved: Under the supervision of senior assistant residents, the pulmonary fellow, and the critical care attending physician, students function as subinterns and are responsible for patient work-ups and daily bedside presentations. Students are given responsibilities for procedures and decision-making in direct proportion to the development of their patient management skills. Daily radiology and bedside attending rounds stress an integrated physiologic approach to the management of critically ill patients with emphasis on acute respiratory care, hemodynamic monitoring, acid-base balance, and nutritional support. Each student is provided a handout of selected readings that supplements the didactic sessions on diagnosis, pathophysiology, and management of critical illness. The student on call schedule is every third night for the duration of this four-week course. The student registered for MEDICINE 224-C may drop the course up to one month before the start date. After that time, the student must arrange for a replacement if he/she subsequently drops the course. (3) Methods of Evaluation: Student evaluations are done by the fellows and faculty attending on the MICU and are based on observed performance. Credit: 5. Enrollment: max 3. *Welty-Wolf and critical care staff*

MEDICINE-230C. PULMONARY MEDICINE. (1) Course Goals: Primary-To provide training in clinical aspects of pulmonary medicine. The primary diseases emphasized

include asthma, chronic obstructive lung disease, pulmonary vascular diseases including pulmonary embolus, acute respiratory failure, hypersensitivity, interstitial and immunologic lung diseases, and pulmonary manifestations of systemic illnesses, i.e., sarcoid, scleroderma, cystic fibrosis, etc. Secondary-To provide experience with pulmonary laboratory techniques including pulmonary function testing, cardio-pulmonary exercise testing, chest radiology, and bronchoscopy. (2) How Goals Are Achieved: Students assigned to the Pulmonary Consult Services at either the Durham VA or at Duke Hospital. They have primary responsibility for workup and presentation of selected patients on these services. All patients are presented and followed at daily rounds with fellows and faculty. Students also participate in a half-day outpatient clinic each week. Joint seminars and conferences involving both the Duke and Durham VA Consult Services are held each week to provide instruction in pulmonary function evaluation, pulmonary physiology, chest radiology, pulmonary pathology and clinical pulmonary medicine. (3) Methods of Evaluation: Student evaluations are done by fellows and faculty assigned to the Consult Services during the period of the course and are based on observed performance. Questions should be directed to Patti Streicher, (919) 668-0380. Credit: 4. Enrollment: min 1, max 4. *MacIntyre and pulmonary staff*

MEDICINE-242C. CLINICAL ARRHYTHMIA SERVICE. (1) Course Goals: Primary - To provide students with an in-depth exposure to the diagnosis and management of cardiac arrhythmias, electrophysiologic studies, ablation of arrhythmias, cardiac pacemakers, and implantable defibrillators; to help students to understand the electrophysiologic events that result in arrhythmias and ECG changes. This course is not designed to be a substitute for the general cardiology elective (MEDICINE 244C and 245C). Secondary - To familiarize the student with certain basic techniques of arrhythmia diagnosis such as esophageal recording and pacing. (2) How Goals Are Achieved: The student spends four weeks working on the Clinical Arrhythmia Service. The student makes rounds with the Clinical Electrophysiology Service on inpatients with arrhythmia problems. The student is encouraged to attend electrophysiologic studies and assist in the analysis of data from these studies. Attendance of electrophysiologic surgical procedures is also encouraged. The student is responsible for the work-up of patients admitted to the Arrhythmia Service as well as inpatient consults and plays an important role in the follow-up of these patients while they are in the hospital. The student sees outpatients during Arrhythmia Clinics that meet on Monday, Tuesday, Wednesday, and Thursday in the PDC. The student assists in the evaluation of patients for permanent pacemaker implantations. Students are responsible for reviewing the literature on subjects related to the patients that they have seen on the clinical service. (3) Methods of Evaluation: Students are evaluated on their clinical skills in taking histories and performing physical examinations, as well as in their presentation and assessment of the patient's problem. They are also assessed on their ability to read and understand the relevant literature and their ability to assume a responsible role in the care of patients on the Clinical Arrhythmia Service. Credit: 4. Enrollment: max 1. *Sorrentino, Grant, Greenfield, Bahnson, Al-Khatib, and Pritchett*

MEDICINE-243C. CARDIOLOGY SUBINTERNSHIP (ASHEVILLE VA). (1) Course Goals: Primary-To provide experience in the assessment and management of patients with acquired heart disease. Secondary - To familiarize the student with both invasive and non-invasive procedures available at this medical center. (2) How Goals Are Achieved: The student is assigned to an attending cardiologist and is expected to work up patients presenting to both the coronary care unit and the cardiology nonacute ward. Daily work rounds commence at 7:30 a.m. with additional student teaching rounds occurring three times a week. In addition, daily interpretation of electrocardiograms, stress tests, Holter monitors,

and echocardiograms focus on student teaching. Cardiac catheterization results also are reviewed on a daily basis. Night call is optional, but students may elect to take call with appropriate attendings. (3) Methods of Evaluation: The preceptor evaluates the student's ability to assess patient problems based on the history and physical and to formulate a plan to evaluate the problems. Furthermore, the preceptor assesses each student's ability to evaluate and act upon data derived from both invasive and non-invasive diagnostic methods. Credit: 4. Enrollment: max 2. *Carnendran and Sharma*

MEDICINE-244C. INPATIENT CARDIOLOGY SUBINTERNSHIP. (1) Course Goals: Primary - To provide an in-depth experience in the evaluation and care of inpatients with various cardiovascular problems. Secondary - To refine student understanding of the cardiovascular history, physical examination, and non-invasive and invasive laboratory testing in evaluating and managing patients with known or suspected cardiovascular disease. (2) How Goals Are Achieved: Students are assigned to the Duke CCU, the Durham VA CCU, or to a cardiology inpatient service at Duke, and, in concert with the house staff, cardiology fellows, and senior staff attendings, work up and manage patients admitted to these various services. They also participate in a core curriculum experience, including individually assigned times to work with HARVEY, the cardiology patient simulator, and various computer-assisted instruction programs. (3) Methods of Evaluation: Students are evaluated by all resident, fellow, and senior staff with whom they work. The evaluation form is available at the beginning of the elective. Depending on circumstances, students may also be evaluated by written and practical examinations at the beginning and/or end of the elective. Prerequisite: none. Credit: 5. Enrollment: max 5. *Waugh and cardiology staff*

MEDICINE-245C. CONSULTATIVE CARDIOLOGY. (1) Course Goals: Primary - To refine and further develop the skills necessary for eliciting an accurate, complete CV history and for performing an accurate, complete CV physical examination: to refine student understanding of normal and pathologic cardiovascular physiology while functioning in the role of a consultant for inpatients and outpatients with various cardiovascular problems; Secondary - to develop the skills necessary to quickly and accurately interpret ECGs (both 12-lead ECGs and rhythm strips). (2) How Goals Are Achieved: Students are assigned to the consult service at either the Durham VA Hospital or Duke, where, in concert with the resident, fellow, and senior staff attending, they evaluate the operative risk for cardiac and non-cardiac surgery, as well as make decisions concerning the evaluation and treatment of patients with a wide variety of heart diseases. Students participate extensively in reading ECGs and a core curriculum experience including individually assigned times to work with HARVEY, the cardiology patient simulator, and various computer-assisted instruction programs. (3) Methods of Evaluation: Students are evaluated by the resident, fellow, and senior staff with whom they work. The evaluation form is made available at the beginning of the elective. Depending on circumstances, students may also be evaluated by written and practical examinations at the beginning and/or end of the elective. Prerequisite: none. Credit: 4. Enrollment: max 7. *Waugh and cardiology staff*

MEDICINE-250C. CLINICAL DERMATOLOGY. The elective in clinical dermatology is designed to prepare students to perform an accurate skin examination, formulate appropriate differential diagnoses, and choose relevant diagnostic or therapeutic interventions. This course is valuable to any student interested in improving their ability and confidence in the cutaneous exam. Students in the rotation spend two weeks working in the outpatient dermatology clinics, one week on the inpatient consult service at Duke, and one week at the Durham VA Medical Center. The outpatient clinical experience includes general dermatology clinics as well as a variety of specialty clinics such as pediatric dermatology,

HIV dermatology, cutaneous oncology, and dermatologic surgery; clinic attendance can be tailored to the student's future career goals. Patient care is supplemented with lectures designed to provide the student with a foundation in dermatologic principles, and students are encouraged to attend weekly departmental teaching conferences. Student evaluations are based on the development of clinical skills as assessed by faculty and residents, and by a brief clinically oriented examination. Any questions may be discussed with the course director, who may be reached at (919) 681-1629. Students are to report to the Dermatology Clinic, Duke South, Purple Zone, Clinic 3K, Room 3337 at 8:30 a.m. on the first day of the rotation for orientation. Dr. Prose is the course director, who may be reached at (919) 684-5146. Credit: 4. Enrollment: max 4. *Prose*

MEDICINE-256C. ETHICAL ISSUES IN MEDICINE. This seminar examines ethical questions raised by modern medical science and technology with special attention to their implications for clinicians and their patients. It includes both historical and philosophical analysis of these questions, as well as coverage of selected practice-related issues (e.g., truth-telling, confidentiality, informed consent). C-L: COMMFAM-256C. Credit: 1. Enrollment: min 6, max 12. *Sugarman and staff*

MEDICINE-260C. GASTROENTEROLOGY. (1) Course Goals: Primary-To provide an experience with digestive diseases from which the student can develop a sound fundamental approach to the diagnosis and management of these problems. Secondary-To provide an exposure to recent advances in the field including therapeutic and diagnostic endoscopy; to stimulate questions concerning digestive diseases and to attract students into the field. (2) How Goals Are Achieved: Participation in the care, work-up, and management of patients hospitalized on the general wards of Duke or the Durham VA Hospital under the guidance of the resident, fellow, and faculty members assigned either to the Durham VA or Duke Consultation Service. The students' experience may include participation in the activities of the clinic endoscopy unit of the Division of Gastroenterology. This unit offers specialized tests and/or procedures necessary for the state of the art care of patients with digestive diseases. Procedural activities include upper endoscopy, endoscopic retrograde cholangiopancreatography, colonoscopy and polypectomy, endoscopic ultrasound, laser photodynamic therapy, and endoscopic papillotomy of the ampulla of Vater. Data derived from these and other laboratory studies are discussed in the context of specific patient problems in weekly conference settings. Students have an opportunity to interact with all the faculty of the Division at morning rounds and other conferences where patients from all of the services (Duke and Durham VA) are discussed. (3) Methods of Evaluation: Student evaluation forms are completed by the resident, fellows, and faculty working with the student on individual patient care services. Final evaluation represents a composite of these forms that chiefly identifies clinical skills, fund of basic information, organizational ability, and degree of interest and participation. Credit: 4. Enrollment: max 4. *Killenberg and gastroenterology staff*

MEDICINE-270C. OUTPATIENT HEMATOLOGY-ONCOLOGY (DUKE OR DURHAM VA). (1) Course Goals: To give the student experience in the diagnosis, long-term treatment, and supportive care of patients with hematologic and oncologic disorders in the outpatient setting. The use and interpretation of peripheral blood films and other specialized laboratory tests (e.g., bone marrow aspirate/biopsy, serum electrophoresis, coagulation studies, tumor markers, leukemia cell markers), as well as an approach to the evaluation and treatment of common hematologic problems (anemias, bleeding and clotting disorders, hematologic and solid tissue malignancies) are included. Issues such as quality of life and care of the geriatric oncology patient are addressed. (2) How Goals Are Achieved: The student is

assigned a staff member as preceptor with whom to work in the Hematology/Oncology clinic one to three half- days per week in clinic, depending on the student's schedule and the availability of physicians in clinic. If desired, a preceptor who concentrates mainly on hematology or oncology may be arranged. This course is offered for eight or, preferably, 16 weeks. (3) Methods of Evaluation: Students are evaluated by their preceptors on the basis of their ability to obtain a history, perform a physical examination, evaluate hematologic and other laboratory data, and propose assessments and plans of action. Credit: 1-2. Enrollment: max 4. *Telen and hematology/oncology staff*

MEDICINE-272C. CLINICAL HEMATOLOGY AND ONCOLOGY (DUKE OR DURHAM VA). (1) Course Goals: Students learn how to interpret peripheral blood films, how to use and interpret other specialized laboratory tests (e.g., bone marrow aspirate/biopsy, serum electrophoresis, coagulation studies, tumor markers, leukemia cell markers), and how to approach the evaluation and treatment of common hematologic problems (anemias, bleeding and clotting disorders, hematologic and solid tissue malignancies). (2) How Goals Are Achieved: Students receive a series of core lectures, gain familiarity with chemotherapy regimens and administration, and attend the ongoing clinical, research, and didactic divisional conferences. Clinical duties include the performance of inpatient consults under the supervision of a fellow and staff member. This course may be taken for four or eight weeks. (3) Methods of Evaluation: The students are expected to perform and present initial evaluations of consult cases including peripheral blood film on daily rounds, and to perform limited literature searches and evaluations of chosen clinical topics. Credit: 4 or 8. Enrollment: max 4. *Telen and hematology/oncology staff*

MEDICINE-274C. MEDICAL SUBINTERNSHIP IN HEMATOLOGY-ONCOLOGY. (1) Course Goals: This is an intensive experience in the care of inpatients with serious hematologic and oncologic disorders. The student learns to interpret peripheral blood films, how to use and interpret other specialized laboratory tests (e.g., bone marrow aspirate/biopsy, serum electrophoresis, coagulation studies, tumor markers, and leukemia cell markers), and how to approach the evaluation and treatment of hematologic and solid tissue malignancies and their complications. (2) How Goals Are Achieved: Under supervision of a Hematology/Oncology fellow and a division staff member, students are given considerable responsibility in the care of inpatients on one of the Hematology/Oncology or Experimental Therapeutics wards in Duke North. They receive instruction and guidance in performing diagnostic and therapeutic procedures and gain experience in the use of chemotherapeutic drug regimens. Specific issues such as quality of life, care of the aging patient with malignancy, and decisions regarding DNR status are addressed by the patient-care team. In addition, students receive a series of core lectures, receive training in chemotherapy, and attend the ongoing clinical, research and didactic divisional conferences. (3) Methods of Evaluation: Students are evaluated by their preceptors on the basis of their ability to obtain a history, perform a physical examination, evaluate hematologic and other laboratory data, and propose assessments and plans of action. Prerequisite: Approval of the faculty based on prior performance. Credit: 5. Enrollment: max 4. *Telen and hematology/oncology staff*

MEDICINE-275C. CLINICAL COAGULATION. (1) Course Goals: Primary-To teach the clinical and laboratory approach to patients with a hemorrhagic or thrombotic disorder. The student learns to evaluate clinical coagulation disorders and become familiar with coagulation laboratory testing and interpretation. Secondary-To expose the student to recent advances in the area of coagulation research. (2) How Goals Are Achieved: The student spends four weeks on the Hematology Consult Service under the direction of hematology division faculty. The student is expected to work up inpatients with coagulation problems re-

ferred to the Coagulation Service as well as participate in a half day a week Coagulation Outpatient Clinic. Patients generally present with complex diagnostic as well as therapeutic problems. The rotation includes Coagulation lab rounds, during which the student learns to interpret lab tests and review abnormal results. The student is expected to read standard texts regarding their patients' problems, as well as relevant reviews provided by the attending physician. The student may also interact with the Anticoagulation Management Service to gain a better understanding of various approaches to outpatient management of anticoagulant therapy. Students electing to do an eight-week rotation have a more extensive laboratory and clinic research experience. (3) Methods of Evaluation: The student's performance is evaluated by the hematology attending with input from the fellow and/or medicine resident on the service. The evaluation is based on observation of the student's ability to do careful histories and physical examinations, to appropriately assess the problem and develop a logical diagnostic and therapeutic plan, and to demonstrate an increase in knowledge regarding laboratory tests and their application to clinic problems. Credit: 4 or 8. Enrollment: max 2. *Telen and hematology staff*

MEDICINE-280C. CLINICAL INFECTIOUS DISEASES. (1) Course Goals: To provide experience in the clinical and laboratory diagnosis of infectious diseases and in their therapy. The primary emphasis is placed on learning from interaction with patients, resident staff, and faculty on the consultation service. Students are expected to work up assigned patients by interview, physical examination, and collation of laboratory results, leading to a summary and synthesis of the problem. Particular emphasis is placed on close follow-up of the patients during hospitalization, including attendance at procedures or operations whenever possible. Students should know their own patients well enough to be able to give a reasonable presentation on ward rounds or at conferences without notice. Students are expected to read standard texts in-depth about their patients' problems, as well as a few recent relevant primary references. Students are expected to attend the various conferences listed on the weekly schedule of division activities punctually, including Microbiology Plate Rounds, Journal Club, and tutorials. They are asked to present cases and provide some discussion at the Thursday Durham V.A. Conference. Each student should be prepared to present and briefly discuss articles that he or she considers to be interesting and timely at Journal Club. (2) Methods of Evaluation: Each student's performance is evaluated and graded by the resident, fellow, and attendings, using the usual honors, pass plus, pass, deferred, or unsatisfactory system that is utilized internally in the Department of Medicine. In arriving at a consensus, appropriate emphasis is placed on knowledge, enthusiasm, and evidence of improvement during the rotation. There is no written examination. Adds are accepted at any time, providing the course has not been filled. However, because this course is usually over-subscribed, drops are not accepted within 30 days of the first day of classes, unless the student finds her or his own replacement. MEDICINE 280C is a full-time experience. Also, it is offered as a sole-enrollment course and, as such, cannot be taken in conjunction with any other course without the permission of the advisory dean and the course director. Credit: 4. Enrollment: max 7. *Hamilton and infectious diseases staff.*

MEDICINE-290C. METABOLISM AND ENDOCRINOLOGY. (1) Course Goals: Primary-The student has an in-depth experience in the evaluation and management of patients with endocrine disorders. Secondary-The student learns basic principles of hormone physiology and applies these concepts in clinical settings. (2) How Goals Are Achieved: Each student is introduced to patient problems by working with the Endocrine faculty (Drs. Brown, Burch, Feinglos, Guyton, Green, Jelesoff, Luttrell, Spratt, Weber, McNeill). Prior arrangements may be made with a particular faculty member under the appropriate course

number. The student is exposed to clinical endocrine disorders by seeing patients in endocrine outpatient clinics (Diabetes/ General Endocrine, and Durham VA General Endocrine Clinic), as well as experiencing the inpatient Endocrinology Diabetes Management/General Endocrine Consult Service. The student has the opportunity to review general literature on common endocrinologic conditions and endocrinologic emergencies, as well as learning basic assessment skills of the patient with diabetes, thyroid disease, and other common endocrinologic presentations. Division conferences include Grand Rounds, Case Conference, and Inpatient Consult Rounds with opportunities to integrate basic concepts with clinical applications. (3) Methods of Evaluation: A written critique is provided by the student's preceptors with comments from other members of the division as appropriate. Credit: 4. Enrollment: max 3. *Weber and endocrinology staff*

MEDICINE-300C. NEPHROLOGY. (1) Course Goals: Primary: To provide clinical experience in the diagnosis and treatment of patients with kidney diseases, fluid and electrolyte disorders, and hypertension. Secondary: To integrate physiology, immunology, pathology, and biochemistry into the evaluation and management of patients with renal disease. (2) How Goals Are Achieved: The students are integrated into the patient care team consisting of attending physician, nephrology fellows, and medical residents. They will participate in both inpatient and outpatient care of patients with a wide range of kidney diseases, fluid and electrolyte problems, and difficult to manage hypertension. Students may choose between the three major nephrology services: the Acute Service which cares for patients in the intensive care units at Duke, the Transplant Service which focuses on patients with kidney or combined kidney-pancreas transplants, and the Durham VA General Nephrology Service which provides balanced exposure to all facets of nephrology. The student participates in work rounds with the residents and fellows each day, daily rounds with the attending physician, and weekly nephrology conferences. These conferences include Journal Club where the latest clinical and basic science literature is reviewed, the weekly Nephrology Didactic Lecture Series focusing on pathophysiological principles of clinical nephrology, and Grand Rounds encompassing Pathology Conference, Clinical Case Conference, and seminars by fellows, faculty and/or visiting professors. This combination of broad-based clinical experience, coupled with formal didactics, provides the student with a comprehensive educational opportunity. (3) Methods of Evaluation: Written evaluation from faculty preceptor. Credit: 4. Enrollment: max 4. *Coffman and nephrology staff*

MEDICINE-307C. NEUROLOGY CLERKSHIP. This course is restricted to those students who did not take the Neurology rotation in their second year. It provides the student with a firm understanding of the neurological examination, formulation of clinical neurological problems, and practice with written and oral communications in a hospital setting. The student has the opportunity to apply the neuroanatomy, neurophysiology, neurochemistry, and neuropathology learned in the first year to the evaluation and care of his or her patients. The patients are drawn from the neurology services at Duke Hospital or the Durham VA Medical Center. The students elicit a history and perform a physical examination. The student records the findings in the hospital charts and presents the findings at regular staff rounds. The student then participates with a clinical team of faculty and house officers in the hospital evaluation of the patients. The student is encouraged to participate in all diagnostic procedures such as lumbar puncture. The student has the opportunity to follow patients through neuro-radiological and neuro-surgical procedures forming part of evaluation and treatment. The specific expectations for the student are: (a) to perform and record a competent neurological and history examination on each admitted patient; (b) to be competent in the hospital management of neurological patients including diagnostic evaluations such as

hematological and urine evaluations, lumbar puncture and appropriate electrical studies; (c) to assume responsibility as the primary care person for his or her patients; (d) to participate in daily work rounds with an assigned team of house officers and faculty; (e) to be sufficiently knowledgeable to participate in patient care decisions; (f) to attend faculty attending rounds and to present patients to faculty within 24 hours after admission; and (g) to participate in neurology service rounds and conferences during the course. The course includes faculty lectures. A written evaluation is provided to the students by faculty and house staff. There is an examination. Credit: 4. Enrollment: max 1. *Chilukuri and neurology staff*

MEDICINE-308C. CLINICAL NEUROLOGY SUBSPECIALTIES. (1) Course Goals: To provide the student clinical exposure to a specific subspecialty in neurology. (2) How Goals Are Achieved: The student focuses on one specific subspecialty in neurology and attends clinic for 3-8 hours weekly. During that time the student participates in the clinical evaluation of patients with a member of the neurology faculty. Clinical experience in Neuromuscular Diseases, Epilepsy and Sleep Disorders, Cerebrovascular Disorders, Memory Disorders, or Neuro-oncology is available. Appropriate reading material is utilized to complement the clinical experience. MEDICINE 207C or MEDICINE 307C are prerequisites for this course. (3) Method of Evaluation: Standard written evaluation form by faculty supervisor. Approval by the course director in order to ensure access to the desired neurologic subspecialty is required. For permission information, please contact Virginia Chambers at (919) 684-4454. Credit: 1-2. Enrollment: max 5 (if participating in different subspecialties). *Chilukuri and neurology staff*

MEDICINE-309C. CONSULTATIVE NEUROLOGY. (1) Course Goals: To introduce senior medical students to the diagnostic and treatment issues encountered on the consultative neurology service. (2) How Goals Are Achieved: The student becomes part of the inpatient neurology consultation team either at Duke Hospital or the Durham VA Hospital. This team consists of senior neurology attendings on a rotating basis as well as a neurology and/or medicine house officer. Consultations are performed by the student under the guidance of the house staff and then are presented to the attending on rounds. The student is responsible for performing a neurologic history and physical, as well as assisting in the interpretation of all important laboratory data. The student continues to follow the patient's course as required. The student also attends rounds when other patients are presented by the house officers. Appropriate reading material is utilized to complement the clinical experience. Attendance at Neurology Grand Rounds and various Neurologic Subspecialty Conferences is required. Experience on an inpatient neurology service such as MEDICINE 207C or MEDICINE 307C is a prerequisite for this course. (3) Method of Evaluation: Standard written evaluation by faculty supervisor with house staff input. Credit: 4. Enrollment: max 2. *Chilukuri and neurology staff*

MEDICINE-310C. NEUROLOGY SUBINTERNSHIP. (1) Course Goals: To provide a neurological patient care experience at the intern level. Students have the opportunity to apply neurological examination skills learned in the second year to direct patient care situations. Students are exposed to a variety of neurological problems, procedures, and therapies. This course is recommended for the student interested in neurology, psychiatry, internal medicine, neurosurgery, neuropathology, or ophthalmology. (2) How Goals Are Achieved: Students are assigned to the Duke or Durham VA Hospital's neurology ward and take call in rotation with a medical intern as part of a patient care team. Students attend Neurology-Neurosurgery Grand Rounds, Neurology Subspecialty Conferences and participate in all ward activities. Full time participation is expected. (3) Methods of Evaluation: Resident and staff physician provide a written evaluation and grade. Credit: 5. Enrollment: min 1, max 1. (more than one with course director's approval). *Chilukuri and neurology staff*

MEDICINE-320C. CLINICAL RHEUMATOLOGY. (1) Course Goals: Primary-To provide experience in the recognition and care of patients with rheumatic, chronic inflammatory, and immunological diseases, including the various forms of arthritis, connective tissue disease, vasculitis, and metabolic arthropathies. Secondary-To develop skills in the interpretation of specialized laboratory studies relating to the evaluation of patients with rheumatic, immunological, and metabolic disorders. Students are also exposed to joint aspiration and injection, synovial fluid analysis, bone and joint radiology, and histopathological analysis of tissue. (2) How Goals Are Achieved: Students evaluate patients at the Duke and Durham VA Hospitals. Daily rounds are held with faculty, house staff, and students that focus on oral presentation of patients with detailed review of pertinent laboratory, x-ray and pathological findings. Basic Science Conference; Bone and Joint Radiology Conference; Pathology Conference; and Rheumatology, Allergy, and Clinical Immunology Grand Rounds are held on a regular basis. Emphasis is placed on a comprehensive approach to the evaluation and treatment of patients with rheumatic, inflammatory, immune and metabolic disorders. Students are assigned primary house officer level responsibilities on the Consultation Service and the Outpatient Clinics at at the Duke or Durham VA Hospitals. (3) Methods of Evaluation: Student evaluations are based on their performance on rounds and in the clinics, including history and physical examination skills, and outside reading. This is a sole-enrollment course and, as such, cannot be taken in conjunction with any other course. Credit: 4. Enrollment: max 2. *St. Clair and rheumatology/allergy/clinical immunology staff*

MEDICINE-321C. INTRODUCTION TO CLINICAL RHEUMATOLOGY. (1) Course Goals: An introductory course in Clinical Rheumatology designed to introduce students to the basics of differential diagnosis in the field of rheumatic disease; to provide more detailed knowledge of the most common, major groups of rheumatic disorders. (2) How Goals Are Achieved: Didactic and interactive lectures are the primary mode of teaching. Handouts and outlines on relevant topics and the Primer of Rheumatic Diseases are provided at the beginning of the course. One or more sessions(s) may be devoted to patient presentations, with several patients available for questioning and discussion. Basic pathophysiology, clinical features, laboratory studies, radiographic findings, and pathology correlations are presented. (3) Methods of Evaluation: participation in class and discussion of subject matter in concluding session. Course director evaluates student with standard Duke evaluation. If permitted by the instructor, this clinical course can be audited. Credit: 1. Enrollment: min 3, max 20. *Criscione and rheumatology staff*

MEDICINE-322C. OUTPATIENT COMMUNITY RHEUMATOLOGY. The clerkship in clinical rheumatology in the community setting is based in the Danville, Virginia Rheumatology Outreach Clinic. Students travel with the attending physician to the outpatient site five days per month for two consecutive months, participating in the evaluation of patients with rheumatic disease. New and return patients are seen, averaging 8-10 patients per visit. The student is under the direct supervision of the attending physician, as no fellows or residents are involved in this particular clinic. The student is expected to learn extensively about the approach to patients with rheumatic complaints and to also gain an understanding of therapeutic options in the management of such patients. Credit: 2. Enrollment: max 1. *Caldwell*

MEDICINE-400C. GERIATRIC MEDICINE. (1) Course Goals: Primary-To enable the student to become familiar with the principles of caring for the geriatric patient. Secondary-To familiarize the student with the physiology and diseases of aging. (2) How Goals Are Achieved: This elective is offered by the interdepartmental faculty of the Division of Geriatric Medicine. The student works with faculty, fellows, and housestaff in a number of settings

involved in the care of the geriatric patient. These include the Geriatric Evaluation and Treatment Clinic (Duke), Geriatric Evaluation Unit Clinic (Durham VA), Forrest at Duke Clinic, Extended Care and Rehabilitation Center (Durham VA), and other subspecialty clinics. Principles to be stressed are biology and pathophysiology of aging, multiple clinical problems in the elderly, interdisciplinary team approach to evaluation, planning and treatment, and goals of maximal functional achievement and independence for the elderly. The student participates actively in the workup and management of patients in inpatient extended care and outpatient settings to become more familiar with the problems of the elderly in the community. Familiarity with the growing literature in geriatric medicine is encouraged. The student participates in seminars, lectures, and team meetings at the appropriate sites. (3) Methods of Evaluation: Evaluation is by consensus of instructors and fellows at the various training sites. It is based on discussions and presentations throughout the course period. Credit: 4. Enrollment: max 2. *Cohen and staff*

MOLECULAR GENETICS AND MICROBIOLOGY

Professor Joseph R. Nevins, Ph.D. (Duke, 1976), Chairman.

Professors: Dani Bolognesi, Ph.D. (Duke, 1967); Bryan R. Cullen, Ph.D. (New Jersey, 1984); Mariano Garcia-Blanco, M.D., Ph.D. (Yale, 1984); Edward S. Orgain Professor of Cardiology Pascal Goldschmidt, M.D., F.A.C.C. (Univ. Libre de Bruxelles, 1980); John D. Hamilton, M.D. (Colorado, 1964); Joseph Heitman, M.D. (Cornell, 1989), Ph.D. (Rockefeller, 1992); Elwood Linney, Ph.D. (California-San Diego, 1973); Jack D. Keene, Ph.D. (Washington, 1974); Margaret Pericak-Vance, Ph.D. (Indiana, 1978); Howard Rockman, Ph.D. (McGill, 1983); David Schwartz, M.D. (California-San Diego, 1979); Bruce Sullenger, Ph.D. (Cornell, 1990); Huntington Willard, Ph.D. (Yale, 1979).

Adjunct Professors: Ken R. Harwood, Ph.D. (CUNY, 1970); William Phelps, Ph.D. (Minnesota, 1985).

Associate Professors: Soman Abraham, Ph.D. (Newcastle upon Tyne, 1981); Gary M. Cox, M.D. (Virginia, 1989); Gale Hill, Ph.D. (Duke, 1966); Dolph Klein, Ph.D. (Rutgers, 1961); Douglas A. Marchuk, Ph.D. (Chicago, 1985); John H. McCusker, Ph.D. (Brandeis, 1986); Thomas G. Mitchell, Ph.D. (Tulane, 1971); John R. Perfect, M.D., Ph.D. (Med. Coll. of Ohio, 1974); David J. Pickup, Ph.D. (Natl. Inst. for Med. Research, 1979); Gregory Riggins, M.D. (Emory, 1984, 1994); Jeffrey Vance, Ph.D. (Indiana, 1979); Rytas Vilgalys, Ph.D. (Virginia Tech., 1985); Robin P. Wharton, Ph.D. (Harvard, 1986); Kenneth H. Wilson, M.D. (North Carolina, 1974); Yuan Zhuang, Ph.D. (Yale, 1989); Peter Zwadyk, Jr., Ph.D. (Iowa, 1971).

Associate Research Professors: Maria Cardenas-Corona, Ph.D. (N. Texas State, 1988); Lizzie J. Harrell, Ph.D. (North Carolina State, 1978); Sara E. Miller, Ph.D. (Georgia, 1972); Marcy Speer, Ph.D. (Duke, 1993).

Adjunct Associate Professors: Jeffrey J. Collins, Ph.D. (Harvard, 1972); Jonathan Horowitz, Ph.D. (Wisconsin, 1985).

Assistant Professors: Alejandro Aballay, Ph.D. (Natl. de Cuyo Univ., 1998); Kenneth Alexander, M.D., Ph.D. (Washington-Seattle, 1989); James A. Alspaugh, M.D. (Duke, 1991); Andrea Amalfitano, Ph.D. (Michigan State, 1989); Hubert Amrein, Ph.D. (Zurich, 1988); Frederick Dietrich, Ph.D. (Mass. Inst. of Tech., 1992); Jonathan Freedman, Ph.D. (Albert Einstein, 1986); Richard Frothingham, M.D. (Duke, 1981); Matthias Gromeier, M.D., Ph.D. (Hamburg, 1992); Meta Kuehn, Ph.D. (Washington, 1993); Daniel Lew, Ph.D. (Rockefeller, 1990); Hiroaki Matsunami, Ph.D. (Kyoto, 1996); Ross E. McKinney, Jr., M.D. (Rochester, 1979); Daniel J. Sexton, M.D. (Northwestern, 1971); Raphael Valdivia, Ph.D. (Stanford, 1997).

Assistant Research Professor: Maki Asano, Ph.D. (Kyoto, 1991); Robert Brazas, Ph.D. (Florida Inst. of Tech., 1985); Holly K. Dressman, Ph.D. (Pennsylvania State, 1994); Robert Rooney, Ph.D. (Columbia, 1986).

Adjunct Assistant Professor: Andrew Peterson, Ph.D. (Harvard, 1988).

Research Associates: Marito Araki, Ph.D.; Ulus Atasoy, Ph.D.; Dale Beach, Ph.D.; Andrea Bild, Ph.D.; Esther P. Black, Ph.D.; Michael Burdick, Ph.D.; Craig Carson, Ph.D.; Glen Coburn, Ph.D.; Jeannette Cook, Ph.D.; Marisol De Jesus Berrios, Ph.D.; Kellie Dean, Ph.D.; Elena Y. Dobrikova, Ph.D.; Ginger Ehmann, Ph.D.; Weihua Fan, Ph.D.; Deborah Fox, Ph.D.; James Fraser, Ph.D.; Jennifer Freedman, Ph.D.; Shinsuki Fujii, Ph.D.; Paloma Giangrande, Ph.D.; Alan L. Goldstein, Ph.D.; Yasuaki Habara, Ph.D.; Timothy Hallstrom, Ph.D.; Sayoko Harashima, Ph.D.; Toshiaki Harashima, Ph.D.; Julie K. Hicks, Ph.D.; Christina Hull, Ph.D.; Alexander Idrum, Ph.D.; Joanne M. Kingsbury, Ph.D.; Ling Jie Kong, Ph.D.; Peter R. Kraus, Ph.D.; Michael Ming Ta Lee, Ph.D.; Anne L'Hernault, Ph.D.; Christina Liquori, Ph.D.; Anastasia Livintseva, Ph.D.; Robert E. Marra, Ph.D.; Rastine R. Merat, Ph.D.; Shingo Nakahata, Ph.D.; Connie B. Nichols, Ph.D.; Bradley P. Nicholson, Ph.D.; Kirsten Nielsen, Ph.D.; Katrina Oie, Ph.D.; Renata Pascon, Ph.D.; James Pearson, Ph.D.; Luiz Penalva, Ph.D.; Kristianna Pittman, Ph.D.; Nicholas Plummer, Ph.D.; Rachel E. Rempel, Ph.D.; Nicole D. Robson, Ph.D.; Miguel A. Rodriguez, Ph.D.; John R. Rhode, Ph.D.; Harumi Saito, Ph.D.; Minako Sakurai, Ph.D.; Ricardo Sanchez, Ph.D.; Kirsten Scott, Ph.D.; Kevin Shianna, Ph.D.; Himanshu Sinha, Ph.D.; Teresa Squire, Ph.D.; Sudha Srinivasan, Ph.D.; Gregory R. Stuart, Ph.D.; Hedwig Sutterlüdy, Ph.D.; Scott A. Tenenbaum, Ph.D.; Fernando A. Tenjo-Fernand, Ph.D.; Jennifer L. Tenor, Ph.D.; Ava Udvardy, Ph.D.; Mara Vorachek-Warren, Ph.D.; Xiaohua Zhang, Ph.D.; Qingshun Zhao, Ph.D.; Wencheng, Zhu, Ph.D.

Emeriti: Wolfgang K. Joklik, D. Phil.; Suydam Osterhout, M.D., Ph.D.; Robert W. Wheat, Ph.D.; Hilda P. Willett, Ph.D.

Required Course

MGM-200B. MICROBIOLOGY. This course in microbiology for medical students is given during the second semester of the first year. An intensive study is made of the common bacteria, viruses, fungi, and parasites that cause disease in humans. The didactic portion of the course focuses on the fundamental biology of micro-organisms causing disease and the molecular mechanisms of the microbial pathogenesis. Attention is given to the host-microbial relationship and the impact of the immune system and antimicrobial therapy on this interaction. The laboratory portion of the course is designed to acquaint students with the basic techniques employed in the clinical microbiology laboratory, and to reinforce microbiological concepts. Medical case histories are presented by the clinical staff to correlate this course with patient care. Credit: 5. *Zwadyk and Mitchell*

Basic Science Electives

MGM-252B. GENERAL VIROLOGY AND VIRAL ONCOLOGY. The course is devoted to the molecular biology of mammalian viruses, with emphasis upon mechanisms of virus replication, virus-host interactions, viral pathogenicity, and the relationship of virus infection to neoplasia. C-L: IMMUNOL-252B; Graduate School. Credit: 3. Enrollment: min 5. *Keene, Alexander, Cullen, Nevins, and Pickup*

MGM-282B. MICROBIAL PATHOGENESIS. This is a graduate level course that primarily focuses on pathogenic bacteria and fungi. The course explores both the basic biology that underlies pathogenesis, as well as specific mechanisms of pathogenesis and virulence. Classes consist of a mixture of lectures, discussions of recent papers, and paper presentations. There are no exams, but instead, grades will be based on critiques of published papers and a research proposal due at the end of the course. C-L: Graduate School. Credit: 3. *Kreuzer and McCusker*

MGM-291B. COMPREHENSIVE IMMUNOLOGY. An intensive course in the biology of the immune system and the structure and function of its component parts. Major topics discussed are: properties of antigens; specificity of antibody molecules and their biologic functions; cells and organs of the lymphoid system; structure and function of complement; inflammation and non-specific effector mechanisms; cellular interactions and soluble mediators in lymphocyte activation, replication, and differentiation; regulation of immune responses, neoplasia and the immune system; molecular structure and genetic organization of immunoglobulins, histocompatibility antigens, and T cell receptor. C-L: IMMUNOL-291B; Graduate School. Prerequisite: Permission of instructor. Credit: 3. Enrollment: max 10. *Krangel and staff*

MGM-399B. PRECEPTORSHIP IN MICROBIOLOGY. An individual reading and/or laboratory course in specialty areas supervised by an individual faculty member. Acceptance, nature of topic, and amount of credit by individual arrangement with proposed faculty member. Prerequisites: to be determined by instructor. Credit: 1-16. *Staff*

NEUROBIOLOGY

James O. McNamara, M.D. (Michigan, 1968), Chairman.

Professors: Mohammed Abou-Donia, Ph.D. (California-Berkeley, 1967); George J. Augustine, Ph.D. (Maryland, 1980); Dona M. Chikaraishi, Ph.D. (California-San Diego, 1973); David Fitzpatrick, Ph.D. (Duke, 1982); Owen Flanagan, Ph.D. (Boston, 1977); Warren G. Hall, Ph.D. (Johns Hopkins, 1975); William C. Hall, Ph.D. (Duke, 1967); Lawrence C. Katz, Ph.D. (California Inst. of Tech., 1984); Gregory McCarthy, Ph.D. (Illinois, 1980); David R. McClay, Ph.D. (North Carolina, 1971); J. Victor Nadler, Ph.D. (Yale, 1972); Miguel A.L. Nicolelis, M.D., Ph.D. (Sao Paulo, 1984, 1988); Dale Purves, M.D. (Harvard, 1964); Sidney A. Simon, Ph.D. (Northwestern, 1973); Theodore Slotkin, Ph.D. (Rochester, 1970); John E.R. Staddon, Ph.D. (Harvard, 1964); Warren J. Strittmatter, M.D. (Duke, 1973); Dennis Turner, M.D. (Indiana, 1975); E. Lee Tyrey, Ph.D. (Illinois, 1969); David S. Warner, M.D. (Wisconsin, 1980).

Associate Professors: Rose-Mary Boustany, M.D. (Amer. Univ. Beirut, 1979); Nell B. Cant, Ph.D. (Michigan, 1973); Joseph M. Corless, M.D., Ph.D. (Duke, 1972, 1971); Michael M. Haglund, Ph.D. (Washington, 1988); Darrell V. Lewis, M.D. (Minnesota, 1969); Donald C. Lo, Ph.D. (Yale, 1989); Roger D. Madison, Ph.D. (Duke, 1981); Richard D. Mooney, Ph.D. (California Inst. Tech., 1991); Stephen Nowicki, Ph.D. (Cornell, 1985); Peter H. Reinhart, Ph.D. (Australasian National, 1985); Donald E. Schmechel, M.D. (Harvard, 1974); Rochelle D. Schwartz-Bloom, Ph.D. (Georgetown, 1983); J.H. Pate Skene, Ph.D. (Washington, 1980); Antonius Vandongen, Ph.D. (Leiden, 1988); Fulton Wong, Ph.D. (Rockefeller, 1977).

Associate Research Professor: You-Wei Peng, M.D. (Zhongshan Med. Coll., 1982), Ph.D. (Baylor Coll. of Med., 1989).

Assistant Professors: Michael D. Ehlers, M.D., Ph.D. (Johns Hopkins, 1998); Guoping Feng, Ph.D. (SUNY-Buffalo, 1994); Timothy M. George, M.D. (New York, 1986); Erich Jarvis, Ph.D. (Rockefeller, 1995); Michael Platt, Ph.D. (Pennsylvania, 1994); Leonard White, Ph.D. (Washington, 1992).

Assistant Research Professor: James Voyvodic, Ph.D. (Washington, 1988).

Emeriti: Irving T. Diamond, Ph.D.; John W. Moore, Ph.D.

Required Course

NEUROBIO-202B. BASIC NEUROBIOLOGY. An intensive introduction to the structure and function of the human nervous system designed specifically for first-year medical students. Lectures, laboratory exercises, and clinical presentations. Credit: 4. *Mooney, Williams, and staff*

Basic Science Elective

NEUROBIO-372B. RESEARCH IN NEUROBIOLOGY. Guided independent study and research experience in neurobiology. Nature of topic to be decided by individual arrangement with faculty advisor. Prerequisite: consent of faculty advisor. Credit: 1-16. *Staff*

OBSTETRICS AND GYNECOLOGY

Professor Haywood L. Brown, M.D. (Bowman Gray, 1978), Chairman.

Professors: Walter L. Thomas Professor W. Allen Addison, M.D. (Duke, 1960); F. Bayard Carter Professor Andrew Berchuck, M.D. (Case Western Reserve, 1980); James M. Ingram Professor Daniel L. Clarke-Pearson, M.D. (Case Western Reserve, 1975); Ronald N. Goldberg, M.D. (California-Los Angeles, 1972); E.C. Hamblen Chair of Reproductive Biology and Family Planning Professor Charles B. Hammond, M.D. (Duke, 1961); Roy T. Parker Professor Arthur F. Haney, M.D. (Arizona, 1972); Gale B. Hill, Ph.D. (Duke, 1966); David F. Katz, Ph.D. (California, 1972); Stanley J. Robboy, M.D. (Michigan, 1965); David W. Schomberg, Ph.D. (Purdue, 1965); John T. Soper, M.D. (Iowa, 1978); E. Lee Tyrey, Ph.D. (Illinois, 1969).

Research Professor: Claude L. Hughes, M.D., Ph.D. (Duke, 1980).

Associate Professors: R. Phillips Heine, M.D. (Texas Tech., 1986); Barbara Hertzberg, M.D. (Duke, 1980); Jeffrey A. Kuller, M.D. (Cincinnati, 1984); Charles H. Livengood, III, M.D. (Duke, 1976); Elizabeth G. Livingston, M.D. (Duke, 1984); Evan R. Myers, M.D. (Pennsylvania, 1988); Thomas M. Price, M.D. (North Carolina, 1984); Patricia M. Saling, Ph.D. (Pennsylvania, 1979); J. Brice Weinberg, M.D. (Arkansas, 1969).

Associate Clinical Professors: Jeffrey C. Andrews, M.D. (Toronto, 1983); Leo R. Brancazio, M.D. (West Virginia, 1988); Peter S. Cartwright, M.D. (Michigan, 1977); Grace M. Couchman, M.D. (Colorado, 1985); Stanley J. Filip, M.D. (Mt. Sinai, 1979); Stephen C. Gooding, M.D. (Bowman Gray, 1965); Gerard G. Nahum, M.D. (Stanford, 1984); Joanne T. Piscitelli, M.D. (Duke, 1980); Anna L. Stout, Ph.D. (South Carolina, 1980); David K. Walmer, M.D., Ph.D. (North Carolina, 1983); Steven R. Wells, M.D. (Bowman Gray, 1985).

Assistant Professors: Nels C. Anderson, Ph.D. (Purdue, 1964); Lori A. Bastian, M.D. (Emory, 1987); James D. Bowie, M.D. (Oklahoma, 1967); Ann J. Brown, M.D. (Stanford, 1988); Laura J. Havrilesky, M.D. (Duke, 1995); Andra H. James, M.D. (Virginia, 1993); Anne D. Lyerly, M.D. (Duke, 1995); Diana B. McNeill, M.D. (Duke, 1982); Amy P. Murtha, M.D. (Med. Coll. of Pennsylvania, 1992); Donald H. Penning, M.D. (Queens, 1983); Angeles Alvarez Secord, M.D. (Washington, 1994); Alison C. Weidner, M.D. (Duke, 1992).

Adjunct Assistant Professor: Neil J. Finkler, M.D. (Mount Sinai, 1982).

Assistant Clinical Professors: Cindy L. Amundsen, M.D. (Tennessee, 1991); Paul S. Andrews, M.D. (North Carolina, 1981); Avis A. Artis, M.D. (Duke, 1984); Katrina H. Avery, M.D. (North Carolina, 1991); Rudy W. Barker, M.D. (North Carolina, 1967); Susann L. Clifford, M.D. (Florida, 1993); MargEva M. Cole, M.D. (Harvard, 1993); Martha L. Decker, M.D. (East Carolina, 1985); Diana Dell, M.D. (Louisiana State, 1982); Richard D. Duncan, III, M.D. (Tennessee, 1994); Anne C. Ford, M.D. (North Carolina, 1991); Tracy W. Gaudet, M.D. (Duke, 1991); Joe W. Hardison, M.D. (North Carolina, 1965); Charles O. Harris, M.D. (North Carolina, 1979); Stacey M. Heath, M.D. (East Carolina, 1988); William R. Lambeth, M.D. (Bowman Gray, 1974); Andrea S. Lukes, M.D. (Duke, 1994); William S. Meyer, M.S.W. (Illinois-Chicago, 1977); Douglas J. Raburn, Ph.D. (Nebraska, 1990); David L. Richardson, Jr., M.D. (South Carolina, 1973); Ira Q. Smith, M.D. (Bowman Gray, 1979); Shelley W. Wroth, M.D. (Columbia, 1992); Robert K. Yowell, M.D. (Duke, 1961).

Assistant Consulting Professors: James L. Allen, M.D. (Emory, 1965); Arnold B. Barefoot, Jr., M.D. (North Carolina, 1982); Walker H. Campbell, M.D. (Virginia, 1963); Karen H. Clark, M.D. (Alabama, 1982); Richard

V. Clark, M.D., Ph.D., (Washington, 1977); Vivian E. Clark, M.D. (Boston, 1981); Yancey G. Culton, Jr., M.D. (Duke, 1956); Jerry L. Danford, M.D. (Duke, 1967); James R. Dingfelder, M.D. (Jefferson Coll., 1965); Michael D. Fried, M.D. (New York Univ., 1971); Carl A. Furr, Jr., M.D. (North Carolina, 1958); Francis S. Gardner, Jr., M.D. (Maryland, 1951); Michael D. Gooden, M.D. (North Carolina, 1973); Howard M. Goodman, M.D. (Med. Coll. of Virginia, 1979); Ronald E. Granger, M.D. (California-Irvine, 1977); William B. Gunter, Jr., M.D. (Emory, 1982); William D. Hathcock, M.D. (Med. Univ. of South Carolina, 1973); Perry M. Harmon, M.D. (North Carolina, 1974); Bennet A. Hayes, Jr., M.D. (North Carolina, 1957); Melvin L. Henderson, M.D. (Duke, 1978); Robert W. Holloway, M.D. (Vanderbilt, 1993); Wanda L. Jenkins, M.D. (Cincinnati, 1979); Johnnie E. Jones, M.D. (Meharry, 1976); Samuel J. Kapnick, M.D. (Harvard, 1991); Glenward T. Keeney, M.D. (Med. Coll. of Virginia, 1967); John W. Lane, M.D. (Duke, 1972); Richard E. Lassiter, M.D. (North Carolina, 1965); Stephen C. Lies, M.D. (Duke, 1976); Frank E. Long, M.D. (Maryland, 1975); Jack P. McDaniel, M.D. (North Carolina, 1956); James P. Moon, M.D. (South Dakota, 1979); William A. Nebel, M.D. (North Carolina, 1962); Phillip H. Pearce, M.D. (Duke, 1960); H. Newton Pleasant, Jr., M.D. (East Carolina, 1992); Marla M. Presta, M.D. (Chicago, 1982); Elizabeth G. Raymond, M.D. (Columbia, 1984); Steven M. Scott, M.D. (Indiana, 1974); E. Frank Shavender, M.D. (North Carolina, 1968); W. Siegfried Smith, Jr., M.D. (Duke, 1961); Paul A. Vieta, M.D. (UMDNJ, 1966); Bertram E. Walls, M.D. (Duke, 1972).

Research Associates: Shalini L. Kulansingham, Ph.D. (Univ. Washington, 2001).

Associates: David E. Abel, M.D. (SUNY-Syracuse, 1992); Elizabeth A. Bell, M.D. (North Carolina, 1990); Peter D. Dwane, M.D. (McGill, 1967); Johnathan M. Lancaster, M.D. (Wales, 1992); Frederick W. Larsen, M.D. (Virginia, 1994); Holly A. Muir, M.D. (Dalhousie, 1983); Peter R. Muller, M.D. (North Carolina, 1987); Jon A. Proctor, M.D. (Colorado, 1985); Sharon L. Rupp, B.S., A.A.S. (SUNY-Canton, 1973) M.S.N. (North Carolina, 1992).

Clinical Associates: Elizabeth J. Burkett, B.S.N. (NCCU, 1973) M.S.N. (North Carolina, 1975); Mina N. Choi, M.D. (Duke, 1991); Alice P. Cooper, N.P. (Emory, 1985); Linda L. Fetko, M.D. (Duke, 1996); Michael K. Flynn, M.D. (Duke, 1993); Karen L. Lee, M.D. (Harvard, 1998); Christopher V. Lutman, M.D. (Ohio State, 1995); Nancy A. MacLaurin, M.D. (Connecticut, 1998); Michael J. Paglia, M.D. (Pennsylvania, 1998); John Payne (Med. Univ. of South Carolina, 1992); Audrey A. Romero, M.D. (Hahnemann, 1996); Rebecca M. Ryder, M.D. (North Carolina, 1989); Geeta Swamy, M.D. (North Carolina, 1997); Robert Wenham, M.D. (Texas-Southwestern, 1997).

Consulting Associates: Kerry H. Ainsworth, M.D. (Northwestern, 1962); Thomas K. Barefoot, M.D. (East Carolina, 1986); Steven H. Berliner, M.D. (SUNY-Brooklyn, 1978); Geoffrey K. Bowman, M.D. (Dalhousie, 1982); Linda K. Bresnahan, M.D. (Indiana, 1987); Pat C. Bryan, M.D. (North Carolina, 1983); Cathryn L. Crosland, M.D. (Kentucky, 1983); Alan S. Davis, M.D. (North Carolina, 1994); Timothy G. DeEulis, M.D. (West Virginia, 1996); Racine N. Edwards-Silva, M.D. (Hahnemann, 1983); Steven E. George, M.D. (South Alabama, 1991); Gerianne Geszler, M.D. (Duke, 1985); Daniel L. Gottsegen, M.D. (Tufts, 1969); André F. Hall, M.D. (Cincinnati, 1992); Jouko K. Halme, M.D., Ph.D. (Helsinki, 1968); Mary G. Hammond, M.D. (Florida, 1974); Stuart H. Jordan, M.D. (North Carolina, 1985); Linda T. McAlister, M.D. (California-San Francisco, 1978); Robert E. Meeks, Jr., M.D. (Mercer, 1989); Celia M. Mendes, M.D. (Brown, 1991); Glen A. Nowachek, M.D. (Loyola, 1982); Denise M. Olson, M.D. (Michigan State, 1988); Russel F. Palmeri, M.D. (Georgetown, 1980); Kathy A. Santoriello, M.D. (Duke, 1984); David A. Schutzer, M.D. (Robert Wood Johnson, 1993); Myron S. Strickland, Sr., M.D. (East Carolina, 1984); Camille J. Wahbeh, M.D. (Amer. Univ. Beirut, 1977); John S. Welsh, Jr., M.D. (Louisiana, 1989); Miles E. Wilson, M.D. (Meharry, 1973).

Emeriti: Arthur C. Christakos, M.D.; Richard J. Dwane, M.D.; Allen P. Killam, M.D.; Roy T. Parker, M.D.; Warren E. Patow, M.D.; Charles H. Peete, Jr., M.D.

Required Course

OBGYN-205C. OBSTETRICS AND GYNECOLOGY. Required of all second-year students. Consists of eight weeks in general obstetrics and gynecology. Students attend lectures, work daily in the general and special outpatient clinics, and are assigned patients on the obstetric and gynecologic wards. Students share in patient care, teaching exercises, and in daily tutorial sessions with the faculty. Clinical conferences, a gynecologic-pathology conference, endocrine conferences, and correlative seminars and lectures are included. Credit: 8. *Nahum*

Clinical Science Electives

OBGYN-210C. GYNECOLOGIC CANCER. This course presents a clinical experience in the management of patients with a gynecologic malignancy. This will include operating room, inpatient unit, and clinic experiences. The student assumes the role of a sub-intern. Outpatient, inpatient, and operative exposure to these patients is extensive. Credit: 4 or 8. Enrollment: max 1. *Clarke-Pearson, Soper, Berchuck, Secord, Havrilesky, and gynecologic oncology fellows*

OBGYN-213C. PREPARATION FOR PRACTICE, CAPE FEAR VALLEY HOSPITAL, FAYETTEVILLE AHEC. This is a unique opportunity to receive both didactic exposure and clinical experience in obstetrics and gynecology in Cape Fear Valley Hospital, a large community hospital in Fayetteville, North Carolina, where almost 4,000 patients are delivered each year. A student actively participates in the care of patients in the labor and delivery room, assists at surgery, and renders postoperative care. This is a community hospital experience rather heavily credited in clinical obstetrics. Students are exposed to a large volume of clinic opportunities. Three senior residents from Duke rotate through Cape Fear Valley Hospital. The students are directly supervised by three full-time Duke faculty at Cape Fear, in addition to Duke Ob-Gyn residents. Prerequisites: permission of Dr. Livengood prior to signing for the course. Check availability through Dr. Gooding's office. Credit: 4. Enrollment: max 1. *Livengood, Gooding, Richardson, Hardison, and staff of Cape Fear Valley Hospital*

OBGYN-231C. CLINICAL REPRODUCTIVE ENDOCRINOLOGY AND INFERTILITY. Course for students who desire additional basic and clinical experience in examination, diagnosis, and treatment of obstetric and gynecologic patients with endocrinopathy and infertility. Course consists of clinical core of reproductive endocrine problems correlated with examination and treatment of patients both in the Endocrinology Outpatient Clinic, in surgery, and in the hospital. Exposure to assisted reproductive technologies is also available, depending on the current clinical load. Credit: 4. Enrollment: max 1. *Walmer, Couchman, Hammond, and reproductive endocrinology fellows*

OBGYN-239C. PERINATAL MEDICINE. A study of the relationship of clinical factors during pregnancy, labor, delivery, and the first month of life. Emphasis is placed on abnormal conditions of pregnancy as related to the infant, prenatal pathological conditions adversely affecting the fetus and the newborn, and early management of the infant. Current problems in the maternal-fetal relationships are outlined. The clinical rotation consists of half-time on the high risk obstetric service and half on the nursery service. Duke North Labor and Delivery, ICN, or Nurseries. See also PEDS 225C. Prerequisites: must contact Dr. Murtha prior to registration. Credit: 8. Enrollment: max 2. *Heine, Livingston, Murtha, and maternal-fetal medicine fellows*

OBGYN-245C. OFFICE GYNECOLOGY. A clinical clerkship focusing on common gynecologic problems in routine clinical practice. For students preparing for careers in either obstetrics and gynecology, primary care specialties, or non-primary care fields. Outpatient diagnosis and patient care are the focus of the clinical experience. Credit: 4 or 8. Enrollment: max 1. *Nahum*

OBGYN-247C. CLINICAL OBSTETRICS. For students preparing for general practice of medicine, pediatrics, or obstetrics and gynecology. This course studies the relationship of clinical factors during pregnancy, labor, and delivery. Emphasis is placed on abnormal conditions of pregnancy as related to the infant. Current problems in the maternal-fetal relationship are outlined. The student functions on an intern level and takes part in activities of the housestaff and faculty. Credit: 5 or 10. Enrollment: max 2. *Heine, Livingston, Murtha, and fellows on obstetrical service*

OBGYN-249C. CLINICAL GYNECOLOGY AND UROGYNECOLOGY. For students preparing for obstetrics and gynecology, general practice, surgery, and urology. Emphasis is placed on the outpatient assessment and inpatient or ambulatory management of patients with acute and chronic gynecologic disorders, including pelvic floor dysfunction, pelvic organ prolapse, urinary and fecal incontinence, and others. Students have the opportunity to work closely with faculty members in the Division of Gynecology. Participation in

the operative care of gynecologic patients is desired. Time for independent study is planned. The student is expected to utilize this time to review and present a specific clinical problem with frequent guidance and input from a member of the Gynecology Division with similar interests. Credit: 4 or 8. Enrollment: max 1. *Weidner, Addison, Amundsen, and urogynecology fellows*

OBYN-253C. PREPARATION FOR PRACTICE, CABARRUS MEMORIAL HOSPITAL, CONCORD, NORTH CAROLINA. This is an opportunity to receive both didactic exposure and clinical exposure in obstetrics and gynecology in the community hospital. The student is expected to function as an intern. The student participates actively in the care of patients in the labor and delivery area, assists at surgery, and renders postpartum and postoperative care. This is a community hospital experience rather heavily credited in clinical obstetrics. The student is exposed to a large volume of clinical material. The practitioners in the community are all board-certified obstetricians and gynecologists and are interested in student teaching. A Duke faculty person provides additional guidance by visiting once per week. This elective can be taken for four weeks for four units or eight weeks for eight units. The students are housed in quarters available for them. Prerequisites: permission of Dr. Livengood prior to registering for the course. Credit: 4 or 8. Enrollment: max 1. *Livengood and staff of the Cabarrus Memorial Hospital*

OPHTHALMOLOGY

Joseph A. C. Wadsworth Clinical Professor David L. Epstein, M.D. (Johns Hopkins, 1968), Chairman.

Professors: W. Banks Anderson, Jr., M.D. (Harvard, 1956); Edward G. Buckley, M.D. (Duke, 1977); Glenn J. Jaffe, M.D. (San Francisco, 1983); Joseph A. C. Wadsworth Research Professor of Ophthalmology Gordon K. Klintworth, M.D., Ph.D. (Witwatersrand, 1957, 1966); Paul Lee, M.D. (Michigan, 1986), J.D. (Columbia, 1996); Brooks W. McCuen, II, M.D. (Columbia, 1974).

Consulting Professor: Edward K. Isbey, Jr., M.D. (Michigan, 1955).

Associate Professors: R. Rand Allingham, M.D. (Cincinnati, 1979); Alan Carlson, M.D. (Duke, 1981); Sharon F. Freedman, M.D. (Harvard, 1985); Stephen C. Pollock, M.D. (Illinois, 1981); Alan D. Proia, M.D. (Cornell, 1980), Ph.D. (Rockefeller, 1979); Cynthia Toth, M.D. (Med. Coll. of Pennsylvania, 1983); Fulton Wong, Ph.D. (Rockefeller, 1977).

Adjunct Associate Professor: M. Joseph Costello, III, Ph.D. (Duke, 1971).

Assistant Professors: Natalie Afshari, M.D. (Stanford, 1995); Sanjay Asrani, M.D. (Seth G.S. Med. Coll., 1988); Catherine Bowes Rickman, Ph.D. (California, 1989); Pratap Challa, M.D. (Florida-Gainesville, 1989); Michael Cooney, M.D. (Columbia, 1994); Joseph Corless, M.D., Ph.D. (Duke, 1972); Sharon Fekrat, M.D. (Chicago, 1991); Pedro Gonzalez, Ph.D. (Universidad de la Laguna, 1988); Leon W. Herndon, M.D. (North Carolina, 1991); Peter C. Huttemeier, M.D. (Copenhagen, 1977); Terry Kim, M.D. (Duke, 1992); John J. Michon, M.D. (Illinois, 1988); Eric A. Postel, M.D. (Jefferson, 1991); Vasantha Rao, Ph.D. (Osmania, 1989); Robin Vann, M.D. (Wake Forest, 1994); Julie Woodward, M.D. (Texas-Houston, 1993).

Assistant Clinical Professors: Thomas Brosnan, M.D. (Med. Univ. of South Carolina, 1997); David A. Chesnut, M.D. (North Carolina, 1995); Laura B. Enyedi, M.D. (North Carolina, 1993); Calvin H. Mitchell, M.D. (Duke, 1958); Laurie K. Pollock, M.D. (Johns Hopkins, 1986); William B. Rafferty, O.D. (Alabama, 1977).

Assistant Research Professors: You Wei Peng, Ph.D. (Johns Hopkins, 1992); Margaret Pericak-Vance, Ph.D. (Indiana, 1978); Dennis Rickman, Ph.D. (Los Angeles, 1993).

Assistant Consulting Professors: Andrew N. Antoszyk, M.D. (N.Y.U., 1983); David P. Berry, M.D. (South Carolina, 1975); John E. Bourgeois, M.D. (Virginia, 1979); David J. Browning, M.D. (Duke, 1981), Ph.D. (Duke, 1980); Craig Fowler, M.D. (Med. Coll. of Virginia, 1985); Anne Marie Hanneken, M.D. (Med. Coll. of Wisconsin, 1984); Phillip McKinley, M.D. (Tulane, 1972); Walter C. McLean, Jr., M.D. (Virginia, 1975); Brian E. Smith, M.D. (Med. Coll. of Georgia, 1993); Charles F. Sydnor, M.D. (Virginia, 1969); Jeffrey S. Taylor, M.D. (Illinois, 1977); Carol Ziel, M.D. (Kentucky, 1987).

Consulting Associates: Thomas L. Beardsley, M.D. (Duke, 1971); J. Thomas Foster, M.D. (Duke, 1958); William R. Harris, M.D. (North Carolina, 1956); Ann Kathryn Joslyn, M.D. (Duke, 1983); Martin J. Kreshon, M.D. (Marquette, 1954); W. Hampton Lefler, M.D. (Bowman Gray, 1963); Harold E. Shaw, Jr., M.D. (Med. Univ. of South Carolina, 1973); Robert E. Wiggins, M.D. (North Carolina, 1984).

Clinical Science Electives

OPHTHAL-210C. MEDICAL OPHTHALMOLOGY. The ophthalmic signs and symptoms of systemic disease are presented in a lecture series. Oriented for those students

interested primarily in pediatrics, internal medicine, or ophthalmology. If permitted by the instructor, this clinical science course can be audited. Credit: 1. Enrollment: min 8, max 20. *Allingham*

OPHTHAL-212C. GENERAL OPHTHALMOLOGY. A clinical preceptorship in which the student participates and observes the regular house staff activities, conferences, lectures, patient care, and treatment including surgery. Emphasis on the use of specialized ophthalmic apparatus is emphasized. Prerequisites: OPHTHAL 210C recommended, but not required. Credit: 4 or 8. Enrollment: max 2. *Allingham*

OPHTHAL-213C. OPHTHALMIC PATHOLOGY. The student reviews all ophthalmic pathology specimens submitted and any pertinent permanent specimens. He or she attends all regular ongoing ophthalmic pathology conferences. Prerequisites: OPHTHAL-212C and OPHTHAL-210C recommended, but not required. Not available during the summer term. Credit: 1. *Proia and Klintworth*

OPHTHAL-214C. INVESTIGATIVE OPHTHALMOLOGY. The student is assigned a project relating to basic ophthalmologic problems. Technical assistance, sufficient equipment, and laboratory animals are supplied for the completion of the project. The student is expected to attend all scheduled research seminars. Prerequisites: OPHTHAL-212C and OPHTHAL-210C suggested, but not required. Credit: 4 or 8. Enrollment: max 2. *Proia, Wong, Jaffe, Epstein, Borrás and Klintworth*

OPHTHAL-215C. PEDIATRIC OPHTHALMOLOGY. A clinical preceptorship in which the student participates in an outpatient pediatric ophthalmology clinic. The student encounters the more common ocular disorders of childhood including ocular motility disturbances, congenital disorders, and congenital metabolic disorders. The diagnosis and treatment aspects are emphasized heavily. The course meets on Tuesdays or Thursdays from 9:00 a.m. till 4:00 p.m. or by special arrangement, such as a half day Tuesday and a half day Thursday. Additional experiences, which would include surgery and/or pediatric neuro-ophthalmology, can be arranged. Credit: 1 or 2. Enrollment: max 3. *Buckley, Enyedi, and Freedman*

PATHOLOGY

Professor Salvatore Pizzo, M.D. (Duke, 1972), Ph.D. (Duke, 1973), Chairman.

Professors: Darell D. Bigner, M.D., Ph.D. (Duke, 1965, 1971); Edward H. Bossen, M.D. (Duke, 1965); William D. Bradford, M.D. (Case Western Reserve, 1958); Patrick J. Buckley, M.D. (Washington, 1976), Ph.D. (Pennsylvania, 1972); Gordon K. Klintworth, M.D., Ph.D. (Witwatersrand, 1957, 1966); Roger C. McLendon, M.D. (Med. Coll. of Georgia, 1982); Nancy Reinsmoen, Ph.D. (Minnesota, 1987); L. Barth Reller, M.D. (Virginia, 1966); Stanley J. Robboy, M.D. (California-Los Angeles, 1965); Victor L. Roggli, M.D. (Baylor, 1976); John D. Shelburne, M.D., Ph.D. (Duke, 1972, 1971)

Research Professor: Uma Kant Misra, Ph.D. (Kansas State, 1958).

Adjunct Professors: James D. Crapo, M.D. (Rochester, 1971); Paul Nettessheim, M.D., D.M.S. (Bonn, 1959); Vladimir Petrow, Ph.D., D.Sc. (London, 1936, 1942); Christopher R. Shea, M.D. (Georgetown, 1983); Nicholas Vick, M.D. (Chicago, 1965).

Associate Professors: Soman Abraham, Ph.D. (Newcastle upon Tyne, 1981); Rex Bentley, M.D. (Harvard, 1986); Leslie Dodd, M.D. (Nevada, 1987); Marcia Gottfried, M.D. (Northwestern, 1978); Maureane Hoffman, M.D., Ph.D. (Iowa, 1982); David N. Howell, M.D., Ph.D. (Duke, 1984, 1982); Christine M. Hulette, M.D., (Louisville, 1983); James G. Lewis, Ph.D. (Duke, 1982); Alan D. Proia, M.D. (Cornell, 1980), Ph.D. (Rockefeller, 1979); Greg Riggins, M.D., Ph.D. (Emory, 1994); Charles Steenbergen, M.D., Ph.D. (Pennsylvania, 1978, 1979); John Toffaletti, Ph.D. (North Carolina, 1977).

Associate Research Professors: George Cianciolo, Ph.D. (Miami, 1977); Carol W. Lewis, Ph.D. (North Carolina, 1972); Bruce LoBaugh, Ph.D. (Pennsylvania State, 1981); Jogin Wu (Univ. of Sci. & Tech., China, 1982).

Associate Clinical Professor: Robin T. Vollmer, M.D. (Duke, 1967).

Assistant Professors: Andrew J. Creager, M.D. (North Carolina, 1995); Thomas Cummings, M.D. (UMDNJ, 1991); Rajesh C. Dash, M.D. (Illinois, 1995); Mark W. Dewhirst, D.V.M., Ph.D. (Colorado State, 1975, 1979); Louis DiBernardo, M.D. (Duke, 1991); Timothy A. Fields, M.D. (Duke, 1997), Ph.D. (Duke, 1996); Henry S. Friedman, M.D. (SUNY-Syracuse, 1977); Herbert Fuchs, M.D., Ph.D. (Duke, 1984); Jerry Gong, M.D. (Shanghai Med., 1986); Barbara K. Goodman, Ph.D. (California-Los Angeles, 1994); Charles S. Greenberg, M.D. (Hahnemann, 1976); John Guyton, M.D. (Harvard, 1973); Laura P. Hale, M.D., Ph.D. (Duke, 1990, 1991); Lizzie Harrell, M.D. (North Carolina State, 1987); John M. Harrelson, M.D. (Duke, 1965); Christopher Herman (Wayne

State, 1996); Randy H. Jirtle, Ph.D. (Wisconsin, 1976); William Kane, M.D., Ph.D. (Washington, 1982); Daniel Kenan, M.D., Ph.D. (Duke, 1995); Virginia Kraus, M.D., Ph.D. (Duke, 1982, 1993); Joanne Kurtzberg, M.D. (New York Med. Coll. 1976); Anand Lagoo, M.D. (B.J. Med. Coll., 1980), Ph.D. (Texas, 1989); James E. Lowe, M.D. (California-Los Angeles, 1973); Kim Lysterly, M.D. (California-Los Angeles, 1983); John F. Madden, M.D., Ph.D. (Duke, 1989); Sara Miller, Ph.D. (Georgia, 1972); Thomas Ortel, M.D., Ph.D. (Indiana, 1985, 1983); L. Darryl Quarles, M.D. (Alabama, 1979); Jonathan I. Scheinman, M.D. (Illinois, 1966); Angelica Selim, M.D. (Universidad de Buenos Aires de Med., 1990); Thomas Sporn, M.D. (Georgetown, 1986); Marilyn Telen, M.D. (New York Univ., 1977); Miriam Wahl, M.D., Ph.D. (Univ of Cincinnati, 1990); Philip J. Walther, M.D., Ph.D. (Duke, 1975, 1974); H. Bill Xie, M.D. (Human Med. Sch., 1982) Ph.D. (Wisconsin, 1994); Michael R. Zalutsky, Ph.D. (Washington, 1974).

Assistant Clinical Professors: John A. Bittikofer, Ph.D. (Purdue, 1971); Steven J. Bredehoeft, M.D. (Kansas, 1974); Jane Gaede, M.D. (Duke, 1966); Claudia K. Jones, M.D. (Duke, 1985); Robert B. Kinney, M.D. (Duke, 1981); Margaret C. Schmidt, M.A. (Louisville, 1969), Ed.D. (Duke, 1988); Siby Sebastian, Ph.D. (Univ of Pune, India, 1996); Frank A. Sedor, Ph.D. (Florida, 1971).

Assistant Research Professors: Ellen Bennett, Ph.D. (McGill, 1991); Mario Gonzalez-Gronow, D.Sc. (Chile, 1970); B.K. Ahmed Rasheed, Ph.D. (Indian Inst. Sci., 1981).

Adjunct Assistant Professors: Michael S. Ballo, M.D. (Case Western Reserve, 1991); James Bonner, Ph.D. (Mississippi State, 1987); John Butts, M.D. (Duke, 1972); Thomas B. Clark, III, M.D. (Med. Univ. of South Carolina, 1983); James D. Crapo, M.D. (Rochester, 1971); Lynn Crook, M.D. (Med. Univ. of South Carolina, 1974), Ph.D. (Emory, 1966); Peter Ingram, Ph.D. (Southampton, 1967); Myla Lai-Goldman, M.D. (Columbia, 1983); James Alan Popp, D.V.M. (Ohio State, 1968), Ph.D. (California-Los Angeles, 1972); Jerry E. Squires, M.D. (West Virginia, 1974), Ph.D. (Yale, 1971); Pamela Sylvestre, M.D. (Southern California, 1995); Peter Wentz, Ph.D. (Florida, 1972).

Associate: Kenneth R. Broda, Ph.D. (Duke, 1977).

Emeriti: Sandra H. Bigner, M.D.; Robert B. Jennings, M.D.; John A. Koepke, M.D.; Kenneth A. Schneider, M.D.; Joachim R. Sommer, M.D.; F. Stephen Vogel, M.D.; Benjamin Wittels, M.D.; Peter Zwadyk, Jr., Ph.D.

Required Course

PATHOL-200B. PATHOLOGY. The core course in pathology is given during the second term of the first year. Fundamentals of pathology are presented by correlating gross and microscopic material to illustrate the structural changes in disease. Lectures dealing with broad concepts of disease processes are presented by senior faculty, and conferences with small groups of students are held under the guidance of staff members. Etiology and pathogenesis of disease, as well as the experimental approach are emphasized for the purpose of correlation with clinical disease. In addition to group work, conferences are scheduled to discuss problems derived from autopsies. Students are required to collaborate in postmortem studies and present cases in clinical-pathologic conferences under the direction of the staff. Credit: 5. *Steenbergen*

Electives

PATHOL-223B or C. AUTOPSY PATHOLOGY. The course is intended to introduce students to the autopsy as an investigative tool. Anatomic-clinical correlation is emphasized. Students work directly with one or more members of the pathology department. They first assist at autopsies and then perform autopsies under supervision. They work up these cases with particular attention to correlations with clinical and experimental medicine, prepare the final autopsy reports, and work essentially at the level of a house officer. Students are expected to present their findings at staff conferences. Preference is given to Pathology Study Program students. Credit: 4 or 8. Enrollment: max 2. *Proia*

PATHOL-227B. MOLECULAR DIAGNOSTICS. This course is designed to provide exposure to the basic molecular biologic techniques that are used in the diagnosis and characterization of inherited diseases and human tumors. The student spends the majority of time at the bench in the Molecular Diagnostic Laboratory, first extracting nucleic acids and then performing southern blot and polymerase chain reaction studies on patients samples. The results of these studies are correlated with both clinical and histopathologic findings to learn the utility and limitations of molecular biologic analysis in the assessment of human disease. Credit: 4. Enrollment: max 2. *Gong*

PATHOL-241B. PATHOLOGIC BASIS OF CLINICAL MEDICINE. This is a lecture course stressing clinicopathologic correlation, morphologic diagnosis, pathophysiology, and laboratory medicine. It is recommended for students enrolled in the Pathology Study Program, but is available as a separate elective for all students. Lectures are on Thursdays from 8:00 a.m. to 9:30 a.m. and on Fridays from 12:00 p.m. to 1:00 p.m. Gross Demonstration is Tuesdays 8:00-9:00 a.m. Course must be taken for the entire year. No audits are allowed. Credit: 1. *Buckley and Steenbergen*

PATHOL-281B or C. CYTOPATHOLOGY PRECEPTORSHIP. This course consists of full-time rotation in the diagnostic cytopathology laboratories. By working with the laboratory staff, the student explores in detail the role played by diagnostic cytopathology in the diagnosis of disease. In addition to general cytology, the student has the opportunity to participate in the fine needle aspiration biopsy service. Although not a requirement, the student is encouraged to pursue special research projects. Preference given to Pathology Study Program students. Credit: 4 or 8. Enrollment: max 1. *Jones, Dodd and cytopathology staff*

PATHOL-342B. SPECIAL TOPICS IN PATHOLOGY. Special problems in pathology are studied with a member of the senior staff. The subject matter is individually arranged. Permission of the instructor required. Credit: 1-16. *Pizzo and staff*

PATHOL-348B or C. PRACTICAL SURGICAL PATHOLOGY. This course is intended as an introduction to the practice of diagnostic surgical pathology. Clinical and morphologic aspects of disease are emphasized in rotations through the different specialty services (Intra-operative Consultation, GYN Path, GI Path, etc.). Students will participate (with residents and staff) in the evaluation of gross specimens, interpretations of glass slides (with ancillary studies), and the preparation of the final report. The course can be tailored to individuals planning a career in pathology or those pursuing other specialties. Rotations through the Fine Needle Aspiration and Exfoliative Cytology services can be scheduled depending on the student's interest. Preference given to Pathology Study Program students. Credit 4 or 8. Enrollment: max 2. *Bentley and staff*

PATHOL-350B or C. MEDICAL MICROBIOLOGY. This is an introduction to medical microbiology (CMB) including appropriate use of diagnostic tests and other laboratory resources for patient care and hospital infection control. The student participates in laboratory rounds with the faculty, medical microbiology fellows, and the infectious diseases services. The student gains appropriate bench experience in all CMB disciplines including the use of molecular biology methods used in patient related tests and infection control investigations. Credit: 4. Enrollment: max 1. *Reller, Harrell, Henshaw, Madden, and staff*

PATHOL-359B. FUNDAMENTALS OF ELECTRON MICROSCOPY. Emphasis is placed on the theory and application of electron microscopy to ultrastructural pathology. The methods relating to electron microscopy, as well as x-ray microanalysis, ion microscopy, and immunocytochemistry are considered. Laboratory experience is included. Credit: 3. *Shelburne, Roggli, Ingram, LeFurgey, and Miller*

PATHOL-364B. MUSCULOSKELETAL PATHOLOGY. An overview of skeletal pathology beginning with the development of the normal skeleton. A systematic review of inflammatory, neoplastic, metabolic, arthritic, vascular, dysplastic, and traumatic diseases of the skeleton. Clinical correlation. Credit: 2. Enrollment: min 4, max 10. *Harrelson*

PATHOL-366B. PULMONARY PATHOLOGY AND PATHOPHYSIOLOGY. Emphasis is on pulmonary pathology and pathophysiology of infections, metabolic, environmental, neoplastic diseases, and certain diseases of unknown etiology (sarcoid, alveolar proteinosis, e.g.). Credit: 3. Enrollment: min 2, max 15. *Roggli and Sporn*

PATHOL-380B or C. SURGICAL PATHOLOGY- EMPHASIS: ELECTRON MICROSCOPY. This course is an apprenticeship in which the student becomes engaged in the actual preparation and diagnosis of tissue changes using both light and electron microscopy. The student, of necessity, learns how to operate the electron microscope. Prerequisites: PATHOL-359B suggested, but not required. Permission of instructor is required. Credit: 4 or 8. Enrollment: max 1. *Shelburne and Vollmer*

PATHOL-385B. MOLECULAR ASPECTS OF DISEASE. This course presents background, investigative methods, and recent advances in understanding the molecular basis of selected diseases, with an in-depth focus on a small number of diseases whose defects are known at the genetic or molecular levels. The course is taught in a small group seminar format by experts in each disease studied. Topics include molecular cytogenetics, immunodeficiency diseases, mechanisms of microbial antibiotic resistance, hemoglobinopathies, neurologic/neuromuscular diseases, coagulopathies, cancer susceptibility genes, tumor suppressor genes, ethical issues in genetic susceptibility testing, gene therapy, and more. Credit: 3. Enrollment: min 5 max 50. *Hale and staff*

PEDIATRICS

Samuel L. Katz Professor Michael M. Frank, M.D. (Harvard, 1960), Chairman.

Professors: Page A.W. Anderson, M.D. (Duke, 1963); George Bisset, III, M.D. (South Florida, 1975); Edward G. Buckley, M.D. (Duke, 1977); James B. Sidbury Professor Rebecca H. Buckley, M.D. (North Carolina, 1958); Y.T. Chen, M.D. (Taiwan, 1973), Ph.D. (Columbia, 1978); Dennis A. Clements, M.D. (Rochester, 1973), M.P.H., Ph.D. (North Carolina, 1988, 1990); G. Robert DeLong, M.D. (Harvard, 1961); Peter C. English, M.D., Ph.D. (Duke, 1975); John M. Falletta, M.D. (Kansas, 1966); John W. Foreman, M.D. (Maryland, 1973); Henry S. Friedman, M.D. (SUNY-Syracuse, 1977); Ronald N. Goldberg, M.D. (California-Los Angeles, 1972); Edward C. Halperin, M.D. (Yale, 1979); Frank H. Kern, M.D. (Pennsylvania, 1982); Wilburt C. Davison Professor Thomas R. Kinney, M.D. (Duke, 1970); Margaret L. Kirby, Ph.D. (Arkansas, 1972); Joanne Kurtzberg, M.D. (New York Med. Coll., 1976); Darrell V. Lewis, Jr., M.D. (Minnesota, 1969); Stephen P. Sanders, M.D. (Louisville, 1975); William R. Treem, M.D. (Stanford, 1977); Martin H. Ulshen, M.D. (Rochester, 1969); Russell E. Ware, M.D., Ph.D. (Duke, 1983, 1991).

Clinical Professors: Wallace F. Berman, M.D. (Minnesota, 1969); Deborah W. Kredich, M.D. (Michigan, 1962); Mahmoud M. Mustafa, M.D. (Jordan, 1980); James A. Stockman III, M.D. (Jefferson, 1969); Norman S. Talner, M.D. (Michigan, 1949); W. Samuel Yancy, M.D. (Duke, 1965).

Research Professor: David S. Millington, Ph.D. (Liverpool, 1969).

Associate Professors: Andrea Amalfitano, D.O., Ph.D. (Michigan State, 1990, 1989); Brenda E. Armstrong, M.D. (St. Louis, 1974); Roger C. Barr, Ph.D. (Duke, 1968); William Clayton Bordley, M.D. (Johns Hopkins, 1986); Rose-Mary Boustany, M.D. (Amer. Univ. Beirut, 1979); Philip P. Breitfeld, M.D. (Rochester, 1979); Ira M. Cheifetz, M.D. (Yale, 1989); Tony L. Creazzo, Ph.D. (Georgia, 1980); Sharon Freedman, M.D. (Harvard, 1985); Michael S. Freemark, M.D. (Duke, 1976); Priya Kishnani, M.D., M.B.B.S. (Bombay, 1990, 1985); Mary Min-Chin Lee, M.D. (SUNY-Buffalo, 1983); Jennifer Li, M.D. (Duke, 1987); John G. Looney, M.D. (Texas-Southwestern, 1969); M. Louise Markert, M.D., Ph.D. (Duke, 1982, 1991); Ross E. McKinney, Jr., M.D. (Rochester, 1979); Thomas M. Murphy, M.D. (Rochester, 1973); Neil Prose, M.D. (New York, 1975); David A. Reardon, M.D. (Tufts, 1986); Philip M. Rosoff, M.D. (Western Reserve, 1978); Laura E. Schanberg, M.D. (Duke, 1984); Scott Schulman, M.D. (George Washington, 1982); Emmanuel B. Walter, M.D. (Maryland, 1983); Larry Williams, M.D. (Duke, 1977); Jo Rae Wright, Ph.D. (West Virginia, 1981).

Associate Clinical Professors: Richard Auten, M.D. (North Carolina, 1981); Ricki F. Goldstein, M.D. (Cornell, 1981); Laura T. Gutman, M.D. (Stanford, 1962); Ronald J. Kanter, M.D. (Vanderbilt, 1979); Susan G. Kreissman, M.D. (Mt. Sinai, 1985); Samuel M. Mahaffey, M.D. (West Virginia, 1979); J. Marc Majure, M.D. (Mississippi, 1981); David T.H. Tanaka, M.D. (Johns Hopkins, 1979); Delbert Wigfall, M.D. (Emory, 1979); Gordon Worley, M.D. (Harvard, 1973).

Assistant Professors: Kenneth A. Alexander, M.D. (Washington, 1989); Daniel K. Benjamin, M.D. (Univ. Virginia, 1995); William D. Bradford, M.D. (Western Reserve, 1958); Terrill D. Bravender, M.D. (Michigan, 1992), M.P.H. (Harvard, 1999); Lisa W. Faberowski, M.D. (Ohio State, 1990); Herbert E. Fuchs, M.D., Ph.D. (Duke, 1984); Timothy M. George, M.D. (New York, 1986); Eva Nozik Grayck, M.D. (Colorado-Boulder, 1988); Sridharan Gururangan, M.B.B.S. (Madras, 1981), M.R.C.P. (Royal Coll. of Physicians, 1988); J. Rene Herlong, M.D. (Duke, 1989); Dwight D. Koeberl, M.D. (Mayo Med. School, 1990), Ph.D. (Mayo Graduate School, 1990); Richard M. Kravitz, M.D. (Temple, 1984); Yin-Xiong Li, M.D. (Hunan Med. Univ., N/A), Ph.D. (Peking Union Med., Coll. 1991); Corinne M. Linaudic, M.D., Ph.D. (Duke, 1995, 1993); Paul L. Martin, M.D., Ph.D. (Washington, 1987); Marie T. McDonald, M.D. (Trinity College, 1994); Erik N. Meyers, M.D. (California-San Diego, 1990); Joseph L. Roberts, M.D. (Emory, 1981), Ph.D. (Duke, 1992); Paul Szabolcs, M.D. (Simmelweis, 1985); Robert J. Thompson, Jr., Ph.D. (North Dakota, 1971); Judith A. Voynow, M.D. (Pennsylvania, 1982); Pedro

Weisleder, M.D. (Universidad Nacional Autonoma de Mexico, 1985), Ph.D. (Univ. Washington-Seattle, 1991); John S. Wiener, M.D. (Tulane, 1988); Sherri A. Zimmerman, M.D. (North Carolina, 1991).

Assistant Clinical Professors: Jeffrey P. Baker, M.D. (Duke, 1984); Jennifer K. Cheng, M.D. (Tufts, 1992); Robert P. Drucker, M.D. (Duke, 1979); Laura B. Enyedi, M.D. (North Carolina, 1993); Nancy E. Friedman, M.D. (Med. Coll. of Virginia, 1975); Karen H. Frush, M.D. (Duke, 1986); Joseph D. Gunn, M.D. (Virginia, 1989); Janet J. Hsu-Lin, M.D. (Tufts, 1994); Susan D. Izatt, M.D. (Tufts, 1987); Martha Ann Keels, D.D.S., Ph.D. (North Carolina, 1984, 1990); Ave Maria Lachiewicz, M.D. (Minnesota, 1980); Elizabeth A. Landolfo, M.D. (Manitoba, 1988); Angelo S. Milazzo, Jr., M.D. (SUNY, 1996); Beatriz Morris, M.D. (Puerto Rico, 1988); John W. Moses, M.D. (Med. Univ. of South Carolina, 1983); Cynthia A. Neal, D.D.S. (North Carolina, 1996); Consuelo Diana Eglia Rabinovich, M.D. (Southern Illinois, 1985), M.P.H. (North Carolina, 1991); Christine Rudd, Pharm.D. (North Carolina, 1973); Gail A. Spiridigliozzi, Ph.D. (Kansas, 1988); Deborah Squire, M.D. (Northwestern, 1978); Karen S. St. Claire, M.D. (Texas-Galveston, 1982).

Assistant Research Professors: Pasquale Chitano, Ph.D. (Milan, 1992); Blythe H. Devlin, Ph.D. (Virginia, 1978); Michael D. Feezor, Ph.D. (North Carolina, 1969); Bernard M. Fischer, D.V.M., Ph.D. (North Carolina State, 1988, 1997); Donald E. Fleenor, Ph.D. (Emory, 1987); J. Francis Heidlage, Ph.D. (Missouri, 1978); Haixiang Jiang, M.D., Ph.D. (Shanghai Med., 1975, 1991); Allyn McConkie-Rosell, M.S.W. (Arkansas, 1980); Rashid N. Nassar, Ph.D. (Duke, 1974); Karen J. O'Donnell, Ph.D. (North Carolina, 1983).

Associates: Michelle L. Bailey, M.D. (SUNY, 1995); Timothy A. Driscoll, M.D. (Ohio State, 1990); Edward A. Evans, M.D. (UMDNJ, 1998); Andrea M. Haqq, M.D. (Calgary, 1994); Yolanda O. Johnson, M.D. (Emory, 1999); Carrie Kitko, M.D. (Ohio State, 1999); Jennifer Lawson, M.D. (Vermont, 1990); L. Scott Levin, M.D. (Temple, 1982); Laurie A. Myers, M.D. (Ohio State, 1992); Thomas A. Owens, M.D. (SUNY-Buffalo, 1995); Linda D. Pegram, M.D. (North Carolina, 1995); Jennifer L. Turi, M.D. (Massachusetts, 1995).

Clinical Associates: Patricia Lynn Ashley, M.D., Ph.D. (Texas-Southwestern, 1991, 1984); Joanne F. Band, M.D. (Yale, 1998); Margarita Bidegain, M.D. (Universidad de la Republica, 1984); C. Michael Cotten, M.D. (Miami, 1986); Muki W. Fairchild, M.S.W. (North Carolina, 1976); Robert D. Fitch, M.D. (Duke, 1976); Kathryn E. Gustafson, Ph.D. (Ohio, 1988); Kristina K. Hardy, Ph.D. (Duke, 2000); Carmen M. Herrera, M.D. (Chile, 1990); Stephen B. Leinenweber, M.D. (Rush, 1995); Edward F. Lueth, M.S.W. (North Carolina, 1982); William F. Malcolm, M.D. (Minnesota, 1998); Maria D. Martinez, M.D. (Navarra-Spain, 1994); Sandra P. Moreira, M.D. (Duke, 1999); Marcia Morgenlander, M.D. (Pittsburgh, 1988); Susan E. Owens, M.D. (SUNY-Buffalo, 1995); Sara P. Robert, M.D. (Loyola, 1999); William H. Schultz, P.A. (Duke, 1981); Martha A. Snyder, M.D. (Med. Coll. of Virginia, Richmond, 1999); Betty B. Staples, M.D. (Maryland, 1998); Yui-Lin Tang, M.D. (National Taiwan, 1983); A. William Taub, M.S.W. (North Carolina, 1981); Diane C. Tenenbaum, M.D. (Tulane, 1992); Amy B. Tu, Ph.D. (Pennsylvania State, 1999); Suzanne Trzcinski Woods, M.D. (Med. Coll. of Ohio, Toledo, 1994).

Senior Research Scientist: Richard Neal Shepherd, Ph.D. (Duke, 1975).

Senior Research Associates: Baodong Sun, Ph.D. (China Med. Univ., 1995); Sarah P. Young, Ph.D. (Inst. of Child Health, 1997).

Research Scientists: Deeksha Sarihyani Bali, Ph.D. (Amritsar, 1987); Tirupapuliyer Damodaran, Ph.D. (Univ. of Madras, India, 1990); Faustina N.A. Sackey, Ph.D. (Univ. Ottawa, Canada, 1995); Robert D. Stevens, Ph.D. (London, 1969).

Research Associates: Radwan Abu-Issa, Ph.D. (Baylor, 2000); Mohamed Nagy Ahmed, M.D. (Suez Canal Univ., Egypt, 1987); Yan An, Ph.D. (Ottawa, 1995); Ramamani Arumugam, Ph.D. (Madras, 1998); Noah Byrd, Ph.D. (Wesleyan, 2002); Emil T. Chuck, Ph.D. (Case Western Reserve, 1998); Michelle L. Einson, Psy.D. (Georgia Sch., of Professional Psychology, 2001); Ruth S.R. Everett, Ph.D. (Purdue, 1999); Mary R. Hutson, Ph.D., (Georgia, 1994); Hui-Ming Liu, M.D. (Norman Bethune, 1978); Urs Pohlman, M.D. (Freie Univ., Berlin, 1994), Ph.D. (Ruprecht Karls Univ., Heidelberg, 2000); Angela Schulz, M.D. (Albert-Ludwigs Univ. of Freiburg, Germany, 2002); Zhaoxia Wang, Ph.D. (Shinshu Univ., Japan, 2001); Xiufeng Wu, M.D. (Changzhi Med. Univ. in China, 1986), Ph.D. (Beijing Med. Univ., 2001); Hengtao Zhang, Ph.D. (SUNY, 2000).

Associates in Research: Edward R. Darken, A.M. (Duke, 1985); James H. Heller, M.A. (Minnesota, 1980), M.S. (Memorial Univ. of Nfld., 1983); Elisa Olga Sajaroff, M.A. (Argentina, 1999); Karen L. Waldo, M.S. (Med. Coll. of Georgia, 1970).

Adjunct Professor: Samuel Gross, M.D. (Rochester, 1955).

Adjunct Associate Professors: Wayne M. Danker, M.D. (New York Med. Coll., 1981); William D. Matthew, Ph.D. (California-San Francisco, 1981).

Adjunct Assistant Professor: Victoria M. Pratt, Ph.D. (Indiana, 1994).

Consulting Professor: Jon N. Meliones, M.D. (Tufts, 1984).

Associate Consulting Professors: Reese H. Clark, M.D. (North Carolina, 1982); Rosalind Coleman, M.D. (Case Western Reserve, 1969); Howard H. Loughlin, M.D. (Pennsylvania, 1970); Evelyn D. Schmidt, M.D. (Duke, 1951), M.P.H. (Columbia, 1962).

Assistant Consulting Professors: Clarence A. Bailey, M.D. (North Carolina, 1958); William L. Coleman, M.D. (New Mexico, 1979); James S. Hall, Jr., M.D. (Duke, 1957); Alvin H. Hartness, M.D. (Bowman Gray, 1965); Cynthia R. Jackson-DiLiberti, D.O. (Univ. Osteopathic Med., Des Moines, 1989); Thomas M. McCutchen, Jr., M.D. (Vanderbilt, 1963); Kathy A. Merritt, M.D. (Duke, 1985); John C. Pollard, M.D. (Virginia, 1968); William C. Powell, M.D. (Bowman Gray, 1952); Rupa Redding-Lallinger, M.D. (Cornell, 1980); James B. Rouse, M.D. (Duke, 1965); Frank S. Shaw, M.D. (Pennsylvania, 1959); Charles I. Sheaffer, M.D. (Western Reserve, 1958); Leonard D. Stein, M.D. (Med. Coll. of Georgia, 1975); J. Gordon Still, M.D. (Bowman Gray, 1978), Ph.D. (Wake Forest, 1978); Fred R. Stowe, Jr., M.D. (North Carolina, 1958); Marjorie E. Tripp, M.D. (Yale, 1973).

Consulting Associates: Mark D. Baker, M.D. (Chicago, 1995); Krystal S. Bottom, M.D. (Florida, 1989);

Carol A. Burk, M.D. (Pittsburgh, 1983); R. Meade Christian, Jr., M.D. (Western Reserve, 1967); Douglas W. Clark, M.D. (North Carolina, 1983); William G. Conley III, M.D. (Med. Coll. of Virginia, 1960); Maria Luisa Escobar, M.D. (Colombian Sch. Of Medicine, 1986); Lisa Piglia Ferrari, M.D. (Duke, 1994); Jean M. Findlay, M.B., Ch.B. (Aberdeen, 1970); Gregory A. Fisher, M.D. (South Florida, 1976); Michelle Forcier, M.D. (Connecticut, 1992), M.P.H. (North Carolina, 1997); Martha E. Gagliano, M.D. (Duke, 1982); Keith Gallaher, M.D. (Pennsylvania State, 1982); William M. Gay, M.D. (Eastern Virginia, 1980); James W. Grant, M.D. (Duke, 1979); Jeffrey D. Greene, M.D. (Duke, 1994), Ph.D. (Duke, 1992); Katherine M. Harper, M.D., (North Carolina, 1995); Larry C. Harris, M.D. (Duke, 1977); Rufus McP. Herring, Jr., M.D. (Bowman Gray, 1969); Sandra Hosford, M.D. (Duke, 1986); Cheryl Jackson, M.D. (Pennsylvania, 1987); Mary Lacaze, M.D. (Mt. Sinai, 1991); Jennifer L. Lail, M.D. (Kentucky, 1978); Charles W. Lallier, M.D. (Virginia, 1981); Pierre C. LeMaster, M.D. (Florida, 1971); Donald N. Ludlow, Jr., M.D. (Hahnemann, 1983); Oveta B. McIntosh-Vick, M.D. (North Carolina, 1983); Ashok B. Mehta, M.D. (Baroda Med. Coll., 1974); Katharine S. Mosca, M.D. (Virginia, 1991); Maxine L. Murray, M.D. (Pittsburgh, 1984); Richard I. Perzley, M.D. (Jefferson Med. Coll., 1973); Emad K. Salman, M.D. (American Univ. of Beirut, 1987); Janice D. Stratton, M.D. (Tulane, 1961); Charles A. Trant, Jr., M.D. (East Carolina, 1989); Joseph W. Whatley, M.D. (Duke, 1958).

Emeriti: Thomas E. Frothingham, M.D.; Jerome S. Harris, M.D.; Samuel L. Katz, M.D.; Shirley K. Osterhout, M.D.; Lois A. Pounds, M.D.; M. Henderson Rourk, Jr., M.D.; Madison S. Spach, M.D.; Alexander Spock, M.D.; Bailey D. Webb, M.D.; Catherine M. Wilfert, M.D.

Required Course

PEDS-205C. PEDIATRICS. The basic course in pediatrics for all students is an eight-week clerkship in the second year. Its principal aim is to provide an exposure to the field of child health. The student has a varying series of experiences which should give a grasp of the concepts that underlie the discipline. Goals include acquiring familiarity and competence with the basic tools of information-gathering (history, physical examination, and laboratory data) and developing an approach to the integration of this material for the solution of problems of health and illness in infancy, childhood, and adolescence. This should be accomplished with continuing reference to the basic principles of pathophysiology encountered in the first year courses. Those patients to whom the student is assigned provide the focus for case studies. In addition to the careful history and physical examination which must be recorded, the student is expected to organize an appropriate differential diagnosis and to seek and read pertinent reference material relevant to each patient. The student should learn to present each case verbally in an organized and succinct fashion, to follow the patient's progress, and to interpret all studies which are performed. The student is expected to learn from a number of sources: standard textbooks and journals, current publications and conferences, and also from people -- house staff, faculty, nurses, parents, and all others with whom contact is made in the clinical setting. Objectives include an understanding of the roles played in pediatrics by other members of the health care team, both in the ambulatory and hospital settings. Patient care may involve nurse, social worker, recreation therapist, psychologist, physiotherapist, dietitian, and others. The eight weeks is divided to include time in several of the following settings: (a) Duke outpatient clinics and emergency room, (b) Duke inpatient, (c) Durham Regional Hospital, (d) Duke nursery, (e) Lincoln Community Health Center, and (f) community practices in and away from Durham. Credit: 8. *Drucker*

Clinical Science Electives

PEDS-210C. ADVANCED PEDIATRICS. This course permits the student to elect an in-depth experience within pediatrics. Each student has a specific faculty preceptor who develops and implements the curriculum tailored to the individual's needs. Listed below are the faculty representatives to contact. Arrangements for the elective must be made with these individuals prior to enrolling in the course. The name of the preceptor with whom a student is working must be designated during web registration. Credit: 1 to 8. Enrollment: max 1. Drucker and departmental division chiefs

Division	Faculty	Telephone
Allergy/Immunology	Rebecca H. Buckley, M.D.	684-2922
Cardiology	Stephen P. Sanders, M.D.	681-2916
Critical Care Medicine	Ira Cheifetz, M.D.	681-5872
Emergency Department	Sara Robert	684-5537*
Endocrinology	Michael S. Freemark, M.D.	684-3772
Gastroenterology	William R. Treem, M.D.	681-4841
Hematology/Oncology	Philip Rosoff, M.D.	684-3401
Infectious Diseases	Ross McKinney, M.D.	684-6335
Medical Genetics	Marie McDonald, M.D.	684-2036
Nephrology	John W. Foreman, M.D.	684-4246
Neurology	Darrell Lewis, M.D.	684-3219
Perinatal Medicine	Ronald N Goldberg, M.D.	681-6024
Pulmonary	J. Marc Majure, M.D.	684-2289
Rheumatology	Deborah Kredich, M.D.	684-6575
Rural Health Clinics	Robert Drucker, M.D.	684-2356**
Sports Medicine	Deborah Squire, M.D.	477-4297

PEDS-211C. PEDIATRIC INFECTIOUS DISEASES. This course provides experience in the clinical and laboratory diagnosis of infectious diseases and in their therapy. The student works closely with the infectious disease fellow and participates actively in evaluation of patients. Daily rounds in microbiology laboratory. Credit: 4 or 8. Enrollment: max 1. *McKinney, Gutman, Katz, Drucker, Clements, Alexander, and Benjamin*

PEDS-215C. ENDOCRINE DISORDERS IN CHILDREN. Students attend in the Pediatric Endocrine, Diabetes, and Insulin Resistance/Obesity Clinics and assume active roles in the evaluation and management of inpatients admitted to the Endocrine Service. Emphasis is placed upon the evaluation of growth and sexual development as indices of endocrine status during childhood. Students also participate in a monthly endocrine journal club and in weekly intra- and interdepartmental, endocrine, clinical and research conferences. Students will make a presentation to the endocrine group at the end of the rotation. Prerequisite: contact instructors. Credit: 4 or 8. Enrollment: max 2. *Freemark and staff*

PEDS-217C. PEDIATRIC HEMATOLOGY AND ONCOLOGY. Includes all aspects of clinical and laboratory hematology as well as the diagnostic evaluation, care, and treatment of patients with malignant diseases. Emphasis is placed on fundamental concepts. Students will accompany the inpatient team on the ward rounds for 1-2 weeks of the rotation with the remaining time spent in the clinic evaluating new patients and seeing established patients. Students also are expected to attend divisional teaching conferences. Students may be asked to research a specific topic and present a short presentation at the end of their rotation. Prerequisite: contact instructor. Credit: 4 or 8. Enrollment: max 1. *Rosoff, Ware, Zimmerman, Kreissman, Breitfeld, Pegram, and Linardic*

PEDS-225C. NEONATOLOGY. Students have patient care responsibilities and experiences in the Duke North Intensive Care Nursery. The course involves direct participation in patient care under the supervision of the faculty and housestaff. Emphasis is placed on the initiation of parent-child relationships and a pathophysiologic approach to assessment and

*The student participates in the initial evaluation, stabilization and management of pediatric medical and surgical patients in the Emergency Department. Special emphasis is placed on the approach to the pediatric trauma victim. Weekly didactic lectures and case review conferences are offered. The student is expected to research a relevant topic of his/her interest and lead a brief discussion with faculty and house staff during the elective. The student is evaluated by the Emergency Medicine Attending staff and receives ongoing feedback throughout the rotation as well as a formal exit interview.

**The Rural Health Clinics rotation provides a broad exposure to general pediatric problems in a medically indigent community. Four days a week (Monday through Thursday) the student travels with a senior pediatric resident to each of four rural county health departments to provide pediatric care in collaboration with public health nurses and child health clinicians. There are approximately two hours a day driving time, which allows for a one-on-one tutorial with the senior resident.

management of the critically ill neonate. This is a sole-enrollment course and, as such, cannot be taken in conjunction with any other course. Prerequisite: contact Dr. Ronald Goldberg. Credit: 5. Enrollment: max 1. *Goldberg, Goldstein, Auten, Herrera, Tanaka, Meyers, Cotten, Bidegain, Izatt, and Malcolm*

PEDS-231C. CLINICAL PEDIATRIC CARDIOLOGY. This course provides an intensive learning experience in the clinical diagnosis and management of childhood heart disease. Emphasis is placed upon the pre- and post-operative management of children with surgical heart disease as well as upon the outpatient management of children with less serious heart disease. The student also is exposed to pediatric acute care medicine and the modalities available to maintain cardiovascular function in the extremely ill child. Scope: history, physical examination, and special diagnostic techniques (echocardiography, electrocardiography, cardiac catheterization, and cineangiography). Students participate on daily ward rounds, outpatient clinics four days per week, and all clinical and didactic teaching conferences of the division. Prerequisite: PEDS 205C. Credit: 4 (or 8 with special permission of the instructor). Enrollment: max 2. *Sanders, Armstrong, Herlong, Kanter, and Li*

PEDS-233C. ALLERGY AND CLINICAL IMMUNOLOGY. Clinical evaluation and practice in use of methods of diagnosis and treatment of allergic and immunologic disorders including the atopic diseases, immunologic deficiency states, and bone marrow transplantation. Scope: in-depth seminars, history, physical examination, skin testing, a variety of clinical immunologic tests, and Clinical Research Unit experience. Credit: 4 or 8. Enrollment: max 3. *Buckley, Markert, Williams, Myers, and Robert*

PEDS-234C. CLINICAL GENETICS AND METABOLISM. The student becomes familiar with evaluation and management of various genetic disorders including malformation syndromes and biochemical disorders. History-taking, pedigree construction and analysis, specialized aspects of the dysmorphological physical examination, diagnostic techniques, routine and specialized laboratory methods (cytogenetic, biochemical, molecular), and reference materials (texts and computer programs) are covered. Students participate in weekly teaching and clinical conferences. Credit: 4. Enrollment: max 2. *McDonald*

PEDS-241C. PEDIATRIC NEPHROLOGY. The course is designed to provide experience in diagnosis, interpretations of laboratory tests, natural history, and treatment of acute and chronic disorders of the kidney in children. The student also is exposed to the management of fluid and electrolyte disorders in infants and children. Prerequisite: prior approval of Dr. Wigfall. Credit: 4. Enrollment: max 1. *Foreman and Wigfall*

PEDS-243C. ADOLESCENT MEDICINE. Students participate in a weekly seminar on Tuesday mornings with an emphasis on the behavioral and developmental aspects of adolescence, substance abuse, contraception, and eating disorders. Patient interactions are arranged at Duke Children's Primary Care on Monday and Friday afternoons. Optional clinic time may be arranged at Wake Teen Medical Services in Raleigh on Wednesday afternoons, or at the Sports Medicine Clinic on Friday afternoons. Tutorial and supervisory time to discuss specific patients and pertinent literature is arranged. A brief, informal presentation on the student's adolescent topic of choice is expected at the end of the clerkship. Credit: 2. Enrollment: max 1. *Bravender*

PEDS-250C. PEDIATRIC INTENSIVE CARE UNIT. This advanced course is designed to allow students a four-week experience as a subintern in the Pediatric Intensive Care Unit. Under supervision of faculty attendings and house staff, the senior student assumes responsibility for the care of critically ill children admitted to the Medicine and Surgery services in the Pediatric Intensive Care Unit. Emphasis is placed on the development of the pathophysiologic approach to the diagnosis and therapy of a broad spectrum of pediatric illnesses as they present in acute care settings. Advanced concepts in pediatric critical care are emphasized. Students rotate night call with pediatric house staff. Prerequisite: PEDS 205C.

Credit: 5. Enrollment: max 2. *Cheifetz, Faberowski, Grayck, Kern, Leinenweber, Schulman, and Turi*

PEDS-260C. ADVANCED CLERKSHIP IN PEDIATRICS. This course is designed to provide the student with an intensive, in-depth exposure to the diagnosis and management of pediatric patients hospitalized at Duke. Students are responsible for admission histories, physical examinations, and management throughout the hospitalization. The student serves as an acting intern throughout the rotation. Night call is expected every fourth night. This is a sole-enrollment course and cannot be taken in conjunction with any other course. Students must obtain the permission of Dr. Robert Drucker to register for or to drop this course. Credit: 5. Enrollment: max: 3. *Drucker and faculty*

PEDS-281C. PEDIATRIC NEUROLOGY. Students will partake in the evaluation and management of both hospitalized and ambulatory pediatric patients with neurological disorders. Emphasis is placed on the neurodevelopmental history, neurological examination, the use of laboratory tests and radiological tools, and pharmacotherapy in the diagnosis and management of childhood neurological disorders. Prerequisite: contact Dr. Lewis. Credit: 4 or 8. Enrollment: max 2. *Lewis*

PHARMACOLOGY AND CANCER BIOLOGY

Professor Anthony R. Means, Ph.D. (Texas-Austin, 1966), Chairman.

Professors: Mohamed Abou-Donia, Ph.D. (California-Berkeley, 1966), Patrick J. Casey, Ph.D. (Brandeis, 1987); O. Michael Colvin, M.D. (Washington, 1961); Everett H. Ellinwood, M.D. (North Carolina, 1959); Cynthia Kuhn, Ph.D. (Duke, 1975); Donald McDonnell, Ph.D. (Baylor, 1987); James O. McNamara, Sr., M.D. (Michigan, 1968); Elliot Mills, Ph.D. (Columbia, 1964); J. Victor Nadler, Ph.D. (Yale, 1972); Saul M. Schanberg, M.D., Ph.D. (Yale, 1964, 1961); Debra A. Schwinn, M.D. (Stanford, 1983); Shirish Shenolikar, Ph.D. (Leeds, 1975); Theodore Slotkin, Ph.D. (Rochester, 1970); Gary Stiles, M.D. (Vanderbilt, 1975).

Research Professor: Wilkie A. Wilson, Jr., Ph.D. (Duke, 1971).

Adjunct Professors: Robert M. Bell, Ph.D. (Berkeley, 1970); Hiroyoshi Hidaka, M.D., Ph.D. (Nagoya, 1963, 1968); Kenneth S. Korach, Ph.D. (Georgia, 1974); Joseph Yanai, Ph.D. (Colorado, 1971).

Associate Professors: Timothy Haystead, Ph.D. (Dundee, 1988); Joseph Heitman, M.D. (Cornell, 1992), Ph.D. (Rockefeller, 1989); Homme Hellinga, Ph.D. (Cambridge, 1986); Sally Kornbluth, Ph.D. (Rockefeller, 1989); Madan Kwatra, Ph.D. (Montreal, 1977); Edward Levin, Ph.D. (Wisconsin, 1984); Daniel Lew, Ph.D. (Rockefeller, 1990); Ann Marie Pendergast, Ph.D. (Riverside, 1985); Rochelle D. Schwartz-Bloom, Ph.D. (Georgetown, 1983); Antonius VanDongen, Ph.D. (Leiden, 1988); Xiao-Fan Wang, Ph.D. (California-Los Angeles, 1986); A. Richard Whorton, Ph.D. (Vanderbilt, 1975).

Adjunct Associate Professor: Robert J. Kavlock, Ph.D. (Miami, 1977).

Assistant Professors: Gerard Globe, M.D., Ph.D. (Duke, 1995); Sheila Collins, Ph.D. (Mass. Inst. of Tech., 1985); Christopher Counter, Ph.D. (McMaster, 1996); Yehia Daaka, Ph.D. (S. Florida, 1995); Michael Ehlers, M.D., Ph.D. (Johns Hopkins, 1998); Walter Koch, Ph.D. (Cincinnati, 1990); Ponugoti Vasantha Rao, Ph.D. (Osmania, 1989); Tannishtha Reya, Ph.D. (Pennsylvania, 1996); Robert Wechsler-Reya, Ph.D. (Pennsylvania, 1995); Tso-Pang Yao, Ph.D. (San Diego, 1994); John D. York, Ph.D. (Washington, 1993).

Assistant Research Professors: Beth Harvat, Ph.D. (New Mexico, 1994); John David Norris, Ph.D. (Galway, 1998); James Otto, Ph.D. (Michigan, 1994); Frederick Seidler, Ph.D. (Duke, 1986); Katherine Swenson, Ph.D. (Washington, 1983); Anjaneyulu Tadepalli, Ph.D. (Pittsburgh, 1972).

Adjunct Assistant Professors: Christopher Lau, Ph.D. (Duke, 1982); David Martin (N/A); Diane Miller, Ph.D. (Kentucky, 1978).

Required Course

PHARM-200B. MEDICAL PHARMACOLOGY. This basic course in pharmacology for medical and graduate students describes the action of drugs in relation to biochemical and physiological processes and to the rationale for their clinical use. Additional topics include pharmacokinetics, drugs of abuse, and commonly encountered toxins. Nine lectures and one small-group, case-based discussion per week for eight weeks, May-June. Credit: 4. *Nadler and staff*

Basic Science Electives

PHARM-233B. ESSENTIALS OF PHARMACOLOGY, TOXICOLOGY, AND DRUG DISCOVERY. Drug absorption, distribution, excretion and metabolism; structure

and activity relationships; drug and hormone receptors, and target cell responses. C-L: Graduate School. Credit: 4. Enrollment: min 5, max 30. *Slotkin and staff*

PHARM-234B. INTERDISCIPLINARY APPROACH TO PHARMACOLOGY. Several model systems (cardiovascular, reproductive, neural, and cell cycle) are to be used to explore the molecular, biochemical, and physiologic basis of drug action. C-L: Graduate School. Credit: 3. Enrollment: max 20. *Whorton and staff*

PHARM-372B. RESEARCH IN PHARMACOLOGY. Laboratory investigation in various areas of pharmacology. C-L: Graduate School. Credit to be arranged. Credit: 1-16. *Staff*

PSYCHIATRY

Professor K. Ranga Krishnan, M.D. (Madras Med. Coll., 1978), Chairman.

DIVISION OF BEHAVIORAL MEDICINE

Professor: Redford B. Williams, Jr., M.D. (Yale, 1967), Division Head.

Associate Consulting Professor: Valerie F. Holmes, M.D. (Louisville, 1980).

Assistant Clinical Professors: Lakshmi Kamaraju, M.D. (Andhra, 1976); Indira M. Varia, M.D. (Shah Med. Coll., 1968); Michael R. Volow, M.D. (Seton Hall, 1964).

Clinical Associates: John G. Giragos, M.D. (Beirut, 1963); Katayoun Tabrizi, M.D. (Tehran, 1984).

Research Associates: John Feaganes, Ph.D. (North Carolina, 1993); Michael J. Helms, B.S. (North Carolina, 1971).

DIVISION OF BIOLOGICAL PSYCHIATRY

Associate Professor: P. Murali Doraiswamy, M.D. (Madras, 1987), Division Head.

Professors: Everett H. Ellinwood, Jr., M.D. (North Carolina, 1959); Richard Weiner, M.D., Ph.D. (Duke, 1975).

Consulting Professor: Richard J. Wyatt, M.D. (Johns Hopkins, 1964).

Adjunct Professors: Jau-Shyon Hong, Ph.D. (Kansas, 1973); Arifulla Khan, M.B.B.S. (Bangalore, 1975); Jeffrey Lieberman, M.D. (George Washington, 1975).

Associate Professors: Edward D. Levin, Ph.D. (Wisconsin, 1984); Joseph P. McEvoy, M.D. (Vanderbilt, 1973); Rochelle Schwartz, Ph.D. (Georgetown, 1983).

Associate Clinical Professors: D. Larry Burk, M.D. (Pittsburgh, 1981); Lawrence A. Dunn, M.D. (Michigan, 1984).

Associate Research Professors: Sheila Collins, Ph.D. (Mass. Inst. of Tech., 1985); Tong H. Lee, M.D. (Stanford, 1988), Ph.D. (Duke, 1986); Jed E. Rose, Ph.D. (California-San Diego, 1978).

Assistant Professors: Marian Butterfield, M.D. (North Carolina, 1990); Frederick Cassidy, M.D. (Vanderbilt, 1988); Scott A. Huettel, Ph.D. (Duke, 1999); Christine E. Marx, M.D. (Duke, 1993); Scott D. Moore, M.D. (Virginia, 1986); Jiang Wei, M.D. (Binzhou Med. Coll., 1982).

Assistant Clinical Professors: Veeraindar Goli, M.D. (Osmania Med. Coll., 1978); Prakash S. Masand, M.D. (Bombay, 1981).

Assistant Research Professors: Colin Davidson, Ph.D. (London, 1996); Amir H. Rezvani, M.D. (Illinois, 1983).

Associate: Leann Nelson, M.D. (Texas, 1986).

Clinical Associates: Geoffrey M. Georgi, M.Div. (Philadelphia Div. School, 1974); Kenneth R. Gersing, M.D. (Washington, 1993); Haresh M. Tharwani, M.D. (Karachi, 1991).

Consulting Associates: Christopher Byrum, M.D. (Virginia, 1988); Ugo Goetzl, M.D. (New York Med. Coll., 1968); Charlie Swanson, M.D. (Indiana, 1991).

Research Associates: Qiang Chen, M.D. (Wannan, 1983); Eiji Kirino, M.D., Ph.D. (Hokkaido, 1989); Cindy Lazarus, Ph.D. (St. Andrews, 2000); Guiying Zhou, M.D. (China Med., 1988).

Associates in Research: Syam Gadde, B.S. (Yale, 1994); Jennifer LeBlanc, M.A. (Southern California, 2001); Martha E. Payne, M.P.H. (North Carolina, 1996); Lawrence J. Shampine, B.S. (Notre Dame, 1975).

DIVISION OF CHILD AND ADOLESCENT PSYCHIATRY

Professor: John S. March, M.D. (California-Los Angeles, 1978), Division Head.

Professors: Michael DeBellis, M.D. (SUNY, 1987); John G. Looney, M.D. (Southwestern, 1969).

Visiting Research Professor: Robert Coles, M.D. (Columbia, 1954).

Associate Professor: Adrian C. Angold, B.Sc. (London Hospital Med. Sch., 1976).

Associate Clinical Professor: Jean G. Spaulding, M.D. (Duke, 1972).

Assistant Professors: Lisa Amaya-Jackson, M.D. (North Carolina, 1986); Helen Egger, M.D. (Yale, 1991).

Assistant Clinical Professors: Allan Chrisman, M.D. (George Washington, 1971); Richard D'Alli, M.D. (Arizona, 1991); Karl Stevenson, M.D. (Bowman Gray, 1966).

Assistant Consulting Professors: Cesar Guajardo, M.D. (Nuevo Leon, 1961); Thomas M. Jones, M.D.

(Mexico, 1974); James B. Payton, M.D. (Arkansas, 1971); Ingrid Pisetsky, M.D. (Albert Einstein, 1971).

Clinical Associates: Ranota D.T. Hall, M.D. (East Tennessee State, 1987); Paul D. Nagy, M.S. (Florida State, 1984); Carol J. Vander-Zwaag, M.D. (Mt. Sinai, 1986).

Consulting Associates: Peter F. Adland, M.D. (Georgetown, 1975); Linwood R. Allsbrook, M.D. (Kentucky, 1981); Bryon Herbel, M.D. (North Dakota, 1986); D. Randall Johnson, M.D. (Med. Univ. of South Carolina, 1983); Michael S. Lancaster, M.D. (Tulane, 1975); Nancy J. Livingston, M.D. (Duke, 1972); Karen M. Munstat, M.D. (Med. Coll. of Ohio, 1990); Daphne Rosenblitt, M.D. (Duke, 1974); Donald L. Rosenblitt, M.D. (Duke, 1973); David A. Smith, M.D. (Alabama, 1980).

Associate in Research: Judith B. Holland, M.A. (North Carolina, 1981).

Instructor: Barbara J. Smith, M.Ed. (North Carolina Central, 1983).

DIVISION OF GENERAL PSYCHIATRY

Clinical Professor: Steven Lipper, M.D. (Boston, 1972).

Associate Professor: Jean Hamilton, M.D. (Univ. Texas Health Sci. Ctr., 1977).

Associate Clinical Professor: Harold S. Kudler, M.D. (SUNY, 1979).

Adjunct Assistant Professor: Samuel B. Thielman, M.D., Ph.D. (Duke, 1980, 1986).

Assistant Clinical Professors: Conrad C. Fulkerson, M.D. (Missouri, 1969); Michael Hertzberg, M.D. (North Carolina, 1985); Roy Stein, M.D. (Duke, 1980).

Assistant Consulting Professor: Ervin Thompson, M.D. (Vanderbilt, 1972).

Clinical Associate: Robert E. Winton, M.D. (Vanderbilt, 1972).

Consulting Associates: Thomas W. Brown, M.D. (Case Western Reserve, 1978); Jeffrey R. Chambers, M.D. (Michigan, 1986); Frances C. Greason, M.D. (East Carolina, 1991); Philip Hillsman, M.D. (Tennessee-Memphis, 1987); Eric L. Kirchmann, M.D. (Washington, 1995); Thomas M. Slaven, Ph.D. (Old Dominion, 1983); Jonathan Weiner, M.D. (North Carolina, 1987).

Instructor: Becky Hanusa, M.S. (Indiana, 1975).

DIVISION OF GERIATRIC PSYCHIATRY

Associate Professor: David Steffens, M.D. (Texas, 1988), Division Head.

J.P. Gibbons Professor Dan G. Blazer, M.D. (Tennessee, 1969), Ph.D. (North Carolina, 1980).

Clinical Professor: Keith G. Meador, M.D. (Louisville, 1982).

Adjunct Professor: John C.S. Breitner, M.D., M.P.H. (Pennsylvania, 1970).

Associate Professors: Harold G. Koenig, M.D. (California-San Francisco, 1982); John W. Williams, M.D. (North Carolina, 1984).

Associate Research Professor: Judith C. Hays, R.N., Ph.D. (Yale, 1991).

Assistant Clinical Professor: John L. Beyer, M.D. (Texas, 1989).

Assistant Research Professor: Celia F. Hybels, Ph.D. (North Carolina, 1997).

Assistant Consulting Professor: Stephen L. Oxley, M.D. (Kentucky, 1973).

Clinical Associates: Peter Barboriak, M.D., Ph.D. (Duke, 1989); Carol Saur, M.S.N. (Univ. American Sch. of Nursing, 1965); Warren Taylor, M.D. (South Florida, 1996).

Consulting Associates: Andrew Allen, M.D. (Miami, 1982); Leslie Hocking, M.D. (Tufts, 1983); Tracey C. Holsinger, M.D. (Virginia, 1992).

Research Associate: Bruce Burchett, Ph.D. (Carleton, 1983).

Instructor: Cornelia B. Service, M.P.H. (North Carolina, 1979).

Associate in Research: Ruth E. Eckles, B.A. (St. Andrews Presbyterian Coll., 1989).

DIVISION OF MEDICAL PSYCHOLOGY

Professor: Richard S. Surwit, Ph.D. (McGill, 1972), Division Head.

Professors: James A. Blumenthal, Ph.D. (Washington, 1975); Barbara J. Burns, Ph.D. (Boston Coll., 1972); Elizabeth J. Costello, Ph.D. (London, 1981); Herbert Crovitz, Ph.D. (Duke, 1970); Francis J. Keefe, Ph.D. (Ohio, 1975); Patrick Logue, Ph.D. (North Dakota, 1965); David Madden, Ph.D. (California-Davis, 1977); Susan Roth, Ph.D. (Northwestern, 1973); Susan Schiffman, Ph.D. (Duke, 1970); Andrew Sherwood, Ph.D. (Hull, 1982); Ilene C. Siegler, Ph.D. (Syracuse, 1973); Timothy J. Strauman, Ph.D. (New York, 1987); Robert J. Thompson, Ph.D. (North Dakota, 1971).

Clinical Professors: Jack D. Edinger, Ph.D. (Virginia Commonwealth, 1971); Scott Swartzwelder, Ph.D. (American, 1980).

Research Professors: John C. Barefoot, Ph.D. (North Carolina, 1968); Gerda Fillenbaum, Ph.D. (London, 1956); Jed E. Rose, Ph.D. (California-San Diego, 1978); William Wilson, Ph.D. (Vanderbilt, 1973).

Adjunct Professors: Bernard T. Engel, Ph.D. (California-Los Angeles, 1956); Robert L. Hubbard, Ph.D. (Michigan, 1974); John Lochman, Ph.D. (Connecticut, 1976); Martin T. Lowy, Ph.D. (Purdue, 1982); Rune Simeonsson, Ph.D. (George Peabody Coll., 1971).

Consulting Professor: Gerald J. Musante, Ph.D. (Tennessee, 1971).

Associate Professors: Jean Beckham, Ph.D. (Florida State, 1988); John F. Curry, Ph.D. (Catholic, 1978); John A. Fairbank, Ph.D. (Auburn, 1980); Richard S.E. Keefe, Ph.D. (New York, 1990); Robert Shipley, Ph.D. (Michigan State, 1972); Karen C. Wells, Ph.D. (Georgia, 1978); Kathleen A. Welsh-Bohmer, Ph.D. (Virginia, 1985).

Associate Clinical Professors: James R. Clack, Ph.D. (Purdue, 1970); Michael L. Cuccaro, Ph.D. (South Carolina, 1988); Karen O'Donnell, Ph.D. (North Carolina, 1983); Rolffs S. Pinkerton, Ph.D. (Georgia, 1967);

Clive J. Robins, Ph.D. (SUNY, 1982); Anna L. Stout, Ph.D. (South Carolina, 1980); Joseph E. Talley, Ph.D. (Virginia, 1977).

Associate Research Professors: James Lane, Ph.D. (California-Los Angeles, 1979); Isaac M. Lipkus, Ph.D. (North Carolina, 1991); Brenda Plassman, Ph.D. (Arizona, 1986); Susan G. Silva, Ph.D. (North Carolina State, 1991); Edward C. Suarez, Ph.D. (Miami, 1986); William C. Wetsel, Ph.D. (Mass. Inst. of Tech., 1983).

Adjunct Associate Professors: Paul T. Costa, Jr., Ph.D. (Chicago, 1970); Karen M. Gil, Ph.D. (West Virginia, 1985).

Assistant Professors: Jeffrey N. Epstein, Ph.D. (SUNY-Stony Brook, 1989); Louis A. Giordano, Ph.D. (Southern Illinois, 1999); Scott H. Kollins, Ph.D. (Auburn, 1997).

Assistant Clinical Professors: Michael Babyak, Ph.D. (Kansas, 1995); John Barrow, Ph.D. (Houston, 1971); Melanie J. Bonner, Ph.D. (Virginia Polytechnic Inst., 1995); Robin A. Buhcke, Ph.D. (Southern Illinois, 1982); Patrick S. Calhoun, Ph.D. (Vanderbilt, 1998); Tracey Potts Carson, Ph.D. (Georgia, 1982); Scott N. Compton, Ph.D. (Nevada, 1998); Renee H. Dunn, Ph.D. (Southern Mississippi, 1996); Christopher L. Edwards, Ph.D. (Kentucky, 1997); Kathryn Gustafson, Ph.D. (Ohio, 1988); Kristina K. Hardy, Ph.D. (Duke, 2000); Steve Herman, Ph.D. (Duke, 1977); Judith C. Holder, Ph.D. (Southern Illinois, 1995); Martin Ionescu-Pioggia, Ph.D. (North Carolina, 1985); Deborah C. Koltai, Ph.D. (California Sch. of Professional Psychology, 1993); Albert D. Loro, Jr., Ph.D. (Washington, 1976); Daphne C. McKee, Ph.D. (North Carolina, 1976); Oliver Oyama, Ph.D. (Indiana, 1985); Laura S. Porter, Ph.D., (SUNY, 1996); Ruth E. Quillian, Ph.D. (Miami, 1994); Rebecca Schein, Ph.D. (Fairleigh Dickinson, 1992); Gail A. Spiridigliozzi, Ph.D. (Kansas, 1988); Amy B. Tu, Ph.D. (Penn. State, 1999); Barbara K. Walters, Ph.D. (Alabama, 1992); Susan P. Wisner, Ph.D. (Boston, 1987); William K. Wohlegemuth, Ph.D. (Miami, 1995); Nancy Zucker, Ph.D. (Louisiana State, 2000).

Assistant Research Professors: Hayden B. Bosworth, Ph.D. (Pennsylvania State, 1996); Beverly H. Brummett, Ph.D. (Kansas, 1996); Colin Davidson, Ph.D. (London, 1996); Larry A. Tupler, Ph.D. (Emory, 1989); H. Ryan Wagner, Ph.D. (New Mexico, 1975); Lana Watkins, Ph.D. (North Carolina, 1991); Kevin P. Weinfurt, Ph.D. (Georgetown, 1997).

Adjunct Assistant Professors: William E. Schlenger, Ph.D. (North Carolina State, Raleigh, 1974).

Assistant Consulting Professors: William D. Barley, M.D. (Texas Tech., 1980); Stephen B. Baumann, Ph.D. (Duke, 1982); William V. Burlingame, Ph.D. (Washington, 1967); Edward Landis, III, Ph.D. (Louisville, 1989); John Lefebvre, Ph.D. (Duke, 1998); Richard L. Munger, Ph.D. (Michigan, 1979); Craig R. Stenberg, Ph.D. (Denver, 1982).

Clinical Associates: Katherine Applegate, Ph.D. (Ohio State, 2000); Linda Barnett, Ph.D. (Kentucky, 1981); Loretta E. Braxton, Ph.D. (North Carolina, 1989); Ernestine C. Briggs, Ph.D. (Illinois-Urbana, 1999); Anita Yvonne Bryant, Ph.D. (Maryland, 1991); Catriona M. Buist, Ph.D. (Our Lady of the Lake, 2001); James W. Carson, Ph.D. (North Carolina, 2002); Robyn L. Claar, Ph.D. (Vanderbilt, 2002); Jill S. Compton, Ph.D. (Michigan State, 1989); Rebecca Dingfelder, Ph.D. (Ohio State, 2002); Laura Dreer, Ph.D. (Central Michigan, 2002); Lauren Durant, Ph.D. (Syracuse, 2001); Barbara Eldredge, Ph.D. (Southern Illinois, 1996); David Fitzgerald, Ph.D. (Notre Dame, 1995); Rebecca F. Frank, Ph.D. (North Carolina, 1994); Patricia J. Gammon, Ph.D. (North Carolina, 1990); Priscilla Grissom, Ph.D. (North Carolina State, 2001); Laura J. Hanisch, Psy.D. (Biola, 2000); Jill L. Hazlett, Ph.D. (Indiana State, 1990); Pamela S. Hazlett, Ph.D. (North Carolina, 1991); Stephanie T. Jenal, Ph.D. (Southern California, 1996); Robert Mankoff, Ph.D. (Georgia State, 1992); Christian F. Mauro, Ph.D. (Miami, 2001); Meggan Moorhead, Ph.D. (Boston, 1980); Jennifer Norten, Ph.D. (North Carolina, 1995); Priti I. Parekh, Ph.D. (Duke, 2001); Guy Potter, Ph.D. (North Carolina, 2000); Amanda L. Price, Ph.D. (Tennessee, 2002); M. Zachary Rosenthal, Ph.D. (Nevada, 2002); Jennifer Sapia, Ph.D. (SUNY, 2000); Anthony J. Smith, Ph.D. (Southern Illinois, 1996); Laura Wagner Moore, Ph.D. (Massachusetts, 2002); Janet Whidby, Ph.D. (Duke, 1987).

Consulting Associates: Steven J. Ashby, Ph.D. (Connecticut, 1976); Susanne E. Dunn, Ph.D. (Duke, 1989); Janet Foliano, Ph.D. (Indiana, 1995); Laura A. Gilliom, Ph.D. (North Carolina, 1997); Spencer Lylerly, Ph.D. (North Carolina State, 1987); Robert J. McCarthy, Ph.D. (South Carolina, 1972); Michael Murray, Ph.D. (South Florida, 1993); Richard R. Rumer, Ph.D. (North Carolina, 1982); Laura J. Weisberg, Ph.D. (Maryland, 2000).

Adjunct Associate: Juesta M. Caddell, Ph.D. (Virginia Polytechnic Inst. and State Univ., 1991).

Instructors: John T. Edwards, Ph.D. (Georgia, 1977); Elizabeth W. Jackson, Ph.D. (North Carolina, 1996); Pamela Maxson, Ph.D. (Pennsylvania State, 1994); C. Toby McCoy, Ph.D. (Vanderbilt, 1986).

Research Associates: Ali Ahmadi-Torshizi, Ph.D. (Shariz, 1997); Simon Bacon, Ph.D. (Birmingham, 1997); Yushi Bai, Ph.D. (China Med., 1998); Andrew Broughton, Ph.D. (Pennsylvania State, 1970); Tavis Campbell, M.A. (Concordia, 1997); Wenhong Cao, M.D. (Medicine Hunan Med., 1983); Jennifer Cheavens, Ph.D. (Kansas, 2002); Shirley X. Guo-Ross, Ph.D. (California-Irvine, 2000); Thomas Haney, M.S.P.H. (North Carolina, 1978); Stephanie R. Johnson, Ph.D. (Catholic, 2002); F. Joseph McClernon, Ph.D. (Southern Illinois, 2001); Alexander V. Medvedev, Ph.D. (Inst. Cytology, 1991); Sarah Mustillo, Ph.D. (Duke, 2000); Vladimir Pogorelov, Ph.D. (Inst. Pharmacology, 1999); Jacques Robidoux, Ph.D. (Montreal, 2000); Ramona Rodriguez, Ph.D. (North Carolina, 2001); William S. Sampson, IV, Ph.D. (North Carolina, 1998); Steven R. Thorp, Ph.D. (Nevada, 2001); Simon T. Tonev, Ph.D. (Duke, 2002); Aaron White, Ph.D. (Miami, 1999); Wythe L. Whiting, Ph.D. (Georgia Inst. Tech., 1998); Jennifer Zervakis, Ph.D. (Duke, 1997).

Associates in Research: Michael Ellis, B.A. (SUNY, 1978); Kristy S. Johnson, M.A. (North Carolina, 1999); Charles Louchlin, M.A. (North Carolina State, 1995); Cynthia C. McCaskill, R.N., M.S.N. (Michigan, 1967); Margaret Poe-Schmitz, M.A. (Towson, 2001); Wendy Webster, M.A. (East Carolina, 1996).

DIVISION OF OUTPATIENT SERVICES

Professor: Jonathan R.T. Davidson, M.D. (Univ. Coll., 1966).

Clinical Professor: Leonard Handelsman, M.D. (Albert Einstein, 1980).

Consulting Professor: Joseph DeVeauh-Geiss, M.D. (SUNY-Upstate, 1972).

Associate Professor: Andrew Krystal, M.D. (Duke, 1987).

Associate Consulting Professors: David M. Hawkins, M.D. (Duke, 1966); Alan Metz, M.B.B.Ch. (Witwatersrand, 1978).

Assistant Professor: Kathryn M. Conner, M.D. (Maryland, 1993).

Adjunct Assistant Professors: Charles D. Casat, M.D. (Boston, 1963). Assistant Clinical Professors: Greg Clary, M.D. (Texas-Houston, 1986); Diana L. Dell, M.D. (Louisiana State, 1982); Leslie Forman, M.D. (Tufts, 1972); Kishore Gadde, M.D. (Guntur, 1978); Caroline Haynes, M.D., Ph.D. (Duke, 1983); David Naftolowitz, M.D. (Albany Med. Ctr., 1986); Grace Thrall, M.D. (Connecticut, 1991); Patricia A. Ziel, M.D. (Michigan, 1968).

Assistant Consulting Professors: Eileen P. Ahearn, M.D. (Duke, 1990); Jack W. Bonner, III, M.D. (Southwestern, 1965); Martin G. Groder, M.D. (Columbia, 1964); Steven L. Mahorney, M.D. (Louisiana State, 1973); Robert D. Phillips, M.D. (Pennsylvania, 1952); W. James Ryan, M.D. (LSU, 1972); Suzanne Sutherland, M.D. (Michigan State, 1988); Pierre V. Tran, M.D. (Univ. de Franche, 1987).

Clinical Associates: Doris M. Iarovici, M.D. (Yale, 1992); Floyd C. Wiseman, M.D. (Texas-Houston, 1982).

Associates: Lou Ann Crume, M.D. (Kentucky, 1986); Theresa A. Yuschok, M.D. (Northwestern, 1986).

Consulting Associates: John A. Ascher, M.D. (North Carolina, 1980); Ernest R. Braasch, M.D. (SUNY, 1970); Lawrence Champion, M.D. (Wisconsin, 1973); John T. Clapacs, M.D. (Duke, 1992); Barbara A. Crockett, M.D. (Hahnemann, 1968); Duncan McEwen, M.D. (Tulane, 1982); Rex Moody, M.D. (North Carolina, 1987); Mindy Oshrain, M.D. (Duke, 1983); Peter Z. Perault, M.D. (Vermont, 1977); Roger Perilstein, M.D. (Temple, 1982); William Price, M.D. (North Carolina, 1985); Ernest Raba, M.D. (Texas, 1972); Kathleen Seibel, M.D. (Minnesota, 1985); Philip M. Spiro, M.D. (Yale, 1983); Nathan R. Strahl, M.D. (North Carolina, 1983); David M. Susco, M.D. (Pennsylvania, 1983); Nerine E. Tatham, M.D. (Howard, 1992); Ronald L. Vereen, M.D. (Duke, 1981); James R. Weiss, M.D. (Louisiana, 1973); James S. Wells, Jr., M.D. (North Carolina, 1977).

DIVISION OF PSYCHIATRIC SOCIAL WORK

Clinical Associate: Muki Fairchild, M.S.W. (North Carolina, 1976), Division Head.

Associate Clinical Professors: Lisa Gwyther, M.S.W. (Case Western Reserve, 1969); William S. Meyer, M.S.W. (Illinois, 1977).

Associates: Edward Lueth, M.S.W. (North Carolina, 1982); Diane E. Meglin, M.S.W. (Yeshiva, 1982).

Clinical Associates: Edna M. Ballard, M.S.W. (North Carolina, 1980); Mary Sue Cherney, M.S.W. (North Carolina, 1984); Mazella B. Hall, Ph.D. (Walden, 1992); S. Kay Patterson, M.S.W. (Ohio State, 1967); Andrew Silberman, M.S.W. (North Carolina, 1982); Libby E. Webb, M.S.W. (Indiana, 1980).

Consulting Associates: Bess Autry, M.S.W. (North Carolina, 1976); Mary Ann Black, M.S.W. (North Carolina, 1970); Mary Jane Burns, M.S.W. (North Carolina, 1974); Mary C. Cole, M.S.W. (Tennessee, 1971); Stephen Hawthorne, M.S.W. (California, 1974); Debbie Hill, M.S.W. (North Carolina, 1987); Lois P. Ostow, M.S.W. (North Carolina, 1981); Betty B. Parham, M.S.W. (Smith, 1971); Carolyn Thornton, M.S.W. (North Carolina, 1968); Stella Waugh, M.S.W. (North Carolina, 1986); Elinor T. Williams, M.S.W. (North Carolina, 1977); Margaret Wilner, M.S.W. (Columbia, 1977).

Research Associate: Susan D. Phillips, M.S.W. (Arkansas, 1995).

Instructors: Nan T. Birchall, M.S.W. (Pennsylvania, 1979); Stephanie B. Bouis, M.S.W. (East Carolina, 1998); Karen Catoe, M.S.W. (North Carolina, 2000); James Dolan, M.S.W. (Rutgers, 1981); Donna R. Eash, M.S.W. (Columbia, 1998); Cooley Gaffigan, M.S.W. (North Carolina, 1996); James R. Gonzalez, M.S.W. (North Carolina, 1998); M. Jane Howard, M.S.W. (Texas, 1979); Nicole Hurst, M.S.W. (East Carolina, 1998); Meryl Kanfer, M.S.W. (Pennsylvania, 1994); Laurel J. Lawson, M.S.W. (North Carolina, 1979); Gael McCarthy, M.S.W. (North Carolina, 1985); Ylana N. Miller, Ph.D. (California-Berkeley, 1975); Patrick J. Murphy, M.S.W. (Our Lady of the Lake, 1974); Maureen Murray, M.S.W. (Smith, 1986); Linda A. Noyes, M.S.W. (Tennessee, 1983); Donna Potter, M.S.W. (Syracuse, 1997); Marilyn D. Reedy, M.S.W. (Tulane, 1964); Karen D. Smith, M.S.W. (North Carolina-Greensboro, 2002); Scott N. Snider, M.S.W. (North Carolina, 1995); Mickey Tullar, M.S.W. (North Carolina, 1982); Polly vande Velde, M.S.W. (Washington, 1979); Glynis G. Wikstrom, M.S.W. (North Carolina, 2000); Janis A. Williams, M.S.W. (Georgia, 1983); Bobby Williamson, M.S.W. (Michigan State, 1979); Ann S. Willoughby, M.S.W. (North Carolina, 1988); Twyla J. Wilson, M.S.W. (North Carolina, 1985).

DIVISION OF SOCIAL AND COMMUNITY PSYCHIATRY

Professor: Marvin S. Swartz, M.D. (Tufts, 1980), Division Head.

Professors: Kurt Back, Ph.D. (Mass Inst. of Tech., 1949); James H. Carter, M.D. (Howard, 1966); Linda K. George, Ph.D. (Duke, 1975).

Associate Professor: Jeffrey W. Swanson, Ph.D. (Yale, 1985).

Associate Clinical Professor: Harold Carmel, M.D. (Mt. Sinai, 1974).

Associate Research Professors: Deborah T. Gold, Ph.D. (Northwestern, 1986); L. Richard Landerman, Ph.D. (Duke, 1978).

Associate Consulting Professors: Nicholas Stratas, M.D. (Toronto, 1957); John Wagnitz, M.D. (Ohio State, 1971).

Adjunct Associate Professor: B. Kathleen Jordan, Ph.D. (Duke, 1986).

Assistant Professor: Elizabeth M.Z. Farmer, Ph.D. (Duke, 1991).

Assistant Research Professors: Charlene A. Allred, Ph.D. (Virginia, 1990); Bruce Burchett, Ph.D. (Carleton, 1983).

Assistant Consulting Professor: Sally Johnson, M.D. (Jefferson, 1976).

Clinical Associates: Ayesha Chaudhary, M.D. (Agakhan, 1991); James N. Finch, M.D. (South Florida, 1981); Holly B. Rogers, M.D. (Texas, 1990); Susan A. Van Meter, M.D. (Oklahoma, 1991).

Consulting Associates: Bruce A. Berger, M.D. (Minnesota, 1977); Jeffrey Brantley, M.D. (North Carolina, 1977); Paul A. Buongiorno, M.D. (Georgetown, 1980); Wiley Dickerson, M.D. (Med. Univ. of South Carolina, 1989); Amilda Horne, M.D. (Univ. Texas Biomed. Graduate Sch., 1979); Gordon Lavin, M.D. (Case Western Reserve, 1978); Robert A. Millet, M.D. (Louisiana State, 1991); Thomas D. Owens, M.D. (Louisiana State, 1985); Mark S. Reynolds, M.D. (Tulane, 1983); James A. Smith, III, M.D. (Howard, 1976).

Instructor: Joanne B. Dellaero, M.Ed. (Houston, 1991).

Associates in Research: Michael Hannon, Ph.D. (Ohio State, 2000); Sandra C. Leak, M.A. (Duke, 1979); Beverly Patnaik, M.A. (N. Texas State, 1975).

Lecturers: Robert Rollins, M.D. (Duke, 1956); N.P. Zarzar, M.D. (American, 1956).

Required Course

PSYCHTRY-205C. PSYCHIATRY. This course is a required six-week clerkship in clinical psychiatry for second year medical students. Students assume limited responsibility with supervision for the diagnosis and treatment of patients with common and severe psychiatric illnesses. Educational settings include inpatient psychiatry services at four different hospitals, psychiatry outpatient clinics, and the psychiatry emergency rooms of two hospitals. Students participate in a series of core didactic lectures and didactic modules which expose them to basic psychopathologic entities, differential diagnosis of psychiatric symptoms, practical application of treatment modalities, and issues of cost effectiveness in diagnosis and treatment. Students also participate in lectures, rounds, and clinical case conferences particular to their rotation site. Students are encouraged to observe psychotherapy and to participate in supervised psychological treatments wherever appropriate opportunities can be provided. Credit: 6. *Stein*

Basic Science Electives

PSYCHTRY-223B. NEUROBIOLOGICAL BASIS OF BEHAVIOR. The course surveys neuroanatomical, neurophysiological, neurochemical, and neuropharmacological evidence of central nervous system function as it relates to normal and abnormal behavior. Clinical description, measurements of function, and laboratory models of function, as well as the biological substrates of affective disorders and psychoses are emphasized. Scientific bases of current therapeutic procedures, especially psychopharmacological, are examined. Course format consists of assigned readings, study questions, and lectures by faculty and other active researchers. Mid-term and final examinations are given. Each student is expected to critique a circumscribed area of research literature focusing on the appropriateness of conceptualizations and experimental methods. Additionally, students have an opportunity to become acquainted with, and to participate in, ongoing research. C-L Graduate School, PHARM 423. Credit: 4. Enrollment: min 1. *Krystal*

PSYCHTRY-297B. ETHNIC AND MINORITY HEALTH PATTERNS AND PROBLEMS. Descriptive and analytical focus on the literature about ethnic and minority health patterns in the United States, the issues inherent therein, and the implications thereof for the delivery of medical services. Credit: 4. Enrollment: min 1. *Carter and Anderson-Brown*

PSYCHTRY-299B. PRECEPTORSHIP IN BEHAVIORAL NEUROSCIENCES. This course provides an opportunity for the student to work closely with a member of the faculty in an area of mutual interest with emphasis upon research (see the website: <http://third-year.mc.duke.edu>, Behavioral Neurosciences Study Program section, for partial list of interest areas; more complete descriptions available). Credit: 1-16. *Krystal*

Clinical Science Electives

PSYCHTRY-240C. SUBINTERNSHIP IN PSYCHIATRY. This course is an intensive clinical experience in the diagnosis and treatment of severe and incapacitating psychi-

atric disorders. The student is given more clinical responsibility than the comparable second year inpatient rotation. Patient care responsibilities include management of ward milieu. Treatment approaches emphasizing psychotropic medication and individual, family, and group psychotherapy are part of the clinical experience. Participation at selected patient care conferences and didactic lectures is expected. The rotation is available at Duke with specialty program experience that can be structured to include a survey of the variety of residential treatments available in this area. If desired, a student can arrange for a special reading tutorial in related topics (e.g., schizophrenia). Credit: 4 or 8. Enrollment: max 1. *Raj*

PSYCHTRY-245C. CONSULTATION-LIAISON PSYCHIATRY. The consultation-liaison services at both Duke Medical Center and the Durham VA Hospital offer clinical clerkships in the management of psychological problems of medical patients and somatic symptoms in psychiatric patients. The student does psychiatric consultations in various specialized medical and surgical services under supervision of residents and senior staff. Emphasis is placed on training the student in advanced interviewing techniques and in assessment and intervention for psychological reactions or depression due to medical illness. The site selected and the specific specialty area chosen depend on the availability and location of psychiatric consultants with those interests. The rotation is flexible. We try to match student interests with the interests of available consultants. Students need to check with Dr. Volow (Durham VA) or Dr. Varia (Duke) four weeks in advance on the current availability on this rotation. Credit: 4 or 8. Enrollment: max 1. *Varia*

PSYCHTRY-260C. NEUROPSYCHIATRY. Neuropsychiatry is the study of how alterations in brain structure and function produce disturbances in human behavior. In this course, the student becomes familiar with the major neuropsychiatric syndromes: dementia, delirium, and selective organic mental syndromes such as organic personality syndrome (e.g., frontal lobe syndrome), and organic affective syndrome (e.g., post-stroke depression). The student develops an understanding of diagnosis and treatment based upon a multidisciplinary clinical approach including specialized clinical neuropsychiatric exams. The patient population is drawn from the Duke Medical Center and Durham VA Hospital psychiatry, neurology, and neurosurgery services. Depending on the site, the student may also have an opportunity to become familiar with specialized neuropsychiatric approaches including psychometric testing and neural imaging techniques such as EEG and computerized EEG, CT scan, MRI, cerebral blood flow, and PET scan. Credit: 4. Enrollment: max 1. *Volow*

PSYCHTRY-280C. MODERN PSYCHOTHERAPY: INTENSIVE CLINICAL INTRODUCTION. In this full-time (or near full-time) introduction, the student participates actively in assessment of outpatients for psychotherapy, short-term psychotherapy of inpatients, ongoing psychotherapy groups, and family therapy sessions. In addition he/she attends seminars on the various psychotherapeutic approaches: psychoanalytically oriented, cognitive, behavioral, interpersonal, systemic, etc. Readings are assigned and discussed. The student may pursue an area of special interest in greater depth with a selected preceptor. Permission of instructor is required to elect the course at any time other than section 41 of the fall term. Credit: 4. Enrollment: min 1. *Kudler*

PSYCHTRY-343C. CLINICAL ASPECTS OF ALCOHOL AND DRUG ABUSE. This course offers students experience in the outpatient treatment of patients with substance use disorders. Students may request assignment to the Durham VAMC Substance Abuse Outpatient Program (VA-SAOP) or to the Duke Addictions Program (DAP). Emphasis is placed on understanding the relationships between addictive disorders and other psychiatric conditions and between addictions treatment and general medical care. Experiences include diagnostic evaluation, pharmacological management, and individual, group, and family psy-

chotherapy. Students function as members of the multidisciplinary treatment team at either site. Students interested in this elective must contact Roy Stein (for the Durham VA) or Jeff Georgi (for DAP) at least eight weeks prior to desired term in order to develop a plan appropriately tailored to the student's interests. Credit: 4 or 8. Enrollment: min 1, max 2. *Stein, Georgi*

PSYCHTRY-495C. SUBINTERNSHIP IN INTERNAL MEDICINE/PSYCHIATRY. This course is an intensive clinical experience in the diagnosis and treatment of severe and incapacitating co-morbid medical and psychiatric disorders requiring acute hospitalization. Students participating in this four-week elective based in Duke North Hospital are expected to function with intern-level responsibility, assuming complete care of assigned patients. The Medicine/Psychiatry faculty on the GenMed 12 service provides direct supervision. The goal of the elective is to refine and then clinically apply a basic knowledge base from the fields of Internal Medicine and Psychiatry. Participation at selected case conferences and didactic sessions is expected. Additionally, each student is required to present two patient case-based, critically appraised topics during the elective. Call is taken in both Medicine and Psychiatry in alternating fashion every fifth night. Prerequisite: permission of instructor. Credit: 5. Enrollment: max 1. *Raj, Clary, Christopher*

RADIATION ONCOLOGY

Professor Edward C. Halperin, M.D. (Yale, 1979), Chairman.

Professors: Mitchell S. Anscher, M.D. (Virginia, 1981); David Brizel, M.D. (Northwestern, 1983); Christopher Coughlin, M.D. (Harvard, 1973); Mark W. Dewhirst, D.V.M., Ph.D. (Colorado, 1979); Randy Jirtle, Ph.D. (Wisconsin, 1975); Lawrence B. Marks, M.D. (Rochester, 1985); Gustavo S. Montana, M.D. (Bogota, 1960); James R. Oleson (Arizona, 1976); Leonard Prosnitz, M.D. (SUNY, 1961); Thaddeus V. Samulski, Ph.D. (SUNY-Buffalo, 1975).

Associate Professor: Shiva K. Das, Ph.D. (Duke, 1990).

Assistant Professors: Ellen L. Jones, M.D., Ph.D. (Dartmouth, 1992, 1990); Moyed Miften, Ph.D. (Michigan, 1994); Timothy Shafman, M.D. (Harvard, 1989); Curtis Whiddon, Ph.D. (Indiana, 1993); Su-Min Zhou, Ph.D. (Chicago, 1992).

Associates: Brian G. Czito, M.D. (Georgia, 1996); Carol A. Hahn, M.D. (Georgetown, 1990); Sally S. Ingram, M.D. (North Carolina, 1988); Catherine G. Lee, M.D. (South Florida, 1988); Robert G. Prosnitz, M.D. (Duke, 1996).

Basic Science Elective

RADONC-227B. GENERAL RADIOBIOLOGY. This course provides a comprehensive overview of radiation's interactions with cells and/or tissues and is oriented toward gaining an understanding of such interactions as they relate to the therapeutic use of radiation alone or in combination with chemotherapeutic drugs. Topics that are covered include carcinogenesis; radiation protection mutagenesis; DNA damage and repair; oncogene, suppressor gene, and growth factor expression; methods for quantitating radiation damage in vitro and in vivo; tumor and normal tissue models for radiation studies; solid tumor metabolism, microenvironment, and physiology; radiation sensitizers and protectors; effects at the tissue and whole organ and whole organism level; time, dose, and fractionation; low dose rate radiotherapy, including use of radio-labelled monoclonal antibodies; hyperthermia; radiation/drug and heat/drug interactions. See instructor for start date of class. Prerequisite: permission of instructor. Credit: 2. Enrollment: max 10. *Dewhirst*

Clinical Science Elective

RADONC-215C. CLINICAL RADIATION ONCOLOGY. Radiation oncology plays a crucial role in the management of patients with cancer. The student begins this course with lectures, individual tutorials, and audio-visual education programs to review the crucial elements of radiation biology, medical radiation physics, and dosimetry. This is followed by clinical instruction based on the ambulatory clinics of the Radiation Oncology Department as well as participation in brachytherapy procedures, care of inpatients, and new patient con-

sultations. This course provides an introduction to the role of radiation therapy in the treatment of malignant disease. Credit: 4 or 8. Enrollment: max 2. *Marks and staff*

RADIOLOGY

Professor Carl E. Ravin, M.D. (Cornell, 1968), Chairman.

Professors: George S. Bisset, III, M.D. (South Florida, 1975); Barbara Carroll, M.D. (Stanford, 1972); R. Edward Coleman, M.D. (Washington, 1968); Carey Floyd, Jr., Ph.D. (Duke, 1981); Philip C. Goodman, M.D. (California-Los Angeles, 1970); E. Ralph Heinz, M.D. (Pennsylvania, 1955); Clyde A. Helms, M.D. (Texas-San Antonio, 1972); Barbara Hertzberg, M.D. (Duke, 1980); Ronald Jaszczak, Ph.D. (Florida, 1968); G. Allan Johnson, Ph.D. (Duke, 1974); Salutarior Martinez, M.D. (Havana, 1961); Gregory McCarthy, Ph.D. (Illinois, 1980); Rendon C. Nelson, M.D. (Loma Linda, 1980); Edward F. Patz Jr., M.D. (Maryland, 1985); Erik K. Paulson, M.D. (Duke, 1985); James M. Provenzale, M.D. (Albany Med. Coll., 1983); Tony P. Smith, M.D. (East Carolina, 1981); Leonard D. Spicer, Ph.D. (Yale, 1968); Charles Spritzer, M.D. (Pittsburgh, 1981); William M. Thompson, M.D. (Pennsylvania, 1969); Michael R. Zalutsky, Ph.D. (Washington, 1974).

Associate Professors: Salvador Borges-Neto, M.D. (Federal Fluminense, 1981); Hal Cecil Charles, Ph.D. (New Orleans, 1981); Bennett Chin, M.D. (Texas Med. Branch, 1987); James Dobbins III, Ph.D. (Wisconsin, 1985); William Foster, Jr., M.D. (Duke, 1973); Donald P. Frush, M.D. (Duke, 1985); Linda Gray Leithe, M.D. (Ohio State, 1982); James R. MacFall, Ph.D. (Maryland, 1976); Nancy Major, M.D. (Tufts, 1988); H. Page McAdams, M.D. (Duke, 1986); Glenn E. Newman, M.D. (Duke, 1973); Mary Scott Soo, M.D. (Wake Forest, 1987); Paul Suhocki, M.D. (Georgetown, 1985).

Associate Clinical Professors: D. Lawrence Burk, Jr., M.D. (Pittsburgh, 1981); Michael W. Hanson, M.D. (West Virginia, 1974); Richard A. Leder, M.D. (Boston, 1984); Robert Vandemark, M.D. (Upstate Med. Ctr., 1980); Terry Yoshizumi, Ph.D. (Cincinnati, 1980).

Associate Research Professors: Laurence Hedlund, Ph.D. (Pittsburgh, 1968); Ganesan Vaidyanathan, Ph.D. (Kentucky, 1987); Bruce Wieland, Ph.D. (Ohio State, 1973).

Assistant Professors: Jay A. Baker, M.D. (Duke, 1992); Daniel P. Barboriak, M.D. (Harvard, 1986); James D. Eastwood, M.D. (SUNY-Buffalo, 1992); David Enterline, (North Carolina, 1982); Laura E. Heyneman, M.D. (North Carolina, 1992); Lisa Ho, M.D. (Maryland, 1992); Srinivasan Mukundan, M.D. (Emory, 1996); Jeffrey R. Petrella, M.D. (UMDNJ, 1987); Neil A. Petry, R.Ph., M.S., B.C.N.P., F.A.P.H.A. (Purdue, 1977); Eric L. Rosen, M.D. (California-San Francisco, 1991); J. Mark Ryan, M.D. (Trinity College, Dublin, 1988); Ehsan Samei, Ph.D. (Michigan, 1997); Allen W. Song, Ph.D. (Med. Coll. of Wisconsin, 1996); Terence Z. Wong, M.D., Ph.D. (Dartmouth, 1990).

Assistant Clinical Professors: David Curtis, M.D. (Colorado, 1971); Edgar Gimenez, M.D. (La Plata, 1975); Robert E. Reiman, M.D. (Case Western Reserve, 1987); Ruth Walsh, M.D. (Oklahoma, 1987); Terry Yoshizumi, Ph.D. (Cincinnati, 1980).

Assistant Research Professors: Gamal Akabani-Hneide, Ph.D. (Texas A&M, 1990); James Bowsher, Ph.D. (North Carolina, 1989); Michael J. Campa, Ph.D. (Florida, 1989); Joseph Lo, Ph.D. (Duke, 1993); Scott Metzler, Ph.D. (Pennsylvania, 1996); Martin P. Tornai, Ph.D. (California-Los Angeles, 1997); Georgia Tourassi, Ph.D. (Duke, 1993); Timothy Turkington, Ph.D. (Duke, 1989); James Voyvodic, Ph.D. (Washington, 1988); Alexander Yordanov, Ph.D. (Tulane, 1996).

Associates: Michael Alexander, M.D. (Georgetown, 1991).

Clinical Associates: Neal Beard, M.D. (Virginia, 1997); R. Lee Cothran, Jr., M.D. (Duke, 1995); Barry Fletcher, M.D. (McGill, 1961); Christopher Gaskin, M.D. (Florida-Gainesville, 1997); Sujata Ghate, M.D. (North Carolina, 1994); Constanza Juliana Gutierrez, M.D. (Texas-Houston, 1996); Caroline Hollingsworth, M.D. (Texas, 1996); Wilton Russell Holman, M.D. (Alabama-Birmingham, 1995); Melanie Hoover, M.D. (Arkansas, 1997); Tracy Jaffe, M.D. (Texas-Southwestern, 1996); Susan Kealey, MB.Bch.BAO. (Univ. Coll. of Dublin, 1995); Lynne Hurwitz Koweek, M.D. (Duke, 1997); Kenneth Lindell, M.D. (Uniformed Svcs. Univ. of Health Sciences, 1994); Melissa Lipton, M.D. (Texas Health Sci. Ctr.-Houston, 1997); Elizabeth McGraw, M.D. (Alabama, 1996); Peter McGraw, M.D. (Alabama, 1996); Christine Miller, M.D. (Wisconsin-Madison, 1996); Martin O'Connell, MB.BAO.BCh. (Univ. Coll. of Dublin, 1994); Bertram Stemmler, M.D. (Texas-Southwestern, 1997); John Thomas, M.D. (Trivandrum Med. Coll., 1987); Shannon Turner, M.D. (Arkansas, 1997).

Fellows: Timothy Berrigan, M.D. (Med. Univ. of South Carolina, 1997); James Brumit, M.D. (East Tennessee State, 1997); Michael Edwards, M.D. (Northwestern, 1997); Ana Gaca, M.D. (Tufts, 1997); Manraj Heran, M.D. (British Columbia, 1996); David Nunley, M.D. (East Virginia, 1995); John O'Neill, M.D. (Loyola, 1997); Rachadip Sachasinh, M.D. (South Alabama, 1997); Ali Shaikh, M.D. (King Edward Med. Coll., 1990); Gerald York, M.D. (East Tennessee State, 1997).

Basic Science Elective

RADIOL-250B. RESEARCH IN RADIOLOGY. Advanced Laboratory in Medical Imaging. The student will be paired with a faculty engineer or physicist and a practicing radiologist for a semester project focused on some current clinical physics question. Working with the technical and clinical mentors, the student will design a research project that will explore via phantom evaluation, simulation, or software modeling the impact of the choice of imaging parameters on clinical imaging. Clinical imaging protocols will be evaluated to de-

termine where the medical physicist/biomedical engineer can provide useful insight in translating technical understanding to clinical protocols. The student will choose a project in CT, MRI conventional radiography, ultrasound, nuclear medicine, or advanced image processing. The course will include a weekly seminar on current imaging topics and will require a scholarly report which will be posted on the Imaging Physics web site for future reference. Credit: 1-16. Enrollment: max 10. *Johnson*

Clinical Science Electives

RADIOL-210C. PEDIATRIC RADIOLOGY. A specialized program of instruction and participation in the wide variety of radiographic examinations in the pediatric age group. Special correlation of these examinations to the problems of specific diagnosis and patient care is made. Credit: 4 or 8. Enrollment: max 2. *Frush and staff*

RADIOL-211C. CLERKSHIP IN NEURORADIOLOGY. A specialized program of detailed instruction in neuroradiology. The program includes participation in many interdepartmental conferences and the performance and interpretation of a variety of examinations including cerebral angiography, computerized axial tomography, magnetic resonance images, and myelography. Credit: 4 or 8. Enrollment: max 2. *Provenzale and staff*

RADIOL-229C. BASIC RADIOLOGY CLERKSHIP. This course is designed to provide an overview of the various imaging modalities of diagnostic radiology and their clinical utility. The elective consists of: (a) lectures and film interpretation sessions supplemented by student presentations; (b) assignment to a variety of diagnostic radiology services during which students observe the performance of diagnostic and interventional studies; and (c) use of a teaching file of radiographs and diagnostic images. One week is spent on the thoracic radiology service. Additional rotations may include the musculoskeletal, neuroradiology, mammography, vascular/interventional, pediatric, CT/abdominal imaging, ultrasound, nuclear medicine, gastrointestinal, and emergency radiology services. Credit: 4. Enrollment: min 4, max 12. *Major and staff*

RADIOL-230C. THORACIC IMAGING. This course will provide the ability to interpret chest radiographs and increase the student's confidence in diagnosing cardiac and pulmonary diseases from chest films. Through formal teaching sessions and case presentations, as well as daily interactions with surgical and medical clinical teams, the student will be exposed to the broad range of modalities and interventional procedures conducted by the thoracic imaging division. Opportunities exist to become involved in research projects. During the course of one month, the student will have interpreted or observed the reading of more than 1,000 chest radiographs. Prerequisite: Basic Radiology Clerkship elective preferred but not mandatory. Credit: 4. Enrollment: max 1. *Goodman and staff*

RADIOL-237C. MUSCULOSKELETAL IMAGING. During this four week elective, the student will be exposed to conventional x-rays in bone radiology, emergency room bone films, bone tumor films and musculoskeletal MRI. At the conclusion, the student will be able to identify fractures and have a working knowledge of musculoskeletal radiology. Credit 4. Enrollment: max. 2. *Major, Helms, Martinez, Spritzer, Cothran*

Elective

RADIOL-275B or C. INTRODUCTION TO DIAGNOSTIC ULTRASOUND. This elective is for medical students who wish to learn the use of sonography as a diagnostic skill with the goal of being able to employ sonography as a guide for simple procedures and as a supplement to the physical examination. Credit: 3. Enrollment: max 5, min 2. *Bowie*

SURGERY

Professor Danny O. Jacobs, M.D. (Washington Univ., 1979), M.P.H. (Harvard, 1989), Chairman.

DIVISION OF GENERAL SURGERY

Professor: R. Randal Bollinger, M.D. (Tulane, 1970), Ph.D. (Duke, 1977), Chief.

Professors: Onyekwere Akwari, M.D. (Southern California, 1970); William G. Anlyan, M.D. (Yale, 1949); Gregory S. Georgiade, M.D. (Duke, 1973); John P. Grant, M.D. (Chicago, 1969); Paul Kuo, M.D. (Johns Hopkins, 1985); George S. Leight, Jr., M.D. (Duke, 1972); H. Kim Lysterly, M.D. (California-Los Angeles, 1983); Richard L. McCann, M.D. (Cornell, 1974); Theodore N. Pappas, M.D. (Ohio State, 1981); Hilliard F. Seigler, M.D. (North Carolina, 1960); Samuel A. Wells, M.D. (Emory, 1961).

Professor Emeritus: Delford L. Stickel, M.D. (Duke, 1953).

Clinical Professor: Joseph A. Moylan, M.D. (Boston, 1964).

Consulting Professor: Peter McKeown, M.B.A. (Florida, 1996).

Associate Professors: W. Steve Eubanks, Jr., M.D. (Alabama, 1987); Mark W. Sebastian, M.D. (Rush, 1987); Douglas S. Tyler, M.D. (Dartmouth, 1985); Steven N. Vaslef, M.D. (Virginia, 1984).

Associate Clinical Professor: Paul C. Hendrix, PA-C, M.H.S. (Duke, 1975, 1991).

Assistant Professors: Lisa A. Clark, M.D. (Harvard, 1994); Bryan M. Clary, M.D. (California, 1991); Bradley Collins, M.D. (Duke, 1989); John L. Gray, M.D. (Duke, 1985); Thomas Z. Hayward, M.D. (Northwestern, 1994); Sandhya Lagoo, M.S., Ph.D. (B.J. Med. Coll., Gujarat Univ., 1985); Jeffrey Lawson, M.D., Ph.D. (Vermont, 1991); Christopher Mantyh, M.D. (Wisconsin, 1991); Paul J. Mosca, M.D., Ph.D. (Virginia, 1995); John A. Olson, M.D. (Florida, 1992); Scott K. Pruitt, M.D. (Columbia, 1987), Ph.D. (Duke, 1994); Janet E. Tuttle-Newhall, M.D. (Bowman Gray, 1988); Lee G. Wilke, M.D. (Duke, 1993).

Assistant Clinical Professors: Kirk A. Ludwig, M.D. (Cincinnati, 1988); Ross McMahan, M.D. (Queens University, 1994); Catherine A. Share, M.D. (Emory, 1986).

Assistant Consulting Professors: Louis H. Barr, M.D. (Georgetown, 1973); Walter W. Burns, M.D. (North Carolina, 1969); John T. Daniel, M.D. (Howard, 1964); Henry N. Ho, M.D. (Michigan, 1978); Robert W. Kieffer, M.D. (Johns Hopkins, 1978); Jane A. Kurucz, M.D. (West Virginia, 1983); Walter J. Loeher, M.D. (Cornell, 1963); Stephen K. Rerych, M.D. (Columbia, 1974); David C. Ritter, M.D. (Texas, 1988); Phillip P. Shaddock, M.D. (California, 1986); Harvey A. Shub, M.D. (Rome, 1971); Peter S. Turk, M.D. (Indiana, 1985); James P. Weaver, M.D. (Pennsylvania, 1969); James S. Wilson, Jr., M.D. (North Carolina, 1975).

DIVISION OF EMERGENCY MEDICINE

Associate Professor: Kathleen J. Clem, M.D. (Loma Linda, 1989), Chief.

Associate Clinical Professor: Susan Promes, M.D. (Pennsylvania State, 1991); Harry W. Severance, Jr., M.D. (Duke, 1981).

Assistant Clinical Professors: Lee S. Benjamin, M.D. (Wayne State, 1997); Daniel H. Booth, M.D. (Duke, 1987); Abhinav Chandra, M.D. (Ohio State, 1995); Karen Frush, M.D. (Duke, 1986); Charles Gerardo, M.D. (California-Davis, 1994); Michael Hocker, M.D. (Colorado, 1993); Joel Kravitz, M.D. (McGill, 1996); Miha S. Lucas, M.D. (Alabama, 1999); Alexis McRae, M.D. (Pennsylvania State, 1998); Richard K. Serra, M.D. (Michigan, 1977); Victoria Thornton, M.D. (Georgetown, 1980).

Associates: John M. Brown, M.D. (Florida, 1984); Bernadette R. Page, M.D. (Loyola, 1970).

DIVISION OF EXPERIMENTAL SURGERY

James B. Duke Professor Dani P. Bolognesi, Ph.D. (Duke, 1964); J.W. and D.W. Beard Professor Eli Gilboa, Ph.D. (Weizmann Inst. Science, 1977); Walter J. Koch, Ph.D. (Cincinnati, 1990); Bruce A. Sullenger, Ph.D. (Cornell, 1991); Kent J. Weinhold, Ph.D. (Pennsylvania State, 1979).

Research Professors: Darell D. Bigner, M.D., Ph.D. (Duke, 1965, 1971); Per-Otto F. Hagen, F.H.W.C. (Watt, 1961); Alphonse J. Langlois, Ph.D. (Duke, 1966).

Associate Professor: CLETTE S. Skinner, Ph.D. (North Carolina, 1991).

Associate Research Professors: Jeffrey R. Marks, Ph.D. (California, 1985); Emmanuel C. Opara, Ph.D. (London, 1984).

Assistant Research Professors: Zeinab A. Abdel-Wahab, Ph.D. (Eastern Virginia, 1985); Eric M. Clary, D.V.M. (Kansas, 1991); Timothy L. Darrow, Ph.D. (SUNY, 1980); Andrea D. Eckhart, Ph.D. (North Carolina, 1997); Guido Ferrari, M.D. (Genoa, 1985); Smita K. Nair, Ph.D. (Tennessee, 1993); William R. Parker, Ph.D. (Nebraska, 1992); Christopher P. Rusconi, Ph.D. (Colorado, 1996); Georgia D. Tomaras, Ph.D. (SUNY, 1998).

Research Associates: Gudrun Huper, M.A. (Stuttgart, 1966); Meredith Long, Ph.D. (Duke, 2001); Brian St. John Manning, Ph.D. (Crumlin Hosp., 1992); Takeshi Nagayasu, M.D., Ph.D. (Nagasaki, 1987, 1996); Si-Xun Yang, M.D. (Suzhou Med. Coll., 1986); Rahima Zennadi, Ph.D. (Nantes, 1992); Jintao Zhou, Ph.D. (Shanghai, 1985).

DIVISION OF THORACIC SURGERY

Professor Peter K. Smith, M.D. (Duke, 1977), Chief.

Professors: David C. Sabiston, Jr. Professor Robert W. Anderson, M.D. (Northwestern, 1964); Donald D. Glower, Jr., M.D. (Johns Hopkins, 1980); Mary and Deryl Hart Professor of Surgery Robert H. Jones, M.D. (Johns Hopkins, 1965); James E. Lowe, M.D. (California-Los Angeles, 1973); James B. Duke Professor David C. Sabiston, M.D. (Johns Hopkins, 1947); Walter G. Wolfe, M.D. (Temple, 1963).

Associate Professors: Thomas A. D'Amico, M.D. (Coll. of Physicians and Surgeons, 1987); Robert D. Davis,

M.D. (California, 1984); James Jaggars, M.D. (Nebraska, 1988); David H. Harpole, M.D. (Virginia, 1984); Kevin P. Landolfo, M.D. (Manitoba, 1985).

Associate Consulting Professor: John C. Lucke, M.D. (St. Louis, 1985).

Assistant Professors: Robert H. Messier, M.D. (Georgetown, 1988); Carmelo Milano, M.D. (Chicago, 1990);

Eric M. Toloza, M.D., Ph.D. (California-Los Angeles, 1991).

Assistant Research Professors: James W. Davis, Ph.D. (Duke, 1993); Doris A. Taylor, Ph.D. (Texas, 1987).

Assistant Consulting Professors: Amir A. Neshat, M.D. (Isfahan, 1960); Wayne H. Welscher, M.D. (SUNY-Upstate, 1975).

Research Associates: Stephen M. Langley, M.B.B.S. (London, 1989); Somaya H. Soloma, M.D. (Egypt, 1989).

DIVISION OF NEUROSURGERY

Professor Allan H. Friedman, M.D. (Illinois, 1974), Chief.

Professors: Dennis A. Turner, M.D. (Indiana, 1975); Robert H. Wilkins, M.D. (Pittsburgh, 1959).

Consulting Professor: Takanori Fukushima, M.D. (Tokyo, 1968).

Associate Professors: Michael J. Alexander, M.D. (Georgetown, 1991); Herbert E. Fuchs, M.D., Ph.D. (Duke, 1984); Michael M. Haglund, M.D., Ph.D. (Washington, 1987, 1988).

Associate Research Professors: Stewart P. Johnson, Ph.D. (Case Western Reserve, 1983); Roger Madison, Ph.D. (Duke, 1981); Ashok K. Shetty, Ph.D. (India Inst. Med. Sciences, 1990).

Assistant Professors: Timothy M. George, M.D. (New York, 1986); William J. Richardson, M.D. (Eastern Virginia, 1977); John Sampson, M.D. (Manitoba, 1990), Ph.D. (Duke, 1996); Richard K. Osenbach, M.D. (Jefferson, 1983); Daryl Hochman, Ph.D. (Washington, 1999).

Assistant Research Professors: Gary Archer, Ph.D. (Cincinnati, 1987); Rok Cerne, M.D. (Slovenia, 1987), Ph.D. (Iowa, 1993); Robert D. Pearlstein, Ph.D. (North Carolina, 1978); Grant A. Robinson, Ph.D. (Pennsylvania, 1985).

Assistant Consulting Professors: Nicholas Avgeropoulos, M.D. (Med. Univ. of South Carolina, 1991); Peter R. Bronec, M.D. (Duke, 1981); Charles S. Haworth, M.D. (Duke, 1982); Bruce L. Kihlstrom, M.D. (North Carolina, 1972); Robert Lacin, M.D. (Lausanne, 1986); Robert E. Price, Jr., M.D. (North Carolina, 1964).

Research Associates: Weiyang Gao-Drake, M.D. (Harbin Med., 1986); Janice O. Levitt, Ph.D. (Temple, 1963); Darion Rapoza, Ph.D. (Chicago, 1990); Maria Rapazo, Ph.D. (Duke, 1994); Dmitriy Fayuk, Ph.D. (Moscow, 1996).

DIVISION OF ORAL SURGERY

Professor: Robert M. Mason, Ph.D., DMD (Illinois, 1965).

Assistant Professor: Thomas A. McGraw, D.D.S. (Pennsylvania, 1985).

Assistant Clinical Professors: Edward A. Dolan, D.D.S. (Maryland, 1971); Martha A. Keels, D.D.S., M.S., Ph.D. (North Carolina, 1984, 1990); Cynthia A. Neal, D.D.S. (North Carolina, 1996).

Assistant Consulting Professor: George A. Walsh, D.D.S. (Georgetown, 1972).

DIVISION OF ORTHOPAEDIC SURGERY

Professor James A. Nunley, II, M.D. (Tulane, 1973), Chief.

Professors: Frank H. Bassett, III, M.D. (Louisville, 1957); G. Paul DeRosa, M.D. (Indiana, 1965); John M. Harrelson, M.D. (Duke, 1964); L. Scott Levin, M.D. (Temple, 1982); Donald E. McCollum (Bowman-Gray, 1953); Virginia Flowers Baker Professor James R. Urbaniak, M.D. (Duke, 1962).

Associate Professors: David E. Attarian, M.D. (Duke, 1980); Robert D. Fitch, M.D. (Duke, 1976); Richard D. Goldner, M.D. (Duke, 1974); Farshid Guilak, Ph.D. (Columbia, 1991); William T. Hardaker, Jr., M.D. (Duke, 1973); Claude T. Moorman, III, M.D. (Cincinnati, 1987); Steven A. Olson, M.D. (Columbia, 1986); William J. Richardson, M.D. (Eastern Virginia, 1977); Thomas Parker Vail, M.D. (Loyola, 1985).

Associate Research Professors: Long-en Chen, M.D. (Peking Med. Coll., 1967), Ph.D. (Shanghai, 1983).

Associate Consulting Professor: William J. Mallon, M.D. (Duke, 1984).

Assistant Professors: Diane M. Allen, M.D. (Duke, 1995); Carl J. Basamania, M.D. (George Washington, 1984); Brian E. Brigman, M.D. (North Carolina, 1994); Mark Easley, M.D. (Virginia, 1992); Lloyd A. Hey, M.D. (Harvard, 1988); Laurence D. Higgins, M.D. (SUNY, 1992); Stephen N. Lang, M.D. (Illinois, 1965); Marco Rizzo, M.D. (Temple, 1996); S. David Stanley, M.D. (Duke, 1993); Alison P. Toth, M.D. (Duke, 1994).

Assistant Clinical Professors: George S.E. Aitken, M.D. (Case Western Reserve, 1982); Richard S. Moore, M.D. (North Carolina, 1991); Michael M. Zilles, M.D. (George Washington, 1994).

Assistant Research Professors: Beverly Fermor, Ph.D. (Univ. of Bristol, 1992); Barry S. Myers, M.D., Ph.D. (Duke, 1991); Ricardo S. Pietrobon, M.D. (Federal Univ. of Parana, Brazil, 1995); Wen-Ning Qi, M.D. (Peking Med., 1967). Assistant Consulting Professors: George K. Bal, M.D. (Uniformed Svcs., 1991); Edward W. Bray, III, M.D. (Med. Univ. of South Carolina, 1971); William J. Callison, M.D. (Vanderbilt, 1953); Edwin B. Cooper, Jr., M.D. (Duke, 1966); Jon R. Davids, M.D. (Harvard, 1985); David T. Dellaero, M.D. (Baylor, 1990); Robert W. Esposito, M.D. (Columbia, 1981); J. Lawrence Frank, M.D. (Duke, 1965); H. John Gerhard, M.D. (Harvard, 1981); Stephen A. Grubb, M.D. (Northwestern, 1974); Albert T. Jennette, M.D. (North Carolina, 1959); Ralph A. Liebelt, M.D. (Michigan, 1985); Edward G. Lilly, III, M.D. (Duke, 1993); Keith M. Maxwell, M.D. (Oral Roberts, 1982); Ronald J. Neimkin, M.D. (Cornell, 1975); William S. Ogden, M.D. (Med. Coll. of Georgia 1965); Thomas B. Pace, M.D. (Mississippi, 1982); Theodore M. Pitts, M.D. (Yale, 1977); Edwin T. Preston, Jr., M.D. (Duke,

1960); Glydon B. Shaver, Jr., M.D. (Tennessee, 1961); Harry L. Warren, M.D. (Texas A&M, 1982).
Consulting Associates: Richard F. Bruch, M.D. (Illinois, 1972); Ronald A. Pruitt, M.D. (Med. Coll. of Virginia, 1959); William A. Somers, M.D. (Duke, 1972).
Clinical Associate: Anna P. Bettendorf, M.D. (UNC, 1990).
Research Associate: Anthony V. Seaber (N/A).

DIVISION OF OTOLARYNGOLOGY

Professor: Joseph C. Farmer, Jr., M.D. (Duke, 1962), Chief.
Professor: Samuel R. Fisher, M.D. (Duke, 1975).
Consulting Professor: John T. McElveen, M.D. (North Carolina, 1978).
Adjunct Professor: Dewey T. Lawson, Ph.D. (Duke, 1972).
Associate Professors: Gregory F. Hulka, M.D. (Duke, 1988); Debra L. Tucci, M.D. (Virginia, 1985); David L. Witsell, M.D. (Colorado, 1990).
Associate Clinical Professor: Richard L. Scher, M.D. (Cincinnati, 1985).
Associate Research Professor: David W. Smith, Ph.D. (Michigan, 1986).
Assistant Clinical Professors: Thomas Y.L. Hung, M.D. (Massachusetts, 1996).
Assistant Consulting Professors: J. Charles Finn, M.D. (Case Western Reserve, 1989); Ronald Lane, M.S., M.D. (Dartmouth, 1984); Johns F.P. Langford, M.D. (Mississippi, 1989); Peter Wallenborn, M.D. (Virginia, 1979); C. Emery Williams, M.D. (Louisiana, 1963).

DIVISION OF PEDIATRIC SURGERY

Associate Professor: Michael A. Skinner, M.D. (Rush, 1984), Chief.
Associate Clinical Professor: Samuel M. Mahaffey, M.D. (West Virginia, 1979).
Assistant Professor: Henry E. Rice, M.D. (Yale, 1988).

DIVISION OF PLASTIC AND MAXILLOFACIAL SURGERY

Associate Professor L. Scott Levin, M.D. (Temple, 1982), Chief.
Professor: Gregory S. Georgiade, M.D. (Duke, 1973); Donald Serafin, M.D. (Duke, 1964).
Associate Consulting Professor: Verne C. Lanier, Jr., M.D. (Vanderbilt, 1966).
Assistant Professors: Michael R. Zenn, M.D. (Cornell, 1988); Jeffrey R. Marcus, M.D. (Michigan, 1994).
Assistant Clinical Professor: Laura A. Gunn, M.D. (Tennessee, 1991).
Assistant Research Professors: Bruce M. Klitzman, B.S.E. (Duke, 1974), Ph.D. (Virginia, 1979); Kevin C. Olbrich, Ph.D. (Duke, 1997).
Assistant Consulting Professors: Glenn M. Davis, M.D. (Med. Univ. of South Carolina, 1974); Guido P. Gutter, M.D. (Med. Coll. of Ohio, 1982); Joseph P. Hunstad, M.D. (Michigan State, 1981); Kim E. Koger, M.D. (Duke, 1990); Ronald Riefkohl, M.D. (Tulane, 1972); Roger B. Russell, M.D. (Bowman Gray, 1976); Luis R. Scheker, M.D. (Santo Domingo, 1976).
Clinical Associate: Detlev Erdmann, M.D. (Tech. Univ. of Munich, 1990).

DIVISION OF UROLOGIC SURGERY

Professor David F. Paulson, M.D. (Duke, 1964), Chief.
Professors: David M. Albala, M.D. (Michigan State, 1983); E. Everett Anderson, M.D. (Duke, 1958); Glenn M. Preminger, M.D. (New York Med. Coll., 1977); Philip J. Walther, M.D., Ph.D., M.B.A. (Duke, 1975); George D. Webster, M.B., F.R.C.S. (Univ. Birmingham, England, 1968).
Associate Professors: Yehia Daaka, Ph.D. (South Florida, 1995); Wendy Demark-Wahnefried, Ph.D. (Syracuse, 1988); Craig F. Donatucci, M.D. (Temple, 1979); Thomas J. Polascik, M.D. (Chicago, 1991); Cary N. Robertson, M.D. (Tulane, 1977); Johannes W.G. Vieweg, M.D. (Regensburg, 1984); John S. Wiener, M.D. (Tulane, 1988).
Assistant Professors: Philipp Dahm, M.D. (Univ. of Heidelberg, 1994); Brian C. Murphy, M.D. (Duke, 1992).
Assistant Research Professors: Paul C. Dolber, Ph.D. (Duke, 1980); Karl B. Thor, Ph.D. (Pittsburgh, 1985).
Assistant Consulting Professors: Robert W. Andrews, M.D. (Bowman Gray, 1980); Niall J. Buckley, M.B., B.Ch. (Univ. Coll. of Dublin, 1979); Timothy P. Bukowski, M.D. (SUNY, 1987); Hector H. Henry, II, M.D. (Tulane, 1965); George K. Ibrahim, M.D. (Duke, 1987); Raymond E. Joyner, M.D. (Bowman Gray, 1968); (Boston, 1989); Wade S. Weems, M.D. (Duke, 1962); Arthur W. Whitehurst, M.D. (Virginia, 1968).
Research Associates: Baojun Gu, Ph.D. (Japan, 2000); Xu Lin, Ph.D. (Zhejiang, 1983); Liming Wang, Ph.D. (China, 2000).

DIVISION OF SPEECH PATHOLOGY AND AUDIOLOGY

Associate Clinical Professor: Frank DeRuyter, Ph.D. (Washington, 1978), Chief.
Clinical Associates: Kevin Caves, B.S.M.E., A.T.P. (Coll. of Engineering, Maryland, 1987); Callie McClatchy, M.S. (Bloomsburg, 1978); Gwendolyn O'Grady, M.S.P.A. (Washington, 1981).

Required Courses

SURGERY-205C. SURGERY. The required course in surgery is given in the second year and consists of an eight-week clinical clerkship. The primary goal is the presentation of

those concepts and principles which characterize the discipline of surgery. The fundamental features which form the foundation of surgical practice are presented at seminars three times weekly. The subjects discussed include antisepsis, surgical bacteriology, wound healing, inflammation, fluid and electrolyte balance, shock, the metabolic response to trauma, biology of neoplastic disease, gastrointestinal physiology and its derangements, and blood coagulation, thrombosis, and embolism. The students are divided into two groups, one at Duke and the other at the Durham Veterans Administration Medical Center, and each works with two members of the surgical faculty. Students are assigned patients on the surgical wards for diagnosis and management, and clinical rounds are made three times weekly with the faculty. A full-time teaching resident is assigned for the course in order to provide the students with continuous and readily available instruction at all times. A one hour session is devoted daily to demonstrations by the surgical specialties including neurosurgery, orthopaedics, otolaryngology, plastic surgery, and urology. The students attend four weekly sessions in experimental surgery, during which each student serves in rotation as the anesthesiologist, first assistant, and operating surgeon in performance of surgical procedures on experimental animals. Credit: 8. *Sebastian*

Clinical Science Electives

SURGERY-227C. ADVANCED UROLOGIC CLERKSHIP. The diagnosis, management, and surgical treatment of patients with urologic disorders are stressed. Students are afforded intimate association with the entire staff in the clinics, wards, and operating rooms, and participate in surgery. Cystoscopic and urographic diagnostic methods, along with other techniques are taught. Credit: 4 or 8. Enrollment: max 3. *Paulson, Albala, Anderson, Wiener, Webster, Donatucci, Walther, and Robertson*

SURGERY-228C. CLERKSHIP IN PEDIATRIC UROLOGY. The course is designed to give an overview of urologic problems in the pediatric population. It includes patient contact and seminar material, as well as ward and operating room experience in the diagnosis, treatment, and long-term follow-up of children with urologic disease. Credit: 4. Enrollment: min 1, max 2. *Wiener*

SURGERY-235C. CLINICAL NEUROSURGERY. The course is designed for those students with a career interest in one of the neurological sciences. Duties include the work-up and care of inpatients, work-up of clinic patients, assistance in the operating room, daily rounds, and night call. Weekly conferences are held in neurosurgery, neurology, neuropathology, and neuroradiology. There are also special lectures. Credit: 4 or 8. Enrollment: max 4. *Friedman, Fuchs, and Turner*

SURGERY-236C. INTERMEDIATE CLINICAL NEUROSURGERY. This elective, intended as an intermediate experience between SURGERY-233C and SURGERY-235C, focuses on the clinical presentation of common neurosurgical disorders, radiographic evaluation, and therapeutic options including the indications and contraindications for surgical intervention. The student works up one to three patients and assists at their operations the following day either once or twice per week, and attends the Saturday, neurosurgical conference. Credit: 1 or 2. Enrollment: max 1. *Friedman*

SURGERY-237C. INVESTIGATIVE NEUROSURGERY. The student is assigned a project relating to neurologic sciences and, within reason, is provided with technical help, recording equipment, and experimental animals necessary for its completion. Each student plans and executes his/her own individual project with the help of the neurosurgery staff. Attendance at weekly conferences is also required. Prerequisites: SURGERY-235C suggested. Credit: 8. Enrollment: max 2. *Turner, Fuchs, Madison, and Sampson*

SURGERY-239C. CLINICAL OTOLARYNGOLOGY. This course provides the student with a comprehensive survey of clinical otolaryngology. Duties include participation in both outpatient clinic activities and inpatient care in addition to assisting in the operating room. The student participates in ward rounds and in various conferences held by the division. Credit: 4 or 8. Enrollment: max: 2. *Farmer, Fisher, Scher, Witsell, Tucci, Hulka, and McElveen*

SURGERY-241C. SURGICAL INTENSIVE CARE. This course is designed to broaden the student's knowledge and experience in dealing with critically ill patients. Under supervision, students function as subinterns in the Surgical Intensive Care Unit (SICU). Students are assigned their own patients and actively participate in daily rounds as part of the SICU team. There is a morning lecture on aspects of critical care each day. Students take call one night in four and work on a one-on-one basis with SICU house staff in the supervised management of critically ill patients. Four weeks are spent in the SICU at Duke University Medical Center (trauma, vascular surgery, liver-kidney-pancreas transplantation, general surgery). There is emphasis on teaching of procedures and techniques necessary for the management of all critically ill patients including hemodynamic assessment and monitoring, cardiovascular resuscitation and use of vasoactive drugs, ventilator management including ARDS, prevention and management of nosocomial infections, and nutritional support. Students are formally evaluated by the SICU house staff and the attending physician. C-L: ANESTH-241C. Credit: 5. Enrollment: max 8. *Sebastian, Vaslef, Tuttle-Newhall, and staff*

SURGERY-244C. INTRODUCTION TO PLASTIC, RECONSTRUCTIVE AND MAXILLOFACIAL SURGERY. This course is designed for students who may have a future interest in plastic surgery. Duties include the preoperative evaluation of patients, assisting in the operating room, making daily ward rounds, and participation in conferences. Credit: 4. Enrollment: max 5. *Levin, Georgiade, Ruff, Zenn, and Gunn*

SURGERY-246C. CLERKSHIP IN PLASTIC AND RECONSTRUCTIVE SURGERY. The student participates in evaluation and management of plastic surgery patients including preoperative assessment, surgical assistance, and postoperative follow-up in a private office and at Durham Regional Hospital. Daily seminars cover core topics such as skin and surgical techniques, wound healing, and scars. Credit: 4. Enrollment: max 1. *Levin, Ruff, Georgiade, Zenn, and Gunn*

SURGERY-247C. PLASTIC SURGERY RESEARCH. Students are engaged in scholarly activities which are active, in-depth learning experiences related to microvascular, plastic, and/or reconstructive surgery. The students are expected to design, execute, and analyze data, and to formulate hypotheses and draw conclusions from their projects. Credit: 1-8. Enrollment: max 4. *Klitzman, Levin, and Olbrich*

SURGERY-255C. DIRECTED STUDY IN SPEECH/LANGUAGE PATHOLOGY AND AUDIOLOGY. Individual directed study in selected topics concerning normal and abnormal hearing, language and speech. In consultation with a faculty member, each student selects one or more areas of study. Emphasis is on fundamentals of normal and abnormal function, principles of evaluation, and management of disorders. Prerequisite: permission of instructor. Credit: 1. Enrollment: max 5. *DeRuyter*

SURGERY-259C. GENERAL PRINCIPLES OF ORTHOPAEDICS. A full experience on the Orthopaedic Service with duties and responsibilities similar to a first year resident. Inpatient care, outpatient examination, operating room experience, and emergency room call are included. Conference attendance is required. Individual or group discussions are conducted each day with attending staff/residents. The purpose of the course is to present broad concepts of orthopaedics to students planning general practice, pediatrics, allied sur-

gical specialties, or orthopaedics. Credit: 4. Enrollment: max 4 for 4 weeks. *Nunley, Hardaker, Goldner, Fitch, Easley, Lang, Richardson, Vail, Levin, Hey, Higgins, Basamania, Lilly, Moorman, Olson, Toth, Brigman, house staff*

SURGERY-267C. INTRODUCTORY CLINIC COURSE IN CHILDREN'S ORTHOPAEDICS AND CEREBRAL PALSY. This introductory clinic course is arranged for those interested in pediatric orthopaedic problems, neurological disease, and related fields. The course gives the student a working experience in the examination and evaluation of clinical outpatients, inpatients, and surgical patients. It demonstrates both the individual and multidisciplinary group approach to the whole patient with complex orthopaedic and neurologic conditions as they affect growth, development, and rehabilitation. Credit: 2 or 4. Enrollment: max 2. *Fitch and Lenox Baker Children's Hospital staff*

SURGERY-275C. PEDIATRIC CARDIAC SURGERY. The student becomes an active member of the surgical team caring for infants and children with congenital heart defects. Responsibilities include ward work and participation during surgery. This student is involved in perioperative decision making. Weekly formal didactic sessions are conducted. Credit: 4. Enrollment: max 2. *Jagers*

SURGERY-276C. ADVANCED CLERKSHIP IN PEDIATRIC SURGERY. This course is designed to familiarize the student with the whole range of surgical problems in children, but with emphasis on the pathophysiology of surgical and related problems in the newborn infant and the total care of the child with a malignancy. The student is encouraged to participate fully in the patient care aspects of the service and is considered an integral part of the patient care team. Although the course may be taken for the full eight weeks, it is felt that a four-week experience is probably optimal for most students. It may be combined with other advanced surgical clerkships such as SURGERY-299C or with four weeks of neonatology (PEDS-225C) or other courses depending on the interests of the student. Prerequisite: brief pre-enrollment interview with Dr. Michael Skinner. Credit: 4 or 8. Enrollment: max 1. *Skinner*

SURGERY-277C. ORTHOPAEDIC RESEARCH. Individual projects are assigned for completion during a limited period of time. A student works with an investigator in the orthopaedic laboratory either at Duke Medical Center or the Durham Veterans Affairs Hospital. Clinical investigation studies are also available at both institutions. Prerequisite: SURGERY-259C. Credit: 8. Enrollment: max 4. *Urbaniak, orthopaedic senior staff, and house staff*

SURGERY-280C. GENERAL SURGICAL ONCOLOGY. The course is designed for the student interested in surgical oncology. The students are involved in patient care with a specific surgeon but, in addition, are expected to attend multidisciplinary conferences related to gastrointestinal and breast carcinoma. These multidisciplinary conferences involve medical and radiation oncology, as well as surgical oncology. The student is also expected to evaluate surgical patients in an outpatient setting as well as participate in inpatient and operative patient care. This course is designed for students who have an interest in the basic sciences in relation to surgical oncology. Attendance at research conferences involved in the molecular and cellular biology of human cancers is also expected. Permission of instructor is required. Credit: 4. Enrollment: min 1, max 2. *Lyerly, Leight, Seigler, Tyler, and Clary*

SURGERY-281C. INTRODUCTION TO FRACTURES AND MUSCULOSKELETAL TRAUMA. Students participate in the emergency management of patients through the Duke or Durham Regional Hospital Emergency Rooms. Principles of fractures and trauma are given during emergency room assignment. Requirements are: attendance at one outpatient clinic per week, two nights on call in the emergency room per week, and attendance

at Grand Rounds Conf. on Wednesday at 7:00 a.m. and Fracture Conference on Saturdays at 7:30 a.m. Credit: 3. Enrollment: max 2. *Nunley, Duke orthopaedic staff, and Durham Regional Hospital orthopaedic staff*

SURGERY-283C. ADVANCED SURGERY-EMPHASIS CARDIOVASCULAR/THORACIC. Advanced concepts in surgery are presented in seminars and in ward, clinic, and operating room experiences. Fifty to 75 percent of the time is devoted to cardiovascular/thoracic surgery and related basic topics, and the remainder to surgery generally. Credit: 8. Enrollment: min 2, max 5. *Wolfe, Anderson, Jones, Lowe, Smith, Young, Glower, Landolfo, Davis, Jagers, D'Amico, and Harpole*

SURGERY-299C. ADVANCED SURGICAL CLERKSHIP. This course is structured to provide the student with a comprehensive approach to surgical disorders. Each student works in the clinics, on the wards, and in the operating rooms side by side with one senior surgeon to be selected from the approved list below. Credit: 5 or 10. *Pappas, Bollinger, Clary, Davis, D'Amico, Georgiade, Jagers, Jones, Kuo, Landolfo, Leight, Lowe, Lysterly, Mantyh, McCann, Olson, Sebastian, Seigler, Smith, Tyler, Vaslef, and Wolfe*

SURGERY-303C. TRAUMA SERVICE. This course is designed to provide students interested in trauma care with further experience both in the Emergency Department and on the Inpatient Trauma Service. The course emphasizes both triage and resuscitation for major and minor emergency problems in the Emergency Department and also pre- and postoperative care on the Inpatient Trauma Service. The student has a full-time experience by assuming duties and responsibilities similar to a junior intern. Emphasis is placed on developing skills in the care of patients with multi-system injuries in the Emergency Department, Inpatient Service, and Operating Room. Students work in conjunction with the attending staff and the residents on the Trauma Service. Credit: 4. Enrollment: max 2. *Vaslef, Georgiade, and Sebastian*

SURGERY-305C. EMERGENCY MEDICINE. Course Goals: 1) This elective will provide exposure to emergency clinical problems. 2) Students will see patients of all ages with the full range of chief complaints that present to the Duke University Emergency Department. 3) Students will gain experience in making initial evaluations as well as diagnostic and treatment plans with an emphasis on detecting and treating immediate life threatening conditions. 4) Their ability to rapidly obtain critical facets of a history and physical examination will improve. 5) Students will mature as clinical problem-solvers by seeing several patients per day with undifferentiated chief complaints. How Goals Are Achieved: 1) Students will present to attendings and residents during approximately 18 ten-hour shifts per month. A mixture of day, evening, and overnight shifts will be assigned. 2) Didactic sessions will be held weekly. 3) Students will present one 20-minute lecture per month on a case/topic of interest. 4) Students will round on patients admitted to the hospital. 5) Students will shadow a Durham EMS paramedic team for one day. Methods of Evaluation: Attendings will give feedback to students. Prerequisites: none. Credit: 4. Enrollment: max 6. *Gerardo*

THESIS

Basic Science Elective

THESIS-301B. THESIS. Graduation from Duke School of Medicine (or continuation with fourth year rotations after completion of third year research) requires completion of an acceptable thesis describing quantitative research. The thesis is in the form of a manuscript of 15-20 double-spaced pages, in addition to any relevant figures. It should include an abstract, introduction with hypothesis, materials and methods, discussion, results and references. The cover page is signed by the student, the mentor, and the study program director and

must be submitted to the third year coordinator by mid-April for eight-month students and mid-August of the student's fourth year for 12-month students. In addition, students must post the thesis in its entirety on a pdf database for review by the study program directors. Instructions on posting theses and details on the formatting of the thesis are located on the Thesis Requirements tab of the third year website: <http://thirdyear.mc.duke.edu>. The thesis will receive a separate grade and number of credits from the research course. Credit: 3. *Staff*

Special Interdisciplinary Study Programs

ANESTHESIOLOGY, SURGERY, AND ENVIRONMENTAL PHYSIOLOGY (ASEP)

Program Directors: Kathryn P. King, M.D. (Coordinating Director); Richard Moon, M.D.; Bryant W. Stolp, M.D., Ph.D.; Steven N. Vaslef, M.D., Ph.D.; and David S. Warner, M.D.

While the university offers a range of opportunities from biochemistry to organ physiology, anesthesiology, surgery, and critical care integrate these multiple systems into a larger perspective of human pathophysiology and pharmacology. Students have opportunities for research in cardiovascular and respiratory physiology, molecular pharmacology, neurobiology, and environmental science. Regardless of ultimate career choice, investigation in anesthesiology, surgery, and critical care medicine provides strong basic science grounding and application of research principles. An area of independent study is defined and a hypothesis proposed as part of an ongoing interaction between the student and the laboratory mentor. Necessary methodological skills are learned by the student early in the course of study to allow data acquisition for subsequent analysis and interpretation. As the year progresses, students participate in "work in progress" seminars that focus on the development of scientific information. Emphasis is placed on experimental design and statistical analysis. At the end of the year, each student is expected to have completed a project of sufficient merit to warrant presentation and publication. Further, the Department of Anesthesiology offers a unique opportunity for the students to present their projects in a formal setting moderated by an external reviewer of national stature. All students are offered a workshop in "Research Methodology/Experimental Design" at the beginning of the year. Additional courses in Physiology and Medicine of Extreme Environments are available for interested students. Students meet with the coordinating director to monitor progress in the laboratory. The course directors meet regularly regarding individual progress of students in the laboratories.

FACULTY: Richard L. Auten, Jr., M.D.; Peter B. Bennett, Ph.D., D.Sc.; Yehia Daaka, Ph.D.; Steve Eubanks, M.D.; Hilary P. Grocott, M.D., F.R.C.P.C.; Kathryn P. King, M.D.; Stephen M. Klein, M.D.; Madan M. Kwatra, Ph.D.; Jeffery H. Lawson, M.D., Ph.D.; Richard Moon, M.D.; David Needham, Ph.D.; Laura E. Niklason, M.D., Ph.D.; Claude A. Piantadosi, M.D.; James D. Reynolds, Ph.D.; Debra A. Schwinn, M.D.; Sidney A. Simon, Ph.D.; Bryant W. Stolp, M.D.; Richard D. Vann, Ph.D.; Steven N. Vaslef, M.D.; Ph.D.; David S. Warner, M.D.

BIOMEDICAL ENGINEERING STUDY PROGRAM (BES)

Program Directors: Farshid Guilak, Ph.D. (Coordinating Director) and Donald Glower, M.D.

This interdepartmental study program is designed to provide third year students with an opportunity to perform basic science research in the broad area of biomedical engineering. The program is designed to provide research opportunities to students interested in the quantitative understanding of the physiology of cells, tissues, organs, and organ systems. The faculty have research laboratories that investigate these areas at the microscopic and macroscopic levels. The course of study usually emphasizes either the employment of whole animal models or in vitro simulation of disease states. The development and employment of new instrumentation may be a component of the research effort, but not its exclusive objective. Emphasis in the student experience is placed upon the teaching of the quantitative method of understanding biological systems. The student is expected to learn to formulate hypotheses regarding biologic systems, develop appropriate methods to test such hypothe-

ses, and use statistical methods to resolve the information obtained. Each student selects a faculty preceptor in consultation with the program director(s) and an individual research plan is developed. Students who wish to enter this program are not required to have an engineering background.

FACULTY: Roger C. Barr, Ph.D.; Long-en Chen, M.D., Ph.D.; Robert D. Fitch, M.D.; Morton H. Friedman, Ph.D.; Donald D. Glower, M.D.; Farshid Guilak, Ph.D.; Craig S. Henriquez, Ph.D.; Lawrence Higgins, M.D.; Bruce Klitzman, Ph.D.; Andrew D. Krystal, M.D.; Jeffrey H. Lawson, M.D., Ph.D.; L. Scott Levin, M.D.; James E. Lowe, M.D.; Roger L. Miller, Ph.D.; Barry S. Myers, M.D., Ph.D.; Laura E. Niklason, M.D., Ph.D.; James A. Nunley, M.D.; Steven Olson, M.D.; Ricardo Pietrobon, M.D.; Glenn Preminger, M.D.; Daniel Schmitt, M.D.; Debra A. Schwinn, M.D.; Lori A. Setton, Ph.D.; David W. Smith, Ph.D.; Peter K. Smith, M.D.; Doris A. Taylor, Ph.D.; Gregg Trahey, Ph.D.; George A. Truskey, Ph.D.; James R. Urbaniak, M.D.; Thomas P. Vail, M.D.; Olaf T. von Ramm, Ph.D.; Patrick D. Wolf, Ph.D.; Fan Yuan, Ph.D.

BIOMEDICAL IMAGING AND MEDICAL PHYSICS STUDY PROGRAM (BIMP)

Program Director: Joseph Y. Lo, Ph.D.

This program encourages medical students to explore many exciting research topics in radiology and imaging, such as magnetic resonance microscopy, molecular imaging, breast ultrasound, and nuclear medicine. Students have the opportunity to work with a diverse group of research and clinical faculty from radiology as well as biomedical engineering and physics. The program strongly emphasizes the use of quantitative and engineering methods to solve clinically significant problems. Students may select from a broad array of research areas including tumor biology, digital image analysis, predictive modeling, computer-aided diagnosis, imaging instrumentation, and medical physics, to name just a few. Each student selects a faculty preceptor in consultation with the program directors and designs an individual plan in cooperation with the preceptor and directors. The primary emphasis of each student's plan is expected to be research. Students may, however, also be advised to take an existing course or to set up a tutorial with a faculty member to fill in deficient areas or to acquire needed quantitative or engineering skills. Depending on the subject area selected, a student may initiate a new research project of limited scope or take over a well-defined part of an existing project. Students are expected to produce a thesis based on their work, and possibly (but not necessarily) a paper suitable for publication in a scientific journal. Students taking this program should have some prior training or experience in one or more of the following areas: mathematics, computer science, physics, chemistry, or engineering (electrical, mechanical, biomedical, etc.).

FACULTY: Jay Baker, M.D.; H. Cecil Charles, Ph.D.; James T. Dobbins III, Ph.D.; Carey E. Floyd, Jr, Ph.D.; Laurence W. Hedlund, Ph.D.; Scott Huettel, Ph.D.; Ronald J. Jaszczak, Ph.D.; G. Allan Johnson, Ph.D.; Joseph Y. Lo, Ph.D.; James R. MacFall, Ph.D.; Edward F. Patz, Jr, M.D.; Martin P. Tornai, Ph.D.; Timothy G. Turkington, Ph.D.; Terry T. Yoshizumi, Ph.D.

BEHAVIORAL NEUROSCIENCES STUDY PROGRAM (BSP)

Program Director: Andrew D. Krystal, M.D., M.S.

This study program is designed to help third year medical students obtain an integrative understanding of the basic processes underlying normal and pathological human and laboratory animal behavior. The course and preceptorship offerings familiarize students with significant developments in the behavioral neurosciences, investigative methodology used to examine human behavior and its neurobiological underpinnings, and the application of these findings to medicine. As an example, they are provided with the neuroanatomical, histochemical, neuroimmunological, neuropharmacological, and neurobehavioral basis of prescribing anxiolytics, antidepressants, and other neurotropic drugs. Students are encouraged to select an area of research concentration and then arrange to match their interests with a faculty member as a research preceptor by discussing the array of options with the study program director. They are given the opportunity to focus on some determinant of human behavior which may include neurobiological, developmental, or psychosocial factors. Students may choose to spend a significant portion of their time in a closely supervised labora-

tory with associated library research in an area of the student's interest resulting in a published report of the work. Specific science interests can be augmented through seminars, guided readings, and appropriate courses providing a greater familiarity with current issues in the biobehavioral sciences. The following course work is recommended for all students: PSYCHTRY 223B, Neurobehavioral Basis of Behavior; PSYCHTRY 360B, Neuropharmacology; PHARM 372B, Cellular Endocrinology; NEUROBIO 270B, Neurobiology; PSYCHTRY 213B, Human Development I. Birth through Adolescence; PSYCHTRY 215B, Comparative Personality Theory. Alternatives to the intensive laboratory research concentration are also offered. In addition to courses in the Department of Psychiatry, students may take courses offered through the Medical and Graduate Schools.

FACULTY: James A. Blumenthal, Ph.D.; Sheila Collins, Ph.D.; P. Murali Doraiswamy, M.D.; Everett H. Ellinwood, Jr., M.D.; Jau-Shyong Hong, Ph.D.; K. Ranga Krishnan, M.B., Ch.B.; Andrew D. Krystal, M.D., M.S.; Cynthia M. Kuhn, Ph.D.; Edward D. Levin, Ph.D.; David J. Madden, Ph.D.; Roy J. Mathew, M.B.; Jeffrey R. Petrella, M.D.; Jed E. Rose, Ph.D.; Saul M. Schanberg, M.D., Ph.D.; Susan S. Schiffman, Ph.D.; Rochelle D. Schwartz-Bloom, Ph.D.; Andrew Sherwood, Ph.D.; David C. Steffens, M.D., M.H.S.; Kamaraju S. Sundar, Ph.D.; Richard S. Surwit, Ph.D.; Marvin S. Swartz, M.D.; Richard D. Weiner, M.D., Ph.D.; William C. Wetsel, Ph.D.; Redford B. Williams, M.D.

CANCER BIOLOGY STUDY PROGRAM (CBP)

Program Director: Matthias Gromeier, M.D.

The Cancer Biology Study Program offers third year medical students a 32-credit program of basic science instruction. Each student has an opportunity to focus on an area of interest and pursue a scholarly activity. Through a combination of research preceptorship and classroom work, students are introduced to cancer research. The students may choose to investigate oncogenes, tumor suppressor genes, growth factors, chromosomal abnormalities, cellular invasion and metastases, tumor doubling time, cell loss, tumor hypoxia, tumor angiogenesis, chemical/radiation/foreign body/viral/tobacco carcinogenesis, biologic and immunotherapy principles, experimental cancer therapeutics, radiobiology and hyperthermic oncology, and the pharmacology of cancer chemotherapy.

FACULTY: Andrew Berchuck, M.D.; Gerard C. Blobe, M.D., Ph.D.; Patrick J. Casey, Ph.D.; O. Michael Colvin, M.D.; Mark W. Dewhirst, D.V.M., Ph.D.; Henry S. Friedman, M.D.; Eli Gilboa, Ph.D.; James M. Grichnik, M.D., Ph.D.; Matthias Gromeier, M.D.; Edward C. Halperin, M.D.; Maureen R. Hoffman, M.D., Ph.D.; Randy L. Jirtle, Ph.D.; Michael J. Kelley, M.D.; Sally A. Kornbluth, Ph.D.; Joanne Kurtzberg, M.D.; Jeffrey R. Marks, Ph.D.; Lawrence B. Marks, M.D.; Joseph R. Nevins, Ph.D.; Edward F. Patz, Jr, M.D.; Ann Marie Pendergast, Ph.D.; Salvatore V. Pizzo, M.D., Ph.D.; Hilliard F. Seigler, M.D.; Victoria Seewaldt, M.D.; Douglas Tyler, M.D.

CARDIOVASCULAR STUDY PROGRAM (CVS)

Program Director: Neil J. Freedman, M.D.

This interdepartmental study program is designed to provide third year medical students with an in-depth basic science research experience in one area of the broad discipline of cardiovascular science. The program is directed at those students potentially interested in a career in cardiovascular research. Faculty members in this study track come from numerous departments, including biochemistry, cell biology, immunology, pathology, and pharmacology. Students who elect this study program undertake a research project in a laboratory under the guidance of a faculty preceptor. In addition, students are encouraged to take course work each term to complement their research interests. Because a wide range of research opportunities is available, course work is individually tailored by the faculty preceptor to the interests of the student.

FACULTY: Page A.W. Anderson, M.D.; Marc G. Caron, Ph.D.; Neil J. Freedman, M.D.; Pascal J. Goldschmidt, M.D., F.A.C.C.; Augustus O. Grant, M.B., Ch.B.; Michael Gunn, M.D.; Barton F. Haynes, M.D.; Margaret Kirby, Ph.D.; Bruce M. Klitzman, Ph.D.; Walter J. Koch, Ph.D.; Christopher D. Kontos, M.D.; William E. Kraus, M.D.; Mitchell W. Krucoff, M.D., F.A.C.C., F.C.C.P.; Madan M. Kwatra, Ph.D.; Carolyn Landolfo, M.D.; Robert J. Lefkowitz, M.D.; Yin-Xiong Li, M.D., Ph.D.; Ann LeFurgey, Ph.D.; Anthony R. Means, Ph.D.; Claude A. Piantadosi, M.D.; Howard Rockman, M.D.; Jonathan S. Stamler, M.D.; Antonius M.J. VanDongen, Ph.D.; Xiao-Fan Wang, Ph.D.; R. Sanders Williams, M.D.; A. Richard Whorton, Ph.D.

CLINICAL RESEARCH STUDY PROGRAM (CRSP)

Galen S. Wagner (Coordinating Director) and Christopher M. O'Connor, M.D., Co-Director.

This study program offers students the opportunity to explore the quantitative and methodological principles of clinical research. Under the direction of two preceptors, typically a clinical investigator and a statistician, students use the methods and techniques of biostatistics and related disciplines to address a clinical research question. Designated courses may be taken with the approval of the student's preceptors.

FACULTY: John Bartlett, M.D.; Lori A. Bastian, M.D.; Ann Brown, M.D.; Robert M. Califf, M.D.; Elizabeth C. Clipp, Ph.D., R.N.; Harvey Jay Cohen, M.D.; G. Ralph Corey, M.D.; Terry A. Cox, M.D., Ph.D.; Elizabeth R. DeLong, Ph.D.; David Edelman, M.D.; Gerda G. Fillenbaum, Ph.D.; Linda K. George, Ph.D.; Tony Galanos, M.D.; Steven C. Grambow, Ph.D.; Christopher Granger, M.D.; James Grichnik, M.D., Ph.D.; Robert A. Harrington, M.D.; Ronnie D. Horner, Ph.D.; James Jollis, M.D.; Keith Kaye, M.D.; Sheri A. Keitz, M.D.; Harold G. Koenig, M.D.; Kerry L. Lee, Ph.D.; Paul P. Lee, M.D., J.D.; Kenneth W. Lyles, M.D.; David J. Madden, Ph.D.; Daniel B. Mark, M.D.; David B. Matchar, M.D.; Douglas C. McCrory, M.D.; Miriam Morey, Ph.D.; Lawrence H. Muhlbaier, Ph.D.; Andrew Muir, M.D.; Evan Myers, M.D., M.P.H.; L. Kristin Newby, M.D.; Eugene Z. Oddone, M.D.; E. Magnus Ohman, M.D.; Maren K. Olsen, Ph.D.; Eric D. Peterson, M.D.; Carl F. Pieper, Dr.P.H.; Truls Ostbye, M.D., Ph.D.; Scott Palmer, M.D.; Dawn T. Provenzale, M.D.; Jaya Rao, M.D.; Don Rockey, M.D.; Gregory P. Samsa, Ph.D.; Kenneth Schmader, M.D.; Daniel J. Sexton, M.D.; David L. Simel, M.D.; Karen E. Steinhauser, Ph.D.; Sandra S. Stinnett, Dr.P.H.; Laura Svetkey, M.D.; Barbara E. Tardiff, M.D.; James A. Tulsky, M.D.; Samuel Wells, M.D.; Eric C. Westman, M.D.; John Whited, M.D.; William E. Wilkinson, Ph.D.

EPIDEMIOLOGY AND PUBLIC HEALTH STUDY PROGRAM (EPH)

Program Director: Kathryn M. Andolsek, M.D., M.P.H.

The Epidemiology and Public Health Study Program is designed to provide third year Duke medical students knowledge regarding research tools to design prospective clinical trials and to analyze the resultant health services research data. Participants also learn the essentials of research design, statistical analyses, health policy, and comparative health systems so that they can be contributors to the improvement of the system of health care, beginning with the improved health of the patient but extending to local, state, and national issues. Each student selects a Duke faculty preceptor in consultation with the program director.

Practicum. Each student works in an epidemiology/health services/public health independent research activity (for example, illness causology and outcome, decision analysis, health economics, or medical center financial operations). This occupies at least 50% or more of the student's time through the year.

Required Research. In conjunction with the practicum, each student is required to produce an in-depth thesis analyzing an area of epidemiology, health service research, finance, health systems, or health policy, most probably related to the student's practicum experience. He or she works with an advisor to determine and investigate the topic. This research activity extends throughout the year, culminating with the acceptance of the completed thesis.

Dual Degree Programs. In some instances, third year students may opt to enter one of several approved programs for dual degrees or study away from this campus. The approved dual degree programs include the M.D./M.P.H. program which allows third year students to enroll in one of several approved M.P.H. programs (Biostatistics; Environmental Sciences and Engineering; Epidemiology; Health Care and Prevention; Health Policy and Administration; and Maternal and Child Health) at the University of North Carolina at Chapel Hill. Students complete all requirements for the M.P.H. degree during one academic year in fulfillment of their third year requirement. Dr. Andolsek is the director of the M.D./M.P.H. Program. Other dual degree programs include the Duke master's degree in Public Policy from the Sanford Public Policy Institute (M.D./M.P.P. program), and the Duke master's in Business Administration from the Fuqua School (M.D./M.B.A. program). Some of these other programs may take more time, thereby necessitating an extension of the time required for

completing the third year requirement. In addition, students may propose an individually-tailored Study Away option. Study Away proposals are reviewed and approved individually by the Third Year Committee. Placements in the Cloister Program at the National Institutes of Health and at the National Institute of Environmental Health Sciences in Research Triangle Park are options; the supervision of students in the Study Away programs can be carried out by faculty from a number of study programs.

FACULTY: Kathryn M. Andolsek, M.D., M.P.H.; Jay Baker, M.D.; Lori A. Bastian, M.D.; Dan G. Blazer, M.D., Ph.D.; Terrill Bravender, M.D.; Steven J. Bredehoeft, M.D., M.P.H.; Barbara J. Burns, Ph.D.; Robert M. Califf, M.D.; Dennis A. Clements, M.D., Ph.D.; John M. Dement, Ph.D.; Rowena Dolor, M.D.; David Edelman, M.D.; Mark Feinglos, M.D.; Michael Freemark, M.D.; Linda K. George, Ph.D.; Deborah T. Gold, Ph.D.; Judith C. Hays, Ph.D.; Ronnie D. Horner, Ph.D.; Laurence Higgins, M.D.; Catherine Hoyo, M.D., Ph.D.; Margaret Humphreys, M.D., Ph.D.; Robert H. Jones, M.D.; Joseph Lo, Ph.D.; Carol Dukes Hamilton, M.D.; Keith Kaye, M.D.; Linda Kinsinger, M.D.; Paul Lee, M.D., J.D.; David B. Matchar, M.D.; Colleen McBride, Ph.D.; John Murray, M.D.; Evan R. Myers, M.D., M.P.H.; Steven Olson, M.D.; Truls Ostbye, M.D.; George Parkerson, M.D., Ph.D.; Ricardo Pietrobbon, M.D.; Joellen M. Schildkraut, Ph.D.; Kevin A. Schulman, M.D., M.B.A.; Pearl Seo, M.D.; Cellette Skinner, Ph.D.; David L. Simel, M.D., M.H.S.; Jeremy Sugarman, M.D.; Laura Svetkey, M.D.; Marvin S. Swartz, M.D.; James A. Tulsky, M.D.; Emmanuel Walter, M.D., M.P.H.; Eric Westman, M.D., M.H.S.; Christopher Woods, M.D.

HUMAN GENETICS STUDY PROGRAM (HGP)

Program Directors: William K. Scott, Ph.D. (Coordinating Director) and Marcy C. Speer, Ph.D.

Our genetic makeup to a large extent dictates our health. The promise of the Human Genome Initiative is a greater understanding of the genetic components to health. Once the genetic contributions to common diseases like osteoarthritis, heart disease, and cancer are understood, the physician will have a powerful means at his or her disposal for identifying individual risk factors and offering lifestyle modifications. The study program in human genetics offers third year medical students an integrated program for understanding research in human genetics, its application to human genetic disease for risk assessment, genetic counseling, public health practice, and potential therapeutics, and ethical and legal implications for this research on the patient, the family, and society. We anticipate that students in this program will follow one of several broad paths, utilizing either a molecular approach or a statistical and epidemiologic approach to understanding and treating human genetic disease. Research opportunities are available in laboratories studying such diverse topics as positional cloning of human disease genes, apoptosis gene therapy, biochemical genetics, animal models of genetics and development, and genetic epidemiology. Opportunities for both basic science and clinical/epidemiologic research projects are available in various laboratories participating in the HGP. In addition to the research project and thesis, the program recommends a 2-credit course, Genetic Analysis of Human Disease (CRP 250), offered in the spring semester, and requires a year-long seminar series targeting current topics in human genetic research. Other elective courses may be taken with the permission of the program director and the student's preceptor.

FACULTY: Andrea Amalfitano, D.O., Ph.D.; Rose-Mary Boustany, M.D.; Blanche Capel, Ph.D.; Yuan-Tsong Chen, M.D., Ph.D.; John R. Gilbert, Ph.D.; Pascal J. Goldschmidt, M.D., F.A.C.C.; Elizabeth R. Hauser, Ph.D.; Michael A. Hauser, Ph.D.; John Klingensmith, Ph.D.; Virginia B. Kraus, M.D., Ph.D.; Douglas Marchuk, Ph.D.; Eden R. Martin, Ph.D.; Joseph R. Nevins, Ph.D.; Margaret Pericak-Vance, Ph.D.; Joellen Schildkraut, Ph.D.; David A. Schwartz, M.D., M.P.H.; William K. Scott, Ph.D.; Marcy C. Speer, Ph.D.; Judith E. Stenger, Ph.D.; Bruce Sullenger, Ph.D.; Jeffrey M. Vance, M.D., Ph.D.; Michelle P. Winn, M.D.; Fulton Wong, Ph.D.

IMMUNOLOGY STUDY PROGRAM (ISP)

Program Director: Jeffrey R. Dawson, Ph.D.

A fundamental understanding of the immune system is central to the effective management of disease in a vast array of public health and clinical settings. The Immunology Study Program will appeal to students interested in the public health initiatives of vaccine design and the management of infectious diseases. This research experience can also be focused on one of a wide variety of pervasive clinical problems. Aberrations of immune system devel-

opment can be studied in fundamental ways using animal models and within the context of the primary immunodeficiencies they cause. Diseases of chronic inflammation and autoimmunity highlight the damaging effects of exaggerated or inappropriate immune responses and can be examined through research focused on the pathogenesis of diseases such as asthma and rheumatoid arthritis. Modulation of normal immune responses is also critical to the management of solid organ and bone marrow transplantation and is becoming increasingly important in the treatment of tumor. All of these issues can be explored in fundamental ways using well-defined animal models and within the context of the associated human diseases. The student may also choose to undertake research pertinent to the myriad molecular processes that underlie normal lymphocyte development and function and use this opportunity to master some of the new technologies available to biomedical research. The ISP emphasizes original research. This program offers third year medical students an opportunity to undertake basic research in immunology and to integrate with graduate students, fellows, and faculty of the Department of Immunology. Preceptors can be chosen from across this broad discipline with projects in all of the above sub-specialties available at Duke. Preceptors will be asked to provide a short list of projects that can be undertaken in their laboratory within the constraints of this program (available on request from the Program Director). The primary goal of the program is to encourage and develop the student's own creativity in the sciences and to provide a substantial research base that will serve the student well in their clinical years. An optional in-depth course in the basic concepts of cellular and molecular Immunology is offered in the spring semester (3 hours per week). Further, there are a variety of seminars and journal clubs that bring the Immunology Department together for presentations of current work and help us all to keep up-to-date with this ever expanding discipline.

FACULTY: R. Randal Bollinger, M.D., Ph.D.; Rebecca H. Buckley, M.D.; Jeffrey R. Dawson, Ph.D.; Jos Domen, Ph.D.; Kimberly Lynn Gandy, M.D., Ph.D.; Eli Gilboa, Ph.D.; Russell P. Hall, III, M.D.; Barton F. Haynes, M.D.; Maureen Hoffman, M.D., Ph.D.; Michael S. Krangel, Ph.D.; Garnett H. Kelsoe, D.Sc.; Joanne Kurtzberg, M.D.; M. Louise Markert, M.D., Ph.D.; David C. Montefiori, Ph.D.; William Parker, Ph.D.; Dhavalkumar D. Patel, M.D., Ph.D.; David S. Pisetsky, M.D., Ph.D.; Scott Pruitt, M.D., Ph.D.; Hilliard F. Seigler, M.D.; Herman F. Staats, Ph.D.; Thomas F. Tedder, Ph.D.; Marilyn J. Telen, M.D.; Kent J. Weinhold, Ph.D.; Yuan Zhuang, Ph.D.

INFECTIOUS DISEASES STUDY PROGRAM (IDP)

Program Director: Thomas G. Mitchell, Ph.D.

Knowledge of infectious diseases is relevant to the care of patients of all ages and each clinical specialty. The Infectious Diseases Study Program provides students with the opportunity to directly explore infectious diseases in a laboratory setting coupled with seminars and optional courses designed to enhance knowledge of host defenses, microbial pathogens, chemotherapy, and the dynamic interactions of these elements. The goals of the program are to instill a critical assessment of information, to provide the opportunity for the creative acquisition of data, to encourage independent thinking, and to provide insight into modern technology and the interrelationship of clinical infectious diseases with basic microbiology and immunology. The participating faculty members are involved in a range of clinical and basic research, including molecular mechanisms of bacterial, fungal or viral pathogenesis, the evolution of microbial pathogens, anti-microbial chemotherapy, the molecular epidemiology of infectious diseases, and the use of model microorganisms to investigate fundamental processes in genetics and cellular and molecular biology.

Each student selects a faculty preceptor with whom to work on an original research project. The student is expected to develop an individual project within the framework of an existing laboratory, design experiments, critically assess the relevant literature, learn to evaluate data, solve problems associated with the project, and communicate the research results in written and oral presentations. Appropriate guidance and assistance are provided by the faculty and others within the laboratory.

Preceptorship. The major emphasis of the program is the research project, and students function as graduate students. The commitment involves at least 40 hours per week with negotiated time off.

Courses. No courses are required, but students may take Comprehensive Immunology (MGM 291B), Virology and Viral Oncology (MGM 252B), or Microbial Pathogenesis (MGM 282B), depending on the student's laboratory research interests.

Seminars. Students in the IDP attend seminars in which faculty members, fellows, and students present their ongoing research. Such presentations enable the student to observe and participate in the critical analysis of research before it reaches the publication stage.

Additional Course Work. Although other basic science electives may be taken upon approval by the mentor and the program director, the student is discouraged from excessively diluting the laboratory experience.

FACULTY: Kenneth Alexander, M.D., Ph.D.; John A. Bartlett, M.D.; Rebecca H. Buckley, M.D.; Richard Frothingham, M.D.; Mariano A. Garcia-Blanco, M.D., Ph.D.; Matthias Gromeier, M.D.; Carol Dukes Hamilton, M.D.; John D. Hamilton, M.D.; Joseph Heitman, M.D.; Keith Kaye, M.D.; Jack D. Keene, Ph.D.; Kenneth N. Kreuzer, Ph.D.; John H. McCusker, Ph.D.; Thomas G. Mitchell, Ph.D.; David C. Montefiori, Ph.D.; Joseph R. Nevins, Ph.D.; John R. Perfect, M.D.; David J. Pickup, Ph.D.; Christian R.H. Raetz, M.D., Ph.D.; Daniel J. Sexton, M.D.; Herman F. Staats, Ph.D.; J. Brice Weinberg, M.D.; Kenneth H. Wilson, M.D.

MEDICAL HUMANITIES STUDY PROGRAM (MEDHUM)

Program Director: Margaret Humphreys, M.D., Ph.D.

Overview: The Medical Humanities Study Program offers a multidisciplinary opportunity for students to explore topics in medical history, ethics, theology, and other fields within the medical humanities. Students design their own research projects under the guidance of medical humanities mentors, and tailor their third year experience around the completion of this project. While some students may participate in their mentor's ongoing research, others can pursue projects independent of (but related to) their mentor's primary areas of interest.

Curriculum:

Research. The principal component of the Medical Humanities Study Program is an in-depth research experience within the medical humanities. The location of this research will vary with the mentor and project chosen. Some projects may be appropriately pursued in libraries and archives. Others may include interviews with or experimentation upon human subjects in the clinical or other academic setting. Like their peers in the more traditional science track, medical humanities students will explore a research question, find data to support or refute it, and write a thesis that communicates their results.

Proposal. All students are expected to prepare a 3-5 page proposal by the end of their second year outlining the aims of the proposed research in consultation with their chosen mentor. This proposal will state the problem to be studied, the rationale and relevance of the problem, and include a bibliography of relevant literature and sources.

Courses. Students are expected to take up to five courses in the medical humanities during their third year. Working with their mentor, students will identify courses within the university relevant to their research question. Courses may be chosen from the Medical School, Divinity School, or Faculty of Arts and Sciences. Individual readings courses with the mentor or other faculty may be included in the courses chosen.

Lecture series. Students will attend the regular humanities lecture series offered through the Center for the Study of Medical Ethics and Humanities.

Posters. Students are expected to submit abstracts to present results in poster or oral format at the annual Alpha Omega Alpha research day in the Searle Center that usually occurs in early June.

Final Thesis. Students will prepare a thesis that represents the product of their research, usually 15-20 pages in length. This is due on the thesis deadline date set by the Registrar's Office.

Presentations. Students are expected to present a paper based on their research in the humanities lecture series during the spring semester.

Publication. Students are encouraged to produce work that is of sufficient originality, importance, and quality that it will be accepted for publication by a relevant medical humanities journal. Authors of historical theses will be encouraged to submit their work for the William Osler Prize awarded by the American Association of the History of Medicine for the best essay by a medical student. The winning essay of this prize contest is traditionally published in the *Bulletin of the History of Medicine*.

FACULTY: Jeffrey P. Baker, M.D., Ph.D.; Peter C. English, M.D., Ph.D.; Angela Holder, J.D., L.L.M.; Margaret Humphreys, M.D., Ph.D.; Keith Meador, M.D., Th.M., M.P.H.; Jeremy Sugarman, M.D., M.A., M.P.H.; James A. Tulsky, M.D.

NEUROSCIENCES STUDY PROGRAM (NSS)

Program Director: Daniel Laskowitz, M.D.

Overview: The Neurosciences Study Program provides a multidisciplinary opportunity for third year medical students over the broad range of basic and clinical neurosciences. Many of the most intractable and prevalent diseases of our time afflict the nervous system, and in many ways, research in the neurosciences represents one of the final frontiers of medicine and biomedical science. Areas of study include molecular and cellular neuroscience, neuroimaging, developmental neurobiology, systems and cognitive neuroscience, animal modeling of neurological disease, and translational neuroscience. Faculty in the program are drawn from many departments including Neurobiology, Radiology, Pharmacology, Cell Biology, Psychology, Neurosurgery, Neurology, Pediatrics, Medicine, Psychiatry, and Ophthalmology, and are engaged in research that ranges from fundamental properties of ion channels and neurotransmitter receptors to cognition and perception. The program emphasizes a basic research experience under the guidance of a mentor along with opportunities to attend seminars and present results in written, oral, and poster presentations.

Research. The basic component of the Neurosciences Study Program is an in-depth research experience in a research laboratory under the supervision of one of the participating faculty. Students will work full-time in a laboratory pursuing an independent research project including conducting experiments, analyzing results, and communicating findings.

Proposal. All students are expected to prepare a 2-3 page proposal by the beginning of the third year, outlining the aims of the proposed research in consultation with their chosen mentor. This proposal should state the problem to be studied, the rationale and relevance of the problem, the specific hypotheses to be tested, a brief description of the experiments to be performed, and references.

Courses. Students will have the opportunity to take or audit graduate level courses offered in the Departments of Neurobiology, Cell Biology, and Pharmacology, as well as courses in biostatistics and human disease pathophysiology and therapeutics. In addition, Vascular, Neurology, Neurosurgery, and Stroke Center conferences can also be attended. Importantly, there are no specific course requirements in the Program, but rather students may pursue their own particular interests by taking or auditing courses recommended by their mentor or relevant to their research project.

Seminars. Students will be able to attend regular seminar series including the Neurobiology Seminar, Signal Transduction Colloquium, Cell Biology Seminar, and Brain Imaging Seminar as appropriate for their particular research project.

Meetings. Students will attend monthly informal meetings with Dr. Laskowitz to present proposed research plans, discuss ongoing projects, and to assess progress. These

meetings may include presentations by invited speakers to discuss particular topics of interest.

Posters. Students are expected to submit abstracts to present results in poster or oral format at the annual Alpha Omega Alpha research day in the Searle Center that will occur in early June.

Final Thesis. At the end of the spring semester, students are required to write up a thesis including their hypotheses, the outcome of their experiments, and conclusions of their work (15-20 pages).

Presentations. In conjunction with the final report, each student will give a 30 minute presentation on the work accomplished to all participants in the program.

FACULTY: George J. Augustine, Ph.D.; Rose-Mary Boustany, M.D.; Nell B. Cant, Ph.D.; Michael Ehlers, M.D., Ph.D.; Guoping Feng, Ph.D.; David Fitzpatrick, Ph.D.; Larry Goldstein, M.D.; William C. Hall, Ph.D.; Scott Huettel, Ph.D.; Erich Jarvis, Ph.D.; Lawrence C. Katz, Ph.D.; Cynthia M. Kuhn, Ph.D.; Daniel Laskowitz, M.D.; Darrell V. Lewis, Jr., M.D.; Donald C. Lo, Ph.D.; Roger Madison, Ph.D.; Martin McKeown, M.D.; James O. McNamara, Sr., M.D.; J. Victor Nadler, Ph.D.; Michael L. Platt, Ph.D.; James M. Provenzale, M.D.; Dale Purves, M.D.; Peter H. Reinhart, Ph.D.; Saul M. Schanberg, M.D.; Ph.D.; Donald E. Schmechel, M.D.; Rochelle D. Schwartz-Bloom, Ph.D.; Sidney A. Simon, Ph.D.; J. H. Pate Skene, Ph.D.; Theodore A. Slotkin, Ph.D.; John E.R. Staddon, Ph.D.; Warren J. Strittmatter, M.D.; Dennis A. Turner, M.A., M.D.; E. Lee Tyrey, Ph.D.; Jeffrey M. Vance, M.D., Ph.D.; Fulton Wong, Ph.D.

OPHTHALMOLOGY AND VISUAL SCIENCES STUDY PROGRAM (OVS)

Program Directors: Catherine Bowes Rickman, Ph.D. (Coordinating Director) and David L. Epstein, M.D.

Description. The purpose of this study program is to provide third year medical students with research skills and experience that can be applied to future careers as clinician scientists in ophthalmology and other fields. Although there is a primary emphasis on laboratory science, clinical research programs of inquiry based on strong scholarship are also possible. There is a focus on clinical investigators forming a true partnership with basic science researchers in attempting to advance the understanding and therapy of ocular diseases. There is an emphasis on hypothesis formation and the planning and execution of experiments that can address and then redefine the hypothesis.

Curriculum. Each student chooses a preceptor according to her/his interests. Together they determine a topic of investigation which requires hands-on laboratory or clinical research by the student. Joint preceptors (for example, a clinical investigator and a basic science researcher) are acceptable and, in fact, encouraged. The course of study must be approved by the study program directors. At the end of the year, each student is expected to produce an in-depth paper based on the research. Throughout the year, students attend: a) regular lectures on topics about ophthalmology and visual science given by Duke faculty, as well as outside lecturers; b) participate in bi-monthly research workshops in which students and faculty make presentations of hypotheses, assumptions therein, methods, and results; and c) give formal presentations of research work at the conclusion of the year.

Research Opportunities. Opportunities include research in physiology, pathology, and molecular and cell biology of the eye as they relate to eye diseases. Opportunities also exist in biophysics and instrumentation, laser cell biology, and scientific basis of glaucoma, corneal, and retinal diseases.

FACULTY: Catherine Bowes Rickman, Ph.D.; Edward G. Buckley, M.D.; David L. Epstein, M.D.; Mark W. Grinstaff, Ph.D.; Glenn J. Jaffe, M.D.; Gordon Klintworth, M.D., Ph.D.; Paul Lee, M.D., J.D.; Brooks W. McCuen II, M.D.; Alan D. Proia, M.D., Ph.D.; P. Vasantha Rao, Ph.D.; Dennis W. Rickman, Ph.D.; Cynthia A. Toth, M.D.; Fulton Wong, Ph.D.

PATHOLOGY STUDY PROGRAM (PSP)

Program Director: Patrick J. Buckley, M.D., Ph.D.

Pathology is the study of disease through the utilization of structural and functional

changes to gain information about the human organism's response to injury. The goal of the Pathology Study Program is to provide the medical student with a thorough learning experience in pathology and laboratory medicine under the guidance of a senior faculty preceptor. The essential elements of this program are: a) independent, but guided research experience (bench or library); and b) active participation in small group seminars.

No courses are required. The PSP program is currently under revision to keep students up to date and involved in a rigorous scholarly experience. Dr. Buckley will provide students with details upon request.

FACULTY: Soman N. Abraham, Ph.D.; Darell D. Bigner, M.D., Ph.D.; Patrick J. Buckley, M.D., Ph.D.; Sheila Collins, Ph.D.; Mark W. Dewhirst, D.V.M., Ph.D.; Steven Eubanks, M.D.; Mark N. Feinglos, M.D.; Charles S. Greenberg, M.D.; Mark W. Grinstaff, Ph.D.; Laura P. Hale, M.D.; David H. Harpole, M.D.; Lizzie J. Harrell, Ph.D.; Maureane Hoffman, M.D., Ph.D.; Randy L. Jirtle, Ph.D.; Daniel J. Kenan, M.D., Ph.D.; Gordon Klintworth, M.D., Ph.D.; Virginia B. Kraus, M.D., Ph.D.; James E. Lowe, M.D.; Herbert K. Lyerly, M.D.; John F. Madden, M.D., Ph.D.; Sara E. Miller, Ph.D.; Salvatore V. Pizzo, M.D., Ph.D.; L. Darryl Quarles, M.D.; Keith A. Reimer, M.D., Ph.D.; Nancy L. Reinsmoen, Ph.D.; L. Barth Reller, M.D.; Gregory J. Riggins, M.D.; Victor L. Roggli, M.D.; John D. Shelburne, M.D., Ph.D.; Charles Steenbergen, M.D., Ph.D.; Timothy T. Stenzel, M.D., Ph.D.; Mark W. Swaim, M.D., Ph.D.; John G. Toffaletti, Ph.D.; Robin T. Vollmer, M.D.

PHARMACOLOGY AND MOLECULAR THERAPEUTICS STUDY PROGRAM (PMT)

Program Director: Madan M. Kwatra, Ph.D.

The PMT program is based on utilization of the basic concepts of biology and chemistry to determine how drugs affect humans. It encompasses the study of the biological targets of drug action, the mechanism by which drugs act, the therapeutic and toxic effects of drugs, as well as the development of new therapeutic agents. Participating faculty members have particular strengths in the areas of receptor function and cellular signaling mechanisms as targets of drug action. Special emphasis is placed on the complex regulatory mechanisms that govern mammalian cell growth and differentiation, how these mechanisms are perturbed in human diseases (such as cancer) and how our knowledge of these regulatory mechanisms might lead to improved therapies. Current research interests of the faculty include:

1. the mechanism of action of neuropeptides and neurotransmitters;
2. ontogeny of signaling pathways in nervous, cardiovascular and immune tissue;
3. cellular signaling mechanisms, including the actions of calcium and cyclic nucleotides on protein phosphorylation/dephosphorylation;
4. receptor function and cell signaling mechanisms regulating cell growth, proliferation and death;
5. the molecular basis of rational drug design.

The major emphasis of the PMT program is on student-generated independent study/research projects conducted in close association with a faculty preceptor. In addition, a weekly seminar series, the Signal Transduction Colloquium, exposes participating students to a variety of topics presented by experts in the various relevant fields of research. Research areas represented in the PMT program fall into four broad categories:

- ***Molecular properties and actions of peptide hormones, growth factors and their receptors:*** Studies on membrane biology, ligand-receptor interactions, and signal transduction; molecular mechanisms of insulin action and related growth factors (EGF and PDGF); and mechanisms of action of regulatory peptides on gastrointestinal target organs.

- ***Genetic and biochemical regulation of membrane function, cytoskeletal elements, intracellular motility, and macromolecular trafficking:*** Studies on the motor complexes which drive organelle movements within cells during endocytosis, exocytosis, and axonal transport; intracellular function of unconventional myosins encoded by abm genes; and regulation of nucleocytoplasmic trafficking.

- **Genetic regulation of cell proliferation, growth, and development:** The biochemical and functional properties of the recessive retinoblastoma oncogene; hormonal regulation of malignant cell growth; the molecular basis of cytokinesis; the role of fetal and placental hormones in the regulation of fetal growth and oogenesis; molecular basis of morphogenetic changes using genetic and transgenic methods; and the role of cyclins in mitotic and meiotic events in relation to cell cycle specific kinases.

- **Regulation of integrated physiological processes:** Investigations on the role of atrial natriuretic factors in blood volume and arterial pressure regulation; the role of intracellular second messengers in ionic and metabolic regulation; regulation of chloride channels in epithelial cells; regulatory mechanisms of tissue oxygen concentration and oxidant damage; organization and control of intermediary metabolism pathways; neural regulation of gonadotropin function; and genetic regulation of intermediary metabolism in response to metabolic demands on striated muscle (myocytes).

The major emphasis of the PMT program is on student-generated, independent study/research projects conducted in a close association with a faculty preceptor. Students are encouraged to enroll in basic science courses or relevant clinical offerings which contribute to their research projects or their future career goals. The research colloquia and self-learning course offerings, as described below, are equally important components of the PMT program.

For all students, the program consists of the following:

Research Presentations. At the beginning of the fall semester, students give a brief presentation on their proposed research to the PMT participants. This presentation and a short research report is a formal requirement of all participants. Toward the end of spring semester, students present their research results before the group in the form of a platform presentation.

Research Reports. Coincident with the research presentations, students submit two written reports to the program director on their research projects. The preliminary report is submitted before the end of the fall semester. It consists of a brief review of the literature, a discussion of the hypothesis to be tested, specific aims of the proposed research, and a brief assessment and justification of the methodologies that are to be employed. The final report, submitted towards the end of the spring semester, is written in the form of a research paper being submitted for publication. It should include a more extensive review of the literature and an evaluation and discussion of the results obtained. The colloquia and research reports provide an opportunity for medical students to develop communication and presentation skills for their biomedical careers.

FACULTY: Mohamed Abou Donia, Ph.D.; Nels C. Anderson, Jr., Ph.D.; Marc G. Caron, Ph.D.; Jonathan A. Cohn, M.D.; Christopher M. Counter, Ph.D.; Michael Freemark, M.D.; Larry Goldstein, M.D.; Joseph Heitman, M.D., Ph.D.; Homme W. Hellinga, Ph.D.; Daniel P. Kiehart, Ph.D.; Madan Kwatra, Ph.D.; Mary M. Lee, M.D.; Daniel Lew, Ph.D.; Rodger A. Liddle, M.D.; Haifan Lin, Ph.D.; Donald P. McDonnell, Ph.D.; Anthony R. Means, Ph.D.; Elliott Mills, Ph.D.; Paul Modrich, Ph.D.; Thomas M. Murphy, M.D.; Christopher Nicchitta, Ph.D.; Christopher M. O'Connor, M.D.; Emmanuel C. Opara, Ph.D.; Thomas L. Ortel, M.D., Ph.D.; Don C. Rockey, M.D.; Johannes Rudolph, Ph.D.; Patricia M. Saling, Ph.D.; David W. Schomberg, Ph.D.; Sean P. Scully, M.D., Ph.D.; Shirish Shenolikar, Ph.D.; Michael A. Shetzline, M.D., Ph.D.; Laura Svetkey, M.D.; Steven R. Vigna, Ph.D.; Judith A. Voynow, M.D.; David K. Walmer, M.D., Ph.D.; Thomas Weber, M.D.; Jo Rae Wright, Ph.D.; Tso-Pang Yao, Ph.D.; Heather N. Yeowell, Ph.D.; John D. York, Ph.D.

Class of 2003 with Postgraduate Year One Appointment

Key: *Student Name, Hometown, Undergraduate College, Internship Institution and Discipline (if applicable), City and State, Residency Institution and Discipline, City and State, Ultimate Career Choice*

Alexander, Thomas Hanson (Tucson, Arizona), University of Arizona, University of California-San Diego, Otolaryngology-Head & Neck Surgery, San Diego, California
Alpert, Eryn (Charlotte, North Carolina), Brown University, Washington University – Emergency Medicine, St. Louis, MO
Anthony, Kara Beth (Pennington, New Jersey), Duke University, University of Pennsylvania – Medicine, Philadelphia, PA
Archibald, Jason David (Potomac, Maryland), Brigham Young University, Johns Hopkins – Preliminary Surgery, Baltimore, MD
Bernstein, Michael Adam (Fairfield, Connecticut), Duke University, Mt. Sinai Hospital – Medicine/Pediatrics, New York, NY
Bourque, Jamieson MacDonald (Washington, DC), University of Virginia, Duke University Medical Center – Medicine, Durham, NC
Bush, Errol L. (Decatur, Georgia), Emory University, Duke University Medical Center – Surgery, Durham, NC
Cabrera, Yessica Eileen (North Miami, Florida), Massachusetts Institute of Technology, Duke University Medical Center – Otolaryngology, Durham, NC
Casal, Suzette (Coral Gables, Florida), Duke University, Georgetown University – Preliminary Medicine, Washington, DC, Duke University, Diagnostic Radiology
Changizi, Kelly Sarantakis (West Chester, Pennsylvania), University of Virginia, University of California-Los Angeles – Neurology, Los Angeles, CA
Chen, Weip (Pasadena, California), Massachusetts Institute of Technology, Harbor – University of California – Medicine, Torrance, CA
Chien, James (West Bloomfield, Michigan), Creighton University, Mayo Clinic Hospital – Transitional, Scottsdale, AZ, University of California-San Francisco – Anesthesiology, San Francisco, CA
Chien, Lynn (Floyds Knobs, Indiana), Duke University, University of California – Davis – Emergency Medicine, Sacramento, CA
Cho, Patricia Sunghee (Cincinnati, Ohio), Harvard University, Duke University Medical Center – Surgery, Durham, NC
Chung, Edward Kwanghyoun (Knoxville, Tennessee), Massachusetts Institute of Technology, Children’s Hospital – Pediatrics-Primary Care, Boston, MA
Corey, Kathleen Elizabeth (Ann Arbor, Michigan), University of Michigan, Massachusetts General Hospital – Medicine, Boston, MA
Crotty, Laura Elise (Durham, North Carolina), Duke University, Massachusetts General Hospital – Medicine, Boston, MA
Dawn, Marianne Edwards (Baltimore, Maryland), Stanford University, Duke University – Medicine Preliminary, Durham, NC, University of Maryland – Dermatology, Baltimore, MD
Fields, Ryan Courtney (Bloomfield Hills, Michigan), University of Michigan – Ann Arbor, Washington University/Barnes-Jewish Hospital – Surgery, St. Louis, MO
Gardner, Kim F.M. (Castries, St. Lucia, West Indies), Florida State University, Vanderbilt University Medical Center – Pediatrics, Nashville, TN
Gilbert, Brett Jason (Buffalo Grove, Illinois), University of Illinois, Duke University Medical Center – Orthopaedic Surgery, Durham, NC
Gillespie, Heather Marie (Rochester, New York), Brown University, Thomas Jefferson University – Family Practice, Philadelphia, PA
Green, Lindsay Biggers (Clemson, South Carolina), Duke University, Deloitte Health Care Consulting, Atlanta, GA
Hatfield, Ann S. (Gainesville, Florida), University of Notre Dame, University of Florida-Jacksonville – Obstetrics and Gynecology, Jacksonville, FL
Hawkins, Yolanda (Des Moines, Iowa), Florida A & M University, Jackson Memorial Hospital – Psychiatry, Jacksonville, FL
Hervey, Sheleika Linette (Duncanville, Texas), Stanford University, Duke University Medical Center – Medicine, Durham, NC
Huang, Erich S. (Durham, North Carolina), Harvard University, Duke University Medical Center – Surgery, Durham, NC
Ibom, Valerie K. (Columbus, Ohio), The Ohio State University, Greater Baltimore Medical Center – Medicine Preliminary, Baltimore, MD, University of Texas, MD Anderson Cancer Center – Radiation Oncology, Houston, TX
Jan, Farhana (Exton, Pennsylvania), Massachusetts Institute of Technology, University of Cincinnati – Medicine Preliminary, Cincinnati, OH, University of Cincinnati – Dermatology, Cincinnati, OH
Johnstone, Erica Boiman (Lake Forest, Illinois), Yale University, Duke University Medical Center – Obstetrics and Gynecology, Durham, NC
Kao, James Chiming (Loveland, Ohio), Duke University
Khalatbari, Dara (Houston, Texas), Vanderbilt University, Lenox Hill Hospital – Medicine Preliminary, New York, NY, Wills Eye Hospital – Ophthalmology, Philadelphia, PA

Kim, Luke (Baltimore, Maryland), Johns Hopkins University, Cornell University – Medicine/Research, New York, NY

Lee, Shelly Tina (Yacaipa, California), Harvard University, Duke University Medical Center – Medicine Preliminary, Durham, NC

Linden, Diane Carol (Los Angeles, California), Middlebury College, University of California San Fernando Valley – Medicine Preliminary, Los Angeles, University of Southern California – Radiation Oncology, Los Angeles, CA

Louie, Gregory Brandt (West Vancouver, BC, Canada), Stanford University, Duke University Medical Center – Medicine – Preliminary, Durham, NC, Stanford University – Diagnostic Radiology, Stanford, CA

Lucas, Cher R. (Spokane, Washington), Dartmouth College, Virginia Mason – Medicine – Preliminary, Case Western – University Hospitals of Cleveland – Dermatology, Cleveland, OH, Dermatology

Maercks, Rian (Miami, Florida), University of Florida, University of Cincinnati – Plastic and Reconstructive Surgery, Cincinnati, OH

McDade, Henry Cooper (Durham, North Carolina), North Carolina State University, Mountain Area Health Education Center – Family Medicine, Asheville, NC

McGirt, Laura Y. (Dhahran, Saudi Arabia), Duke University, Johns Hopkins – Medicine, Baltimore, MD

McGirt, Matthew J. (Charlotte, North Carolina), Duke University, Johns Hopkins – Neurological Surgery, Baltimore, MD

McLean, Kia Maureen (Silver Springs, Maryland), Stanford University, University of Pittsburgh – Plastic Surgery, Pittsburgh, PA

Melgiri, Narayan D. (Houston, Texas), Rice University

Merchant, Faisal Majid (Atlanta, Georgia), Emory University, Massachusetts General Hospital – Medicine, Boston, MA

Meyer, Laura Tamiko (Whitefish Bay, Wisconsin), Harvard University, Carillon Health System – Transitional, Roanoke, VA, Duke University – Radiology, Durham, NC

Miller, Aaron Samuel (Norfolk, Virginia), Duke University, Yale – Pediatrics, New Haven, CT, Pediatric Infectious Diseases

Molino, Arlene Cecelia dela Cruz (Chicago, Illinois), Northwestern University, MacNeal Hospital – Transitional, Chicago, IL, University of Chicago – Dermatology, Chicago, IL

Morgan, Marcello (Maysville, North Carolina), Harvard University, McGill University – Anatomic Pathology, Montreal, Quebec, Canada

Odom, Audrey R. (High Point, NC), Duke University, University of Washington – Pediatrics, Seattle, WA, Academic Pediatrics

O’Halloran, Elizabeth Kendall (Spokane, WA), The University of Chicago, Duke University Medical Center – Otolaryngology, Head & Neck Surgery, Durham, NC

Onigkeit, James E. (Cleveland, Ohio), University of Miami, Mayo Clinic – Anesthesiology, Rochester, MN

Palestrant, Daniel (Phoenix, Arizona), Johns Hopkins University, Beth Israel Deaconess – Surgery, Boston, MA, Transplant Surgery

Palker, Todd (Kings Park, New York), University of Virginia, New York Presbyterian Hospital – Cornell, New York, NY

Pernell, Chris Tonya (East Orange, NJ), Princeton University, UCLA School of Medicine – Surgery, Los Angeles, CA, Neurosurgery

Phelps, Benjamin Ryan (Denison, Texas), University of Texas – Austin, University of California-San Francisco – Pediatrics, San Francisco, CA

Phillips, Katie M. (Midland, Michigan), University of Michigan, Duke University Medical Center – Medicine, Durham, NC, General Medicine

Prempeh, Maxwell (Maplewood, New Jersey), Duke University, Duke University Medical Center – Medicine, Durham, NC

Rauscher, Frederick Michael (Griffith, Indiana), Indiana University, University of Hawaii – Transitional, Honolulu, HI, Bascom Palmer Eye Institute/University of Miami – Ophthalmology, Miami, FL

Ray, Gregory Thomas (Cary, North Carolina), University of North Carolina, Duke University Medical Center – Pathology, Durham, NC

Reynolds, Christopher (Rochester, New York), Duke University, University of North Carolina – Emergency Medicine, Chapel Hill, NC

Rimel, B.J. (Fayetteville, North Carolina), University of Rochester, Northwestern University – Obstetrics and Gynecology, Chicago, IL

Rineer, Craig Andrew (Mount Joy, Pennsylvania), University of Pennsylvania, Harvard Combined Programs – Orthopaedics, Boston, MA

Ruiz de Luzuriaga, Brian Calado (West Chester, Ohio), The Ohio State University

Sair, Harris Iqbal (Yokohama, Japan), Duke University, University of Virginia – Roanoke Salem Campus – Medicine Preliminary, Roanoke, VA, Temple University – Radiology, Philadelphia, PA

Schoennecker, Jonathan G. (St. Louis, Missouri), Middlebury College, Vanderbilt University – Orthopaedics, Nashville, TN

Schweigler, Lisa Margaret (Washington, District of Columbia), Harvard University, University of Michigan Hospitals – Emergency Medicine, Ann Arbor, MI

Serlin, Scott B. (Durham, North Carolina), Texas A&M University, St. Joseph’s Hospital – Medicine – Preliminary, Phoenix, AZ, University of Texas-Houston – Radiology, Houston, TX

Stewart, Laura Evelyn (Knoxville, Tennessee), Vanderbilt University, Duke University Medical Center – Pathology, Durham, NC

Stohr, Bradley Alden (Sacramento, California), Swarthmore College, University of California-San Francisco – Pathology, San Francisco, CA

Sturm, Jesse J. (West Hartford, Connecticut), Duke University, Johns Hopkins – Pediatrics, Baltimore, MD

Thomas, Lisa-Gail (May Pen, Jamaica), University of Miami, Duke University Medical Center – Medicine, Durham, NC

Tiku, Angali Prya (Raton, New Mexico), Duke University, University of Pennsylvania – Medicine, Philadelphia, PA

To, Kathleen Binh (Alhambra, California), University of California-San Diego, Loma Linda University – Surgery, Loma Linda, CA

Toomayan, Glen A. (Palisades Park, New Jersey), Duke University, Duke University Medical Center – Orthopaedics, Durham, NC

Townsend, Brent Archibald (Tulsa, Oklahoma), Harvard University, Moses Cone Hospital – Medicine – Preliminary, Greensboro, NC, Brigham & Women’s Hospital – Radiology, Boston, MA

Tseng, Timothy Yu-Ting (Houston, Texas), Harvard University, Duke University Medical Center – Urology, Durham, NC

Walton, Geoffrey Brant (Raleigh, North Carolina), North Carolina State University, Stanford University – Surgery – Preliminary, Stanford, CA, Stanford University – Anesthesiology, Stanford, CA

Wang, Caroline Angela (Houston, Texas), Rice University, Duke University Medical Center – Medicine, Durham, NC

Wang, David William (Corpus Christi, Texas), Rice University, Duke University Medical Center – Orthopaedics, Durham, NC

Wang, Emily (Houston, Texas), Harvard University, University of California-San Francisco – Medicine, San Francisco, CA

Wickham, Michael Quinn (Raleigh, North Carolina), Duke University, Duke University Medical Center – Orthopaedics, Durham, NC

Wirk, Shaheen A. (Beaver Creek, Ohio), Duke University, Bridger Capital, Equity Analyst, New York, New York

Wood, Jr., William Allen (Newport Beach, California), Harvard University, Harvard University – Medicine/ Pediatrics, Boston, MA

Wright, Tarra (Lubbock, Texas), Texas Tech University, Duke University Medical Center – Transitional/ Ophthalmology, Durham, NC

Yesus, Ambeshie (Clarksville, Indiana), Yale University, University of Southern California – Medicine, Los Angeles, CA

Zamah, Alberuni Musa (Shawnee, Kansas), Rice University, Stanford University – Obstetrics and Gynecology, Palo Alto, CA

Doctor of Physical Therapy Division



Doctor of Physical Therapy Division

The Profession of Physical Therapy

Doctors of Physical Therapy (DPT) apply the knowledge of the basic sciences to the prevention and treatment of movement dysfunction resulting from disease or injury. The physical therapist screens, examines, evaluates, diagnoses, prognoses, and provides interventions across the life span. Patient interventions are focused on prevention of dysfunction, relief of pain, improvement of strength, endurance, flexibility, coordination, and joint range of motion in order to maximize functional potential. The variety of settings in which a physical therapist may work includes hospitals, outpatient clinics, schools, skilled nursing facilities, rehabilitation centers, sports facilities, home care agencies, and corporate businesses. With experience, additional education, and board certification, the physical therapist may choose to specialize in orthopaedics, pediatrics, neurology, cardiopulmonary, sports physical therapy, clinical electrophysiology, women's health, and geriatrics. Beyond clinical practice, physical therapists may also pursue roles in education, research, and administration.

Mission Statement of the Doctor of Physical Therapy Division

The mission of the Doctor of Physical Therapy Division is to prepare Doctors of Physical Therapy, who by virtue of their critical thinking ability, clinical skills, diagnostic competence, ethical standards, and moral character are recognized experts in the diagnosis and management of neuromusculoskeletal function across the continuum of care, and who will serve their patients as primary clinical care practitioners, promoting the optimum health and function of their clients and society.

By pursuing this mission with vision and integrity, these leaders in the profession will seek to engage the mind, elevate the spirit, and stimulate the highest effort of all who are associated with the Doctor of Physical Therapy Division through education, practice, and research.

Doctor of Physical Therapy Curriculum

The Duke University Medical Center Doctor of Physical Therapy curriculum is a graduate professional degree program for entry into the profession of physical therapy. Upon successful completion of both didactic and clinical components of the curriculum, the student is awarded the Doctor of Physical Therapy (DPT) degree. The three year full-time program, located in the medical center, provides a comprehensive foundation in the art and science of physical therapy, preparing graduates to serve as primary clinical care practitioners for patients with neuromusculoskeletal dysfunction, throughout the continuum of care. The DPT program at Duke University has received full accreditation status from the Commission on Accreditation of Physical Therapy Education of the American Physical Therapy Association, and has offered an accredited educational program for physical therapists since its inception in 1943.

Faculty

Chief: J. K. Richardson, PT, PhD, OCS

Director of Graduate Studies: Daniel E. Erb, PT, PhD

D. Bongiorno, PT, MS; L. Case, PT, MS, PCS; R. Crouch, PT, MS; D. Dore, EdD, PT, MPA; C. Figuers, PT, EdD; J. Gwyer, PT, PhD; E. Hegedus, PT, DPT, OCS; L. Lawrence, PT, MS; C. Odom, PT, DPT, ATC; R. Richardson, PT, MEd; M. Riordan, PT, MS; W. Roy, III, PT; K. Shipp, PT, PhD; A. Taylor, PhD; K. Varvel, PT, MPH; L. White, PhD; T. Worrell, PT, EdD, SCS, ATC, FACSM.

Program of Study. The curriculum is comprised of 126 credits of academic work, completed over eight academic semesters, requiring 33 months of full-time attendance. Course work includes didactic courses in basic sciences, clinical sciences, patient management, research, administration, education, and two five-month clinical internships. The clinical in-

ternships are conducted in selected practice sites in North Carolina and across the country. Two elective courses and a required research project provide opportunity for the student to pursue areas of physical therapy throughout the entire scope of practice.

Curriculum. The curriculum is presented in an integrated format, such that successful completion of all courses in each semester is required prior to progressing on to the next semester.

Year One

Fall Semester

PT-D-301. Human and Clinical Anatomy	5 credits
PT-D-302. Palpation	1 credit
PT-D-303. Histology, Embryology and Tissue Biomechanics	3 credits
PT-D-304. Human Development	2 credits
PT-D-305. Physical Therapist Interventions I	3 credits
PT-D-306. Practice Management/ Health Service Delivery	2 credits
PT-D-307. Movement Sciences I/Biomechanics	3 credits
PT-D-308. Clinical Experience I	1 credit
Total	20 credits

Spring Semester

PT-D-311. Neurosciences	4 credits
PT-D-312. Pathology	3 credits
PT-D-313. Physical Therapist Interventions II	4 credits
PT-D-314. Integumentary Practice Management	2 credits
PT-D-315. Cardiovascular and Pulmonary Practice Management	3 credits
PT-D-316. Clinical Examination, Evaluation, Diagnosis and Prognosis	3 credits
PT-D-317. Evidence-based Practice I	3 credits
PT-D-318. Clinical Experience II	1 credit
Total	23 credits

Summer Semester

PT-D-321. Movement Science II/Motor Control	2 credits
PT-D-322. Arthrological and Pathological Movement Science I	3 credits
PT-D-323. Diagnostic Imaging	3 credits
PT-D-324. Musculoskeletal Practice Management I	4 credits
PT-D-325. Medical Practice Management	3 credits
PT-D-326. Physical Therapist Interventions III	3 credits
PT-D-327. Patient/Client Management Seminar I	2 credits
PT-D-328. Clinical Internship I	1 credit
Total	21 credits

Year Two

Fall Semester

PT-D-402. Arthrological and Pathological Movement Science II	3 credits
PT-D-403. Musculoskeletal Practice Management II	4 credits
PT-D-404. Neurological Practice Management I	5 credits

PT-D-405. Evidence-based Practice II	3 credits
PT-D-406. Patient/Client Management Seminar II	2 credits
Total	17 credits

Spring Semester (8 weeks)

PT-D-411. Psychosocial Aspects of Care	2 credits
PT-D-412. Neurological Practice Management II	5 credits
PT-D-413. Educational Theory and Practice	2 credits
PT-D-414. Administration I	3 credits
PT-D-415. Patient/Client Management Seminar III	2 credits
Total	14 credits

Spring/Summer Semester (20 weeks)

PT-D-416. Clinical Internship II	4 credits
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Year Three

Fall Semester (8 weeks)

PT-D-501. Clinical Pharmacology and Nutrition	2 credits
PT-D-502. Administration II	3 credits
PT-D-503. Primary Care Practice	3 credits
PT-D-504. Practice Elective I	3 credits
PT-D-505. Practice Elective II	3 credits
Total	14 credits

Fall/Spring Semester (20 weeks)

PT-D-506. Clinical Internship III	4 credits
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Spring Semester (6 weeks)

PT-D-507. Professional Practice, Development and Evaluation	3 credits
PT-D-508. Evidence-based Practice III	3 credits
PT-D-509. Health Promotion and Injury Prevention	3 credits
Total	9 credits

In addition to the above courses, students must successfully complete written and practical comprehensive examinations as part of PT-D-507, and a research project as part of PT-D-508.

Program Policies and Grading Standards. Enrolled students should reference the *2003-2006 DPT Student Handbook* for detailed program policies. Graduate students in the Doctor of Physical Therapy degree program are participants in a professional educational program whose graduates assume positions of responsibility as primary clinical care practitioners in health practice. Accordingly, students are evaluated on their academic and clinical performance and also on their interpersonal communication abilities, their appearance and professional conduct. [Deficiencies in any of these areas are brought to the student's attention in the form of a written evaluation, and failure to correct these performance issues may result in probation, suspension or expulsion from the program.]

Academic Progression and Requirements for Graduation. The faculty of the Doctor of Physical Therapy Division accept responsibility for monitoring the academic progress of each student enrolled in the program. The following policy describes the standards by which

satisfactory academic progress will be assessed, the determination of academic standing, and the requirements for successful completion of the Doctor of Physical Therapy degree.

I. Standards of Academic Progress

A. Grades

1. Didactic Courses

For all didactic courses in the curriculum, the following grading system will be used:

A = 90 – 100 percent

B = 80 – 89 percent

C = 70 – 79 percent

F = 69 percent or below

I = Incomplete

2. Clinical Courses

For Clinical Education Experiences I and II (PT-D 308 and 318) and for the Clinical Internship I (PT-D 328), the following grading system will be used:

P = Pass

F = Fail

I = Incomplete

For the Clinical Internship II and III (PT-D 416 and PT-D 506), the following grading system will be used:

A = 90 – 100 percent

B = 80 – 89 percent

F = Fail

I = Incomplete

Clinical Internship II and III will be graded on the letter grade scale of *A* or *B*. Students must have a grade of *A* or *B* to successfully complete the Clinical Internship. A grade of *F* will result in the requirement to repeat the internship. Students may only repeat an unsuccessful internship one time. If the student is unsuccessful in the repeat attempt, they will receive a failing grade and will be dismissed from the program. The student may appeal their dismissal from the program by notifying the chief in writing, as to why they believe an appeal is warranted. Repeat residencies are scheduled at the discretion of the chief and academic coordinator of clinical education.

3. Incomplete Grades

A grade of *I* Incomplete is given when, at the time the grades are reported, some portion of the student's work in a course is lacking *for an acceptable reason, such as inability to attain sufficient mastery of the course content without additional study due to illness or impairment*. Incomplete grades may be given at the instructor's, chief's, or director of graduate studies' discretion, with the approval of the Committee on Academic Performance for the following reasons:

- A. Documented student illness that prevents the student from completing the required work in the semester in which the course is offered.
- B. Illness of the student's immediate family member(s), which prevents the student from completing the required work in the semester in which the course is offered.
- C. A student who selects alternative or additional unplanned learning experiences that will impede his/her ability to complete course work in the semester in which the course is offered. Examples of such opportunities

include: acceptance of a Fulbright Grant, Rhodes Scholarship, or other academic award, or participation in the Olympics or Pan American Games.

- D. A student who requires maternity or paternity leave or time to provide elder care.

A grade of Incomplete may not be given to a student for the sole purpose of providing additional time so the student may elevate a course grade. Instructors who elect to give a student an *I* grade are committing themselves to perform the additional instruction/evaluation required for the student to complete the course within one calendar year. *I* grades remain on the transcript with the earned grade added later.

The course instructor will determine the manner in which the *I* grade will be converted to an earned grade. The instructor who gives an *I* for a course specifies the date by which the student must have made up the Incomplete, but in no case will this exceed more than one calendar year from the date the course ended or prior to matriculation into a clinical internship. Incomplete grades which are not satisfied within one calendar year automatically become grades of *F*–Fail. If an extension to this time limit is required, an appeal in writing must be made to the chief just prior to expiration of the calendar year in which the Incomplete grade must be completed. When the faculty member certifies that an Incomplete has been satisfied, a passing grade is placed alongside the Incomplete on the permanent and official transcript.

If a student's grade in a course that contains specific subunits is passing, but one or more subunits have been failed, the student will receive a grade of *I* in the course and must complete remedial work in order to earn a passing grade in the course.

4. Failing Grades

- A. A grade of *F* Fail is recorded on the permanent record of a student by the registrar upon submission by the faculty member that unsatisfactory work has been performed by the student. Failures will not be erased from the permanent record, and will result in immediate withdrawal from the Doctor of Physical Therapy Program. However, the student may appeal this withdrawal by indicating in writing to the chief (a) reasons why the student did not achieve minimum academic standards and (b) reasons why the student's immediate withdrawal should be changed. A student may continue to matriculate in courses until the decision of the appeal is determined. The chief will notify the student of the appeal decision in writing within three weeks of receipt of the appeal. All appeals must be mailed to the chief via United States Postal Service Certified Mail.

- B. Progression

Normally, all first year courses must be satisfactorily completed before a student may enroll in the second year courses, and all second year courses must be satisfactorily completed before a student may enroll in the third year courses. (When requested by the student, altered sequences for students who require remediation may be considered for approval by the faculty, and the chief.)

II. Determination of Academic Standing

All students' records are reviewed periodically by the faculty, and each student is assigned to one of the following categories of Academic Standing.

- A. Good Academic Standing

The student is considered to be in Good Academic Standing if they maintain an overall, cumulative, grade point average of 3.0 or higher, and "Pass" for Clinical Experiences or Clinical Internship I for all courses attempted. The student cannot receive less than a grade of *C* in any course attempted.

B. Academic Probation

Academic probation is an academic standing that indicates concern about the student's performance in the curriculum. By placing the student on academic probation, the student is notified of the faculty's concern regarding past performance. The student also is informed that future performance must improve or the student risks withdrawal from the program. In these instances, the director of Graduate Studies will notify the registrar that the student is being placed on academic probation.

When a student is placed on academic probation, they remain in this academic standing until the student either improves their grade point average to an overall cumulative grade point average of 3.0 or better, or is withdrawn from the program. A student who is currently on Academic Probation must achieve a cumulative grade point average of 3.0 or better in the next consecutive semester or will be withdrawn from the program.

The director of Graduate Studies will notify the student that their performance will be evaluated at the end of each succeeding semester, and that future poor performance may occasion withdrawal from the program (see following section).

The faculty of the Doctor of Physical Therapy Division will use the following standards for assigning the status of academic probation.

1. A student will be considered to be on Academic Probation if their cumulative grade point average is 2.99 or less.
2. A student who successfully appeals a grade of *F* in one course in the curriculum will be considered to be on Academic Probation. (See Withdrawal below).
A student who has been placed on Academic Probation may require remedial work to rectify their weakness. Such remediation will be determined by the chief, advised by the faculty, and communicated to the student in writing by the director of Graduate Studies, and may entail additional costs for the student.

C. Withdrawal

A student who fails to demonstrate successful academic progress will be withdrawn from the program.

The faculty of the Doctor of Physical Therapy Division will use the following standards for withdrawing a student from the program.

1. A student will be asked to Withdraw following the attainment of a grade of *F* Failure in one course in the curriculum. The student may appeal this withdrawal as described under the section, "Failing Grades."
2. A student who is currently on Academic Probation will be asked to Withdraw following the attainment of a cumulative grade point average of 2.99 or less in a second consecutive semester.

III. Appeals of Academic Status (Academic Probation or Withdrawal)

A student placed on Academic Probation or Withdrawn from the program may appeal by indicating in writing to the chief: (a) reasons why the student did not achieve minimum academic standards, and (b) reasons why the student's academic standing should be changed. Each appeal will be considered on its merit. Individual cases will not be considered as precedent. The chief will notify the student of the decision on the appeal in writing within three weeks of receipt of the appeal. All appeals must be mailed to the chief via United States Postal Service Certified Mail.

IV. Requirements for Graduation

A. Academic Standards for Graduation

The following standards must be met by the student to successfully complete the Doctor of Physical Therapy degree program.

1. Completion with a passing grade of a minimum of 126 units of course credit, including all required courses. This includes the successful completion of a research requirement and of all clinical education courses.
 2. Passing of all Practical Examinations administered by the faculty, and passing a written Comprehensive Examination with a grade of 70 percent or better.
- B. Time Limits on Meeting Requirements for Graduation
1. The standard required length of study to complete the above-listed academic standards is eight continuous academic semesters of full-time work (including two summer terms), completed in 33 calendar months.
Under extraordinary conditions, a student may be permitted a time limit of two semesters of full or part-time enrollment beyond the standard required length of study to complete the program. The student must apply in writing for such consideration to the chief who will review each case.
 2. The student is expected to make continuous and successful progress towards the requirements for graduation throughout the curriculum. The student must register for all required courses during each semester of the curriculum, and may carry into succeeding semesters no more than one *I* course grade. Under extraordinary circumstances, a student may apply for an exception to the typical pattern of progress towards degree requirements.
- C. Incomplete Mastery of Content
1. If a student successfully appeals a grade of *F* in a course and is permitted to continue in the curriculum, the instructor is not required to provide individual remediation to the student. In this case, the only plan for remediation is for the student to retake the course in the semester in which it is normally given. The student will bear all financial implications of repeated course work. All remediation efforts must be completed within the above-outlined time limits for completion of the program, or a grade of *F* Fail will remain on the student's permanent record.
 2. If a student achieves a failing grade (less than 70 percent) on the Comprehensive Examination, a specific remediation plan for the student will be developed. This remediation may involve retaking the entire examination, a portion of the examination, a new examination, or other performance evaluation as determined by the faculty.
 3. The remediation plan will be developed within two weeks of the date of the Comprehensive Examination and will be conducted at a date mutually agreeable to the student and the director of Graduate Studies, but no later than 4 weeks following the date of the original examination. If the student is unsuccessful in a second attempt to pass the Comprehensive Examination with a passing grade of 70 percent or greater, the student will be dismissed from the program.

Attendance and Excused Absences. Students are expected to attend all classes and clinical internship hours, and are excused only for illness or personal emergency. The chief may approve a student's written request for a Leave of Absence for personal, medical, or academic reasons, for a period not to exceed one year. Written notification of the approved time frame of the leave of absence to the student, the registrar, and the director of financial aid will be provided. The student must provide written notification of their intent to return to the program at least 90 days prior to the anticipated date of re-entry. The student requesting an extension beyond one calendar year may be required to apply for readmission to the program, and/or to repeat some or all course work. For purposes of deferring repayment of student loans during a school-approved leave of absence, federal regulations limit the leave to six months.

Prerequisites for Admission. Requirements for admission to the Doctor of Physical Therapy Division include a baccalaureate degree, completion of prerequisite courses, Graduate Record Examination (GRE) Aptitude Test scores from within the last five years, the filing of an application (including essays and reference letters), and upon invitation, a personal interview. The GRE must be taken no later than the November test date.

Prerequisite course work: 3 semester hours of biological sciences (recommended courses include embryology, histology, microbiology), 3 semester hours of cell biology or molecular biology, 3 semester hours of human anatomy, 3 semester hours of human physiology, 6 semester hours of chemistry, 6 semester hours of physics (including principles of light, heat, electricity, mechanics, and sound), 3 semester hours of statistics, 6 semester hours of psychology (recommended courses include abnormal psychology, child, or developmental psychology), and 9 semester hours of humanities/social sciences (recommended courses include scientific and technical writing, and social anthropology). Human anatomy and human physiology courses must be completed within five years of the date of the application. All prerequisite courses must be completed with a grade of C or better. No prerequisite credit can be given to courses showing a Pass/Fail grade. A baccalaureate degree in the natural sciences is not a requirement for admission; however, a background of coursework in the natural sciences is strongly recommended.

Application Procedures. Application materials are available from July through December 1 each year, and may be obtained by writing: Admissions Secretary, Duke University Medical Center, Doctor of Physical Therapy Division, DUMC, Box 3907, Durham, NC 27710, (919) 681-4380. The application and all supporting documents must be post-marked no later than December 1 of the year preceding admissions. The application must be received in the department within 14 days of the December 1 postmark. The application fee is \$75. An early application deadline of November 1 will require a reduced application fee of \$65. Fall semester transcripts containing any prerequisite course work must be submitted as soon as they are available. Only students for full-time study are accepted. State residence does not influence admissions policies or tuition costs.

Web-based application is available, and we encourage applicants to complete an electronic application, located at http://dukehealth.org/healthcare_professionals/dpt.

Tuition and Expenses. The faculty of the Doctor of Physical Therapy Division practice a "need-blind admissions process," with adequate financial aid for those students with financial need. The tuition for the 126 credits of the program is budgeted in three annual payments of 42 credits/year. The approved costs will be available from the Office of Financial Aid in May prior to admissions in the fall. Detailed student budgets are provided for all interviewed applicants.

Financial Aid. Qualified applicants may be eligible for federal educational loan programs or institution-based loans. A small amount of need-based scholarship awards is available for selected matriculated students. Financial aid information is available for all interested applicants by contacting the Office of Financial Aid, Box 3067, Duke University Medical Center, Durham, NC, 27710, or at the School of Medicine's Office of Financial Aid website: <http://finaid.mc.duke.edu/>.

Courses of Instruction

PT-D-301. Human and Clinical Anatomy. This course is devoted to the study of regional gross structure and function of the human body. The emphasis is on the relationship between structure and function of the neuromusculoskeletal system and the clinical implications of dysfunction. The student is also introduced to clinical problem identification through discussion of the anatomical bases for somatic dysfunction.

PT-D-302. Palpation. This course is devoted to the study of surface anatomy and palpation of the human body. The emphasis is on the location of important regional and local bony and soft tissue structures, including bony landmarks, joint spaces, muscles, ligaments, bursae, nerves and vessels, and the demonstration of appropriate palpation techniques. This course is coordinated with PT-D 301, Human Clinical Anatomy.

PT-D-303. Histology, Embryology and Tissue Biomechanics. This course covers tissue structure and major function of the cells and tissues of the body. Topics in this course include: structure and function of the cells and tissues of the body, tissue diversity, histology of major organs, basic cellular anatomy, developmental biology/embryology, cell structure, function, cell diversity, and cell communication. The course covers topics of embryology from conception through birth. The course also presents the basic science of tissue biomechanics and the response of muscle, bone, joints, and soft tissue to disease and injury. The normal repair process and the effects of the physical therapist's interventions including rest, stress, stretch, resistance, immobilization, and work are discussed. Complications and benefits of interventions, the effects of nutrition, aging, exercise, and immobility are discussed.

PT-D-304. Human Development. This course covers human development from birth to death, including its physical, psychological, social, and economic aspects. Emphasis in the course is on physical development. The course highlights the diversity of development among individuals and cultures.

PT-D-305. Physical Therapist Interventions I. In this course students will be introduced to a variety of basic physical therapy skills. Early observation, communication, teaching and safety procedures, including body mechanics and universal precautions, are covered. Emphasis is placed on psychomotor performance including transfers, gait training, positioning, bandaging, and basic patient handling skills. Medical terminology is introduced and vital signs assessment is taught. Basic, but complete, competencies in goniometry and Manual Muscle Testing are expected.

PT-D-306. Practice Management/Health Service Delivery. This course will orient the student to the role and function of the physical therapist in contemporary health care with an awareness of ethical principles, historical foundations of the profession, current health care issues, and health economics. The course introduces the patient management model in physical therapy including patient examination, evaluation, diagnosis, prognosis, intervention, and outcomes. It will include a discussion of practice policies, models of disability, models of clinical decision-making, and documentation. Students will develop initial skills in patient interviewing and note writing.

PT-D-307. Movement Science I/Biomechanics. This course addresses basic concepts relating to the architectural design and function of synovial and non-synovial joints, the morphology and function of skeletal muscle, observational joint and movement analysis, anthropometry, and biomechanical force systems. Free body diagrams as well as trigonometric and algebraic functions are used to solve biomechanical problems related to physical therapy practice. Emphasis is on static analysis of both stationary and moving bodies.

PT-D-308. Clinical Experience I. This course will serve as the initial entry point into the clinical environment. A variety of patient types and settings will be observed during four full-day (eight hour) experiences. Emphasis will be placed on integrating didactic information and developing psychomotor skills in the clinical setting. Students will also be exposed to a variety of professional practice issues and roles of physical therapists. Licensed clinical and/or academic faculty will provide direct supervision of the students. The supervisory model for this experience will not exceed 4 students : 1 clinical instructor.

PT-D-311. Neurosciences. This course covers the anatomy and physiology of the nervous system. The student is introduced to concepts and terminology. Detailed neuroanatomy of the peripheral and central nervous system is presented. The neurophysiological basis of motor control is addressed, including sensory and motor systems, memory, cognition, and neural plasticity. Lectures, laboratory exercises, and problem-solving sessions are included.

PT-D-312. Pathology. In this course, an introduction to diseases commonly seen in patients receiving physical therapy will be presented. Body responses to injury and disease will be traced from the cellular level to the systems level. Typical disease processes in these areas are covered: pulmonary, cardiac, neurological, infectious, genetic, immunosuppressive, metabolic, and metastatic.

PT-D-313. Physical Therapist Interventions II. This course covers strategies and techniques to manage pain, edema, loss of normal motion, tissue dysfunction, and weakness through direct interventions. Interventions include: strength training, stretching, soft tissue mobilization, and exercise training. The effects of exercise across the lifespan are discussed.

PT-D-314. Integumentary Practice Management. This course will present the practice management model for patients with pathology or impairment of the integumentary system. The role of the physical therapist as a primary care practitioner in examination, evaluation, and intervention will be stressed. The continuum of impairment of functional limitation to disability will be presented.

PT-D-315. Cardiovascular and Pulmonary Practice Management. This course gives an overview of the related pathologies of the cardiovascular and pulmonary system, examination and evaluation procedures, diagnostic procedures, goal setting, interventions, and patient management. A major focus of this course is laboratory sessions applying cardiovascular and pulmonary evaluation and intervention procedures such as airway clearance and exercise testing. This course covers the principles of training, exercise, and health promotion related to the cardiovascular and pulmonary systems.

PT-D-316. Clinical Examination, Evaluation, Diagnosis and Prognosis. This course gives students skill in observation, communication, gross screening of posture, gait, function, integument, neurological, and musculoskeletal status. Additionally, students acquire skill in specific examination of flexibility, joint range (goniometry), anthropometric measures, and muscle strength (MMT). This course further provides opportunity for students to integrate material in determining patient problems and establishing an initial plan of care.

PT-D-317. Evidence-based Practice I. In this course, students will be introduced to the science of clinical reasoning in health care and physical therapy, and the integration of clinical reasoning and evidence-based practice will be developed. Students will then learn how to access knowledge for practice, and will learn the methods of scientific inquiry, including research theory, design, methods, and measurement. Students will read research literature weekly and participate in a critical appraisal of the selected research methods and the meaningfulness of the findings for clinical decisions.

PT-D-318. Clinical Experience II. This course will continue to reinforce principles learned throughout the program to date. Under the guidance of licensed clinical faculty, students will integrate concepts, principles, and techniques with emphasis on interventions learned during the first spring semester. The structure of this phase of clinical education will consist of four full days in the clinic. The focus will be on the practice areas of cardio-pulmonary and integumentary care. Students will spend two consecutive days in each of the above practice areas where they can experience and learn how physical therapists function in these environments. The supervisory model for this experience will not exceed 3 students: 1 clinical instructor.

PT-D-321. Movement Science II/Motor Control. Current concepts of motor control and motor learning are synthesized from multiple disciplines to provide a framework for physical therapy practice. Neurological mechanisms are examined and integrated with other physiological, psychological, and biomechanical contributions to movement and function. The role of task and environment in the control of movement is also analyzed.

PT-D-322. Arthrorological and Pathological Movement Science I. A critical examination of the morphology and function of the articulations of the axial skeleton and upper limb. Course content stresses normal musculoskeletal movement of each of the pertinent segments as well as the pathomechanics of selected trunk and upper limb musculoskeletal anomalies resulting from congenital malformations, bone and soft tissue injuries, or disease. The course exposes students to kinematic and kinetic analysis of selected movement patterns pertinent to clinical practice.

PT-D-323. Diagnostic Imaging. The study of the principles, procedures, and interpretation of diagnostic imaging techniques. Primary emphasis will be on plain film radiography of musculoskeletal injuries and conditions with secondary emphasis on computerized tomography scans, magnetic resonance imaging, bone scans, myelograms, and other nuclear medicine procedures.

PT-D-324. Musculoskeletal Practice Management I. This course is designed to expand the knowledge base of the student into the specialized area of Musculoskeletal Practice Management with emphasis on the cervical spine and upper extremities. Direct physical therapist intervention for patient examination, evaluation, diagnosis, prognosis, and intervention will be presented.

PT-D-325. Medical Practice Management. This final physical therapist intervention course will cover strategies and techniques to manage pain, edema, loss of normal motion, soft tissue dysfunction and weakness through direct interventions. Interventions include: basic exercise, soft tissue mobilization, relaxation, splinting and compression garments, athermal modalities, cryotherapy, deep thermal modalities, electrotherapeutic modalities, and hydrotherapy.

PT-D-326. Physical Therapist Intervention III. This course introduces students to an evidence-based approach to the use of therapeutic physical agents; that is, the literature that supports or refutes the use of each physical agent will be discussed. An algorithm is presented to facilitate accurate classification of the patient's impairments and functional limitations. In addition, the role of pain and joint effusion in inhibition of function is presented. Specifically, students will learn and understand the scientific bases of commonly used therapeutic physical agents in physical therapy practice. The physiological effect of each therapeutic physical agent will be discussed and specific reading will be available. Laboratory sections will require students to demonstrate specific competencies in the use of the agents. Students will use a case-study format to demonstrate the competency of the material.

PT-D-327. Patient/Client Management Seminar I. In this seminar course, students will expand on their ability to integrate knowledge from various content areas in the analysis of patient cases, and will further develop their skills in the integration of clinical reasoning and evidence-based practice. The seminar format will include presentation of written, video, computer, and live patient cases followed by discussion of diagnostic, prognostic, and intervention aspects of the case. Analysis and critique of cases will address the clinical and scientific information presented in each case, synthesis of the information, strength of the conclusions, areas needing further investigation, and issues regarding decision-making and intervention in the context of the current state of knowledge. An interdisciplinary format will be encouraged, with students required to attend and report back on 2-3 Medical Center Conferences / Grand Rounds as part of this course.

PT-D-328. Clinical Internship I. This first, full-time clinical experience will consist of a four-week learning experience in an inpatient setting, including: acute care, subacute, or skilled nursing. The focus of the experience will be the development of psychomotor skills, professional behaviors, gross and specific examination, and intervention procedures and documentation skills. Exposure to the multiple roles of the physical therapist will be emphasized (e.g., administration, case management, consultation). The student will be supervised by a licensed physical therapist. The supervisory model for this experience will not exceed 2 students : 1 clinical instructor.

PT-D-402. Arthrological and Pathological Movement Science II. The goal of this three-hour a week course is to learn and to understand the relationships of lower extremity arthrology to the normal, impaired, and pathological gait patterns. The course is composed of the following sections: 1) Hip and SI Joints, 2) Knee Joint, 3) Ankle and Foot Joints, 4) Normal Gait, 5) Impaired and Pathological Gait Patterns. Specifically, sections 2-5 will consist of lecture. Students will be prepared to discuss specific unit objectives and reading assignments for clarification as needed in "Discussion Sessions." Students will assume an active role in the "Discussion Session," as the instructor facilitates problem-solving and clarifications if needed. Laboratory sessions will require students to demonstrate specific competencies. Students will analyze video tapes of normal, impaired and pathological gait patterns.

PT-D-403. Musculoskeletal Practice Management II. This course is designed to expand the knowledge base of the student in the specialized area of Musculoskeletal Practice Management with emphasis on the thoracic spine, lumbar spine, pelvis and lower extremities.

PT-D-404. Neurologic Practice Management I. An introduction to management of children and adults with neuromuscular disorders is presented. Examination, evaluation, diagnosis, prognosis, and intervention is discussed. Peripheral neuromuscular (e.g., muscular dystrophy, brachial plexus injury) and spinal cord disorders (e.g., spinal cord injury, spina bifida) are included.

PT-D-405. Evidence-based Practice II. This course is comprised of two complementary sub-units. In the Analytical Basis of Inquiry sub-unit, students will learn the logic of hypothesis testing and specific statistical tests used for descriptive and inferential analysis of research data. Students will read research literature weekly and discuss the analytical approaches that support the research findings. In the Critical Appraisal of Evidence for Practice unit, students will build on their knowledge of research methods and learn to critically appraise the evidence for physical therapy practice by: developing an answerable clinical question, identifying the best research evidence, and assessing the quality of the evidence. In addition, epidemiological statistics that enhance the understanding of diagnostic tests and treatment options will be covered. In both units, students will use statistical software to build skills in data analysis with practice data sets.

PT-D-406. Patient/Client Management Seminar II. The goal of this two-hour a week seminar course is to learn the cognitive components and psychomotor skills required to perform a patient/client interview in the most efficient and valid manner. The class is divided into smaller group interactions and discussions. Students complete specific readings on the three components of the patient/client interview process. After students read the assignments, small group discussions will occur where the students actively explore the topics. Then, at the next class meeting, students practice the interviewing techniques while being video- or audio-taped. At the next class meeting, "Demonstration of Core Skills Lab," students demonstrate their mastery of the core skills practiced in the previous class while being

video- or audio-taped. Verbal critiques from the professor and peers will be provided. The final and midterm examinations will each consist of a 15-minute video-taped interview of a patient with a written self-critique that provides strategies to improve the student's own performance.

PT-D-411. Psychosocial Aspects of Care. In this course, students will survey the various factors affecting the patient, the family, and the physical therapist relationship in situations of chronic illness and loss. Students will increase skill in developing an effective helping relationship with other people. Experiential learning experiences and self-observation will be used to promote this development.

PT-D-412. Neurological Practice Management II. The study of management of children and adults with neuromuscular disorders is continued with emphasis on more complex CNS and multisystem disorders. Examination, evaluation, diagnosis, prognosis, and intervention are discussed. Both concepts and skills are addressed. Acquired injuries (e.g., cerebrovascular disease, traumatic brain injury), degenerative disorders (e.g., Parkinson's disease, multiple sclerosis) and congenital disorders (e.g., cerebral palsy) are included.

PT-D-413. Educational Theory and Practice. In this course, principles of teaching and learning will be introduced and applied to the health care setting. Students will learn to use a variety of teaching methods selected and developed for a specific audience. Students will formulate and implement a plan for facilitating personal behavioral change.

PT-D-414. Administration I. The study of administrative styles in the healthcare delivery system. Emphasis on management analysis in professional settings of hospitals, long term care facilities, home care, private practice, and community-based programs as related to business operations, budget development, and personnel management.

PT-D-415. Patient/Client Management Seminar III. In this course students will be introduced to the management of patients who require prosthetic or orthotic assistive devices. Students will complete readings outside of class and participate in problem-solving laboratories with patients who use these assistive devices. Additional case studies will be presented on patients with a variety of complex diagnoses, and students will analyze the clinical decisions that are crucial to each case.

PT-D-416. Clinical Internship II. This 20-week clinical internship may occur in varied settings under the supervision of a selected and trained clinical instructor, and following a written curriculum. The required focus of this clinical experience will be in either the musculoskeletal or neuromuscular practice areas. Under supervision, students will learn skills in all components of the physical therapy practice management model, including conducting patient examinations and evaluations, establishing patient diagnoses and prognoses, conducting patient interventions, and measuring patient outcomes. When possible, students will experience patients in these practice patterns who are across the range of acute to chronic conditions. Students will practice all administrative aspects of their professional roles during these internships, and will learn the components of safe, ethical, and efficacious practice. Performance expectations will include safe and effective examination, evaluation, diagnosis, prognosis, intervention, and patient management skills. Students will complete a variety of learning experiences during this internship related to patient care, teaching, and research. The maximum supervisory ratio for this course will be 2 student interns: 1 clinical instructor.

PT-D-501. Clinical Pharmacology and Nutrition. This course will introduce students to the basic principles of pharmacology and nutrition. Study of pharmacologic intervention and nutritional practices for patients commonly seen in physical therapy is included.

PT-D-502. Administration II. The study of various aspects of the operations of a business. Personnel aspects to be studied are: interviewing, negotiating, hiring, training, promot-

ing, and terminating personnel. Professional development and mentoring as related to quality practice will be emphasized. Business aspects will include development of new programs and services, problem-solving techniques, and quality improvement programs. Emphasis will be placed on customer service methodology.

PT-D-503. Primary Care Practice. This course explores the related concepts of direct access to physical therapy care, autonomous/independent physical therapist practice, and physical therapists in the roles of point-of-entry or primary care providers. Examples of direct access physical therapist practice in the United States are covered as well as the legal, political, ethical, and liability issues surrounding the concept of direct access.

This course is designed to allow the student to integrate the coursework and clinical experiences thus far in the curriculum in the context of the practice of physical therapy without physician referral. To that end, students apply the principles of screening for medical disease or conditions and decision-making regarding referral to a physician or another health care provider, when their examination and evaluation of a patient warrants this action via case examples and case presentations based on their own clinical experience. In addition, students are exposed to several complementary and alternative medicine (CAM) disciplines in order to increase their understanding of what type of care the patient may be receiving when being treated by a CAM practitioner.

PT-D-504/505. Practice Elective I and II. In these courses, students will choose two electives in which to deepen their knowledge base for practice. Practice electives will be offered in: pediatrics, geriatrics, orthopaedics, sports, cardiopulmonary, neurology, education, research, and administration.

PT-D-506. Clinical Internship III. This 20-week clinical internship may occur in varied settings under the supervision of selected and trained clinical instructors. The required focus of this clinical experience will be in either the musculoskeletal or neuromuscular practice areas, depending on the previously completed internship (PT-D-416). Under supervision, students will learn skills in all components of the physical therapy practice management model, including conducting patient examinations and evaluations, establishing patient diagnoses and prognoses, conducting patient interventions, and measuring patient outcomes. When possible, students will experience patients in these practice patterns who are across the range of acute to chronic conditions. Students will practice all administrative aspects of their professional roles during these internships and will learn the components of safe, ethical, and efficacious practice. Performance expectations will include safe and effective examination, evaluation, diagnosis, prognosis, intervention, and patient management skills. Students will complete a variety of learning experiences during this internship related to patient care, teaching, and research. The maximum supervisory ratio for this course will be 2 student interns: 1 clinical instructor.

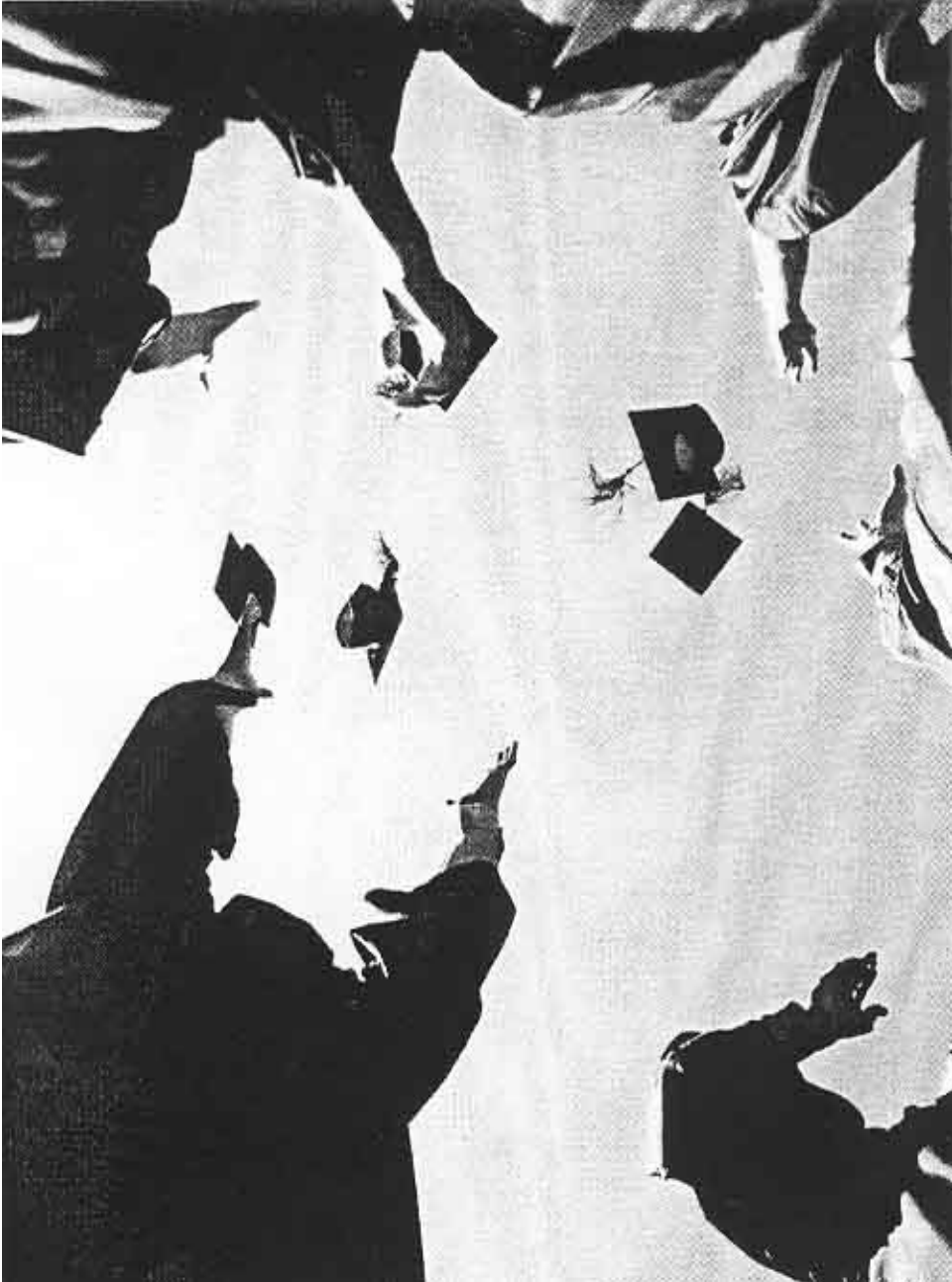
PT-D-507. Professional Practice Development and Evaluation. This course will require students to read about and discuss the concept of professionalism and interpret this concept for their own careers. Students will integrate the didactic, clinical, and research components of their experience in preceding course work, with the goal of evaluating their strengths and weaknesses for professional practice. Students will develop skills in self-assessment and planning for continuous professional development in five areas of physical therapy: teaching, research, administration, clinical practice, and service.

PT-D-508. Evidence-based Practice III. This course will provide students the opportunity to finalize their research or scholarly project in written form and complete a formal research presentation of their project results. The role of critical inquiry and evidence-based practice will be discussed, including the development of practice policies and the use of ev-

idence to support clinical decisions. Students will discuss strategies to change practice at the grass roots level and will develop a plan to foster their growth as scholarly practitioners.

PT-D-509. Health Promotion and Injury Prevention. In this course, the student will learn to identify and assess the health needs of individuals, groups, and communities through screening for prevention of injury, developing wellness programs, and triaging appropriate patients for physical therapy. The student will be able to design and execute programs to promote optimal health by providing information or consultation on many aspects of health risks and disability. The student will be exposed to a multidisciplinary approach to health promotion and injury prevention and will participate in an existing program.

Master of Health Sciences Degree Programs



The Clinical Leadership Program

MASTER OF HEALTH SCIENCES CURRICULUM

Department of Community and Family Medicine

Chairman: J. Lloyd Michener, M.D.

Program Director: Michelle J. Lyn, M.B.A., M.H.A.

Clinical Leadership Program Steering Committee:

Ruth Anderson, Ph.D., R.N., C; Steven J. Bredehoeft, M.D., M.P.H.; Mary T. Champagne, Ph.D., R.N.; Christopher Conover, Ph.D.; Susan D. Epstein, M.P.A.; Joseph S. Green, Ph.D.; Clark C. Havighurst, J.D.; J. Lloyd; Michener, M.D.; Gwendolyn Murphy, Ph.D., R.D.; Kevin A. Schulman, M.D., M.B.A.; Justine Strand, M.P.H., PA-C; Duncan Yaggy, Ph.D.

The Clinical Leadership Program is designed to provide clinicians with the skills necessary to become leaders within today's changing health care environment. The MHS-CL, offered through the School of Medicine's Department of Community and Family Medicine in collaboration with Duke's Fuqua School of Business, Law School, Terry Sanford Institute for Public Policy, and the School of Nursing provides a comprehensive core curriculum that includes, from a health delivery perspective, management theory, health care administration, financial management, economics, law, organizational behavior, informatics, quality management, and strategic planning.

Curriculum. The Clinical Leadership Program offers participants an unparalleled educational experience that addresses the many disciplines effective leaders must master and practice in health care administration: financial management, economics, law, organizational behavior, informatics, quality management, and strategic planning. Whether it is by leading a service-oriented integrated health system, rural practice, or community clinic, the factors for study and research (such as clinical integration, community outreach, and consumer empowerment) are a constant.

This 43 credit-hour, two-year professional degree program awarded by the Duke University School of Medicine allows participants to continue practicing in their profession

while attending courses on the Duke University campus. Those accepted into the program will complete a longitudinal policy project and a seminar experience that give students the opportunity to explore topics in more depth with a Duke University Health System leader outside the classroom setting. These experiences also allow the student to customize the program to meet individual needs.

Once accepted into the Clinical Leadership Program, students will move through the program as an integrated team. The cohort creates an exceptional peer learning experience which results in relationships that continue throughout one's professional and personal life. Shared experiences through team problem-solving and project collaboration form lasting professional and personal bonds. This can be one of the most rewarding outcomes of the program. The structure of the cohort enables classmates to start the program together and continue through the curriculum together. Because the class size is limited, students receive individual attention from faculty members.

Curriculum Sequence

Year One

Fall Semester

NUR 301 Population Based Approaches to Health Care	3
LAW 347 Health Care Law and Policy	3
CLP 200 Seminar	2
Total	8

Spring Semester

NUR 401 Dynamics of Management	3
NUR 402 Financial Management and Budget Planning	4
CLP 201 Seminar	2
Total	9

Summer Semester

PHYASST 250 Health Systems Organization	2
MEDINFO 233 Introduction to Medical Informatics	3
CLP 205 Project	3
CLP 202 Seminar	2
Total	10

Year Two

Fall Semester

CLP 206 Quality Management	3
CLP 207 Operational Management	3
CLP 203 Seminar	2
Total	8

Spring Semester

HLTHMGMT 326.401 Economics of Health Care	3
CLP 205 Project	3
CLP 204 Seminar	2
Total	8

Grand Total **43**

Prerequisites for Admission. The prerequisites for admission to the MHS in Clinical Leadership curriculum include:

1. A clinical degree such as MD, PA, NP, or the equivalent.

2. Three years post-training clinical experience or the equivalent.
3. Prior preparation in statistics. A list of course offerings as well as online/self-paced tutorials is provided for students who do not have such training.
4. Prior experience in budgeting.
5. Computer skills, including experience with: word processing, e-mail, spreadsheets, Internet research, and presentation programs. (All students in the MHS-CLP are required to have their own PC of Pentium class with Internet Access.)
6. Administrative experience desirable.

Admissions Procedures. Applicants seeking admission either as a degree candidate or as a non-degree participant should submit the application form and the following supporting documents.

1. Official transcripts from each post-secondary institution attended. Transcripts must be sent by the institutions attended directly to the Clinical Leadership Program. Personal copies are not accepted.
2. Three letters of recommendation, including one from an individual with direct knowledge of the candidate's clinical experience and one from someone with direct knowledge of the candidate's administrative experience. All letters should be written by persons who are qualified to testify to the candidate's capacity for graduate work. The provided evaluation forms should be mailed to the Clinical Leadership Program directly by the evaluators.
3. Applicants who do not possess a graduate degree are required to provide Graduate Record Examination (GRE) General (Aptitude) Test results. Scores must not be more than five years old, and must be mailed directly to the Clinical Leadership Program from the Educational Testing Service.
4. Proof of current NC practice licensure. In addition, candidates must maintain license throughout enrollment in the Clinical Leadership Program.
5. Applicant finalists are required to complete an admissions interview.

Application Deadline. The deadline for receipt of applications for the 2003-2004 academic year is July 1, 2003. Since enrollment is limited, late applications cannot be guaranteed consideration. All application material, a \$100.00 application fee, and correspondence concerning your application should be sent to the Clinical Leadership Program, Department of Community and Family Medicine, Box 2914, Duke University Medical Center, Durham, NC 27710. Applicants will be notified of admission decisions not later than August 1, 2003. Materials submitted in support of an application will not be released for other purposes and cannot be returned to the applicant.

Costs and Financing. Tuition for the 2003-2004 academic year is \$800.00 per unit. Duke faculty members may be eligible for the University's Educational Assistance Program. Other sources of support may exist in clinical departments; prospective applicants should consult with program directors and division chiefs regarding potential funding sources.

Financial Aid. Qualified students may be eligible for Stafford Loans up to \$8,500, and up to \$10,000 in tuition loans. Clinical Leadership students may be eligible for up to \$10,000 in unsubsidized federal Stafford Student Loans. The North Carolina Student Loan Program for Health, Science, and Mathematics provides financial assistance in the form of loans up to \$6,500 per year for North Carolina residents; these loans may be cancelled through approved service in shortage areas, public institutions, or private practice. Applicants may call (919)571-4182 for further information about this loan program. Limited scholarships funds are also available. All financial aid awards are made on the basis of documented financial need. Financial aid application packets are distributed on the admissions interview date. Additional information is available from the Office of Financial Aid at (919) 684-6649.

This program is part-time. It is assumed that the candidate will continue to work part-time in a clinical capacity while working toward the Master of Health Sciences in Clinical Leadership.

Grading Policies. Grades for all courses and clinical rotations within the Clinical Leadership curriculum are assigned on the basis of the following: Honors (*H*), Pass (*P*), Low Pass (*L*), and Fail (*F*). The Clinical Leadership Program is designed to integrate classroom and clinical learning experiences considered necessary for competency as health care providers. Therefore, the failure of any required course prevents a student from continuing in the program. Also, a student can receive no more than a total of three grades of "Low Pass" in the 27 required courses.

A grade of "Incomplete" (*I*) may remain on a student's transcript for one year only. After one year, a grade of "Incomplete" is automatically converted to an *F* (Fail). An extension to this one year limit may be granted by the program director; a request must be submitted in writing to the program director no later than 30 days prior to the expiration of the one year time limit.

Academic Progress. A leave of absence will be granted upon request at the discretion of the Steering Committee.

Courses of Instruction

CLP-200. Clinical Leadership Seminar (2 units)–*Perspectives on Health Care.* Under the direction of a senior faculty leader, students will explore the principles behind the forces impacting the dynamic health care environment. Building upon topics covered in the complementary core course, "Population-Based Approaches to Health Care," students will be exposed to current issues and strategies regarding population analysis and decision-making through the use of case studies and interaction with leaders in health care planning, financing, and programming. *TBA*

CLP-201. Clinical Leadership Seminar (2 units)–*Health Care Finance: Barriers and Opportunities for Change.* This seminar will focus on leadership skills for effecting change while demonstrating sound fiscal judgement. Students will apply financial management and budget planning skills gleaned from the complementary core course, "Financial Management and Budget Planning," as well as management theory covered in "Dynamics of Management," to case studies and current situations of various health care settings. Duke Health System leaders will expose students to examples from the evolution of and current issues facing health systems as a basis for exploring management principles and leadership skills for effecting change that reflects fiscal responsibility. *TBA*

CLP-202. Clinical Leadership Seminar (2 units)–*Organizational Structure and Use of Data to Support and Manage Change.* Through interaction with leaders from the private and public health care sectors, students will analyze the current state of health care delivery in the United States with a focus on the impact of changing organizational structures and rapidly advancing technologies. To provide further exploration of specific topics covered in the core courses, "Health System Organization" and "Introduction to Medical Informatics," discussion leaders will focus on the health care workforce, the economic framework of the health care industry, changing private and public responsibilities, and opportunities for entrepreneurial endeavors. *TBA*

CLP-203. Clinical Leadership Seminar (2 units)–*Management of Self.* Students will be challenged to apply the skills and knowledge they have acquired through the program to develop a strategic career management plan. The plan will include statements of a personal vision, mission, and values; a description of identified strengths and weaknesses; and strategies to achieve goals, including strategies to overcome weaknesses that would impede the student's professional performance. *TBA*

CLP-204. Clinical Leadership Seminar (2 units)–*Leading in a Chaotic Environment.* Students will meet with industry experts on health care law and policy to work through case studies in risk, regulation, and antitrust. *TBA*

CLP-205. Clinical Leadership Project (6 units). The Clinical Leadership Project helps a real client decide what to do about a problem in health policy, financial planning, or administration. Its purpose is to recommend and defend a specific course of action. Students work as part of a team to complete the project. The project is divided into two parts, with the first being devoted to client and problem identification and developing and defending a written prospectus. The second semester is devoted to the completion and final defense of the project in its entirety. *TBA*

CLP-206. Quality Management. The course provides a survey of all related aspects of quality management including a review of HEDIS, NCQA, JCAHO structures and guidelines. Special emphasis is placed on outcomes, clinical guidelines, evidence-based medicine, disease management, interdisciplinary team care, CQI/TQM, role of purchaser, and patient satisfaction. *Michener*

CLP-207. Operational Management. The course covers the practical aspects of communication, meeting management, and human resource management. Topics include performance appraisal, conflict management, demand management, aligning incentives, labor substitution/consolidation, role of extenders, analytical decision-making, project management, and process (systems) analysis. *Michener*

LAW-347. Health Care Law and Policy. A survey of the legal environment of the health services industry in a policy perspective, with particular attention to the tensions and trade-offs between quality and cost concerns. Topics for study: access to health care; the clash between professionalism and commercialism, including antitrust law; personnel licensure; private personnel credentialing and institutional accreditation; hospital organization and staff privileges; professional and institutional liability; cost containment regulation, including certification of need; cost controls in government programs. Of interest to students interested in public policy, law and economics, as well as those with specific interests in the health care field. *Havighurst*

MEDINFO-233B. Introduction to Medical Informatics. An in-depth study of the use of computers in biomedical applications. Important concepts related to hardware, software, and applications development are studied through analysis of state-of-the-art systems involving clinical decision support, computer-based interviewing, computer-based medical records, departmental/ancillary systems, instructional information systems, management systems, national data bases, physiological monitoring, and research systems. *Hammond*

HLTHMGMT 326.401. Economics of Health Care. This is a course in Health Economics that applies the tools of Microeconomic Theory to examine the market behavior of consumers and firms in the health care sector. The focus is on analyzing the economic fundamentals behind the actions and reactions of the players in the health care market. The emphasis will be on acquiring a tool kit that will enable a structured and analytical examination of the issues rather than a review of the issues per se. On the demand side, the course will analyze the economic factors affecting medical care utilization. The role of health insurance will be explored in detail. The course will examine the supply of health insurance and the rising costs of medical care. The growth of the managed care industry will be studied, as will the economic issues underlying the operation and performance of hospitals and group practices. In conclusion, the role of the physician will be analyzed through an economic lens. *Khwaja*

NUR-301. Population-Based Approaches to Health Care. Provides an overview of population-based approaches to assessment and evaluation of health needs. Selected theories are the foundation for using scientific evidence for the management of population-based care. Enables the health care professional to make judgments about services or approaches

in prevention, early detection and intervention, correction or prevention of deterioration, and the provision of palliative care. Fall. *Denman*

NUR-401. Dynamics of Management. This course is an in-depth analysis of selected organizational behavior topics and management practices related to patient care systems administration within a larger, integrated health care system. From a well developed theoretical orientation, students will critically identify issues, formulate questions, and pursue managerial interventions that will result in high quality, aggregate patient care, and organizational outcomes that are socially relevant and clinically cost-effective. Spring. Prerequisite: NUR 400 or consent of instructor. *Anderson and Nevidjon*

NUR-402. Financial Management and Budget Planning. Designed for managers in complex organizations. Focuses on the knowledge and skills needed to plan, monitor, and evaluate budget and fiscal affairs for a defined unit or clinical division. Health care economics, personnel, and patient activities are analyzed from a budgetary and financial management perspective within an environment of regulations and market competition. Spring. *Zellman*

PHYASST-250. Health Systems Organization. An introduction to the structure and administrative principles used by health care organizations. A lecture series taught by an interdisciplinary faculty and by community experts in health care organization. Topics include the patient as consumer, third-party payment, and public policy trends. *Strand*

Electives

CLP-208. Faculty Development: Teaching Skills. This semester-long seminar series is designed for health professionals in academic or leadership roles wishing to improve their teaching, and educational skills. It is also appropriate for fellows considering academic careers. The course uses active discussions supplemented by readings, role plays, observed teaching and peer feedback to assist participants in improving their skills in the following areas: clinical teaching, lecture, small group facilitation, advising, dealing with problem learners, and curriculum design and implementation. Participants complete and present a semester project of a curriculum design suitable for implementation in their own or other program of choice. Prerequisite: Permission of instructor Kaprielian and staff. *Kaprielian*

CLP-209. Faculty Development: Administration and Leadership. The changing health care environment has put increasing pressures upon health professions faculty. Similar forces have created needs for change in both the content and process of our educational programs. This semester-long seminar is designed for health professionals in or considering academic or leadership roles. The course uses discussion supplemented by readings, role plays, problem-solving exercises, and peer feedback to assist participants in improving their knowledge and skills in the following: negotiation, time management, quality improvement, delegation/supervision, academic writing, finance and budgeting, leadership, and managing change. Participants complete and present a semester project on an administrative issue/problem of their choosing. Prerequisite: Permission of instructor Kaprielian and staff. *Kaprielian*

The Clinical Research Training Program

MASTER OF HEALTH SCIENCES CURRICULUM

Program Director: Eugene Z. Oddone, M.D.

Associate Directors: Linda S. Lee, Ph.D. and Gregory P. Samsa, Ph.D.

This training program meets an existing need at Duke University Medical Center for formalized academic training in the quantitative and methodological principles of clinical research. Designed primarily for clinical fellows who are training for academic careers, the program offers formal courses in clinical research design, research management, and statis-

tical analysis. Students who complete a prescribed course of study in the training program are awarded a Master of Health Sciences in Clinical Research degree by the School of Medicine.

The Clinical Research Training Program is offered by the faculty of the Department of Biostatistics and Bioinformatics with the participation of other members of the Medical Center faculty who have expertise in relevant areas.

Degree and Non-degree Admission. All persons wishing to take courses in the Clinical Research Training Program, even on a non-degree basis, must be admitted to the program. An advanced degree in a clinical health science from an accredited institution is a prerequisite for admission either as a degree candidate or as a non-degree student.

A student seeking admission to the Clinical Research Training Program should obtain an application packet which contains the necessary forms and detailed instructions on how to apply. Requests for application forms or for additional information about the training program should be directed to the Clinical Research Training Program, Box 3827, Duke University Medical Center, Durham, North Carolina 27710, (919) 681-4560 or by email to crtp@mc.duke.edu. Additional information may be found on the program's website at <http://crtp.mc.duke.edu>.

A complete application for admission, either as a degree candidate or as a non-degree student, consists of the application form and the following supporting documents: (1) a current *curriculum vitae* (CV); (2) an official transcript from each post-secondary institution attended; (3) three letters of evaluation written by persons qualified to testify to the applicant's capacity for graduate work.

Program of Study. The degree requires 24 credits of graded course work and a research project for which 12 units of credit are given. Six courses (241, 242, 245, 247, 253, and 254) constitute 18 credits that are required for all degree candidates (see Courses of Instruction below). The student's clinical research activities provide the setting and the data for the project, which serves to demonstrate the student's competence in the use of quantitative methods in clinical research. The program is designed for part-time study, which allows the fellow/student to integrate the program's academic program with clinical training.

Examining Committee. Three faculty members constitute an examining committee to certify that the student has successfully completed the research project requirement for the degree. The committee must include a clinical investigator and a statistician, both of whom are on the faculty of the Clinical Research Training Program (CRTP). The third member of the committee should be a faculty member who has substantive knowledge in the area in which the clinical research project is conducted; for clinical fellows, this committee member is often the student's mentor. The chair of the committee must be a member of the CRTP faculty.

Grades. Grades in the Clinical Research Training Program consist of *H* (High Pass), *P* (Pass), *L* (Low Pass) and *F* (Fail). In addition, an *I* (Incomplete) indicates that some portion of the student's work is lacking for a reason acceptable to the instructor at the time grades are reported. Students will not be permitted to enroll in any course for which they have an unresolved *I* in a prerequisite course. In any case, a grade of *I* must be resolved no later than the end of the following academic semester, unless the course director specifies an earlier date by which the student must make up the deficiency. In exceptional circumstances, an Incomplete that is not resolved within the designated period may be extended for a specified period with the written approval of the course director and the program director. If an Incomplete is not resolved within the approved period, the grade of *I* becomes permanent and may not be removed from the student's record.

A student's enrollment as a degree candidate is terminated if he or she receives a single grade of *F* or two grades of *L* in the program. For these purposes, both *WF* (see below) and a permanent *I* are considered to be failing grades.

Withdrawal from a Course. A course may be dropped at the student's discretion during the first three weeks of class; no grade is recorded and all tuition is refunded. If a course is dropped later in the term, no tuition is refunded and the status of the student at the time of withdrawal is indicated on the permanent record as *WP* (Withdrew Passing) or *WF* (Withdrew Failing).

Tuition. Tuition for the 2003-2004 academic year is \$510 per unit of credit. Faculty may be eligible for the university's Educational Assistance Program. Other sources of support exist in some clinical departments; prospective students should consult with program directors and division chiefs regarding potential funding sources.

Transfer of Credit. Transfer of credit for graduate work completed at another institution is considered only after a student has earned a minimum of 12 credits in the Clinical Research Training Program. A maximum of six units of credit may be transferred for graduate courses completed at other institutions. Such credits are transferred only if the student received a grade of *B* (or its equivalent) or better. The transfer of graduate credit does not reduce the required minimum registration of 36 credits for the degree. However, a student who is granted such transfer of credit may be permitted to register for as much as 18 credits of research instead of the usual 12 credits.

Time Limitations. A degree candidate is expected to complete all requirements within six calendar years of matriculation. Degree credit for a course (including one for which transfer credit is given) expires six years after the course is completed by the student; in this case, degree credit can be obtained only by re-taking the course.

Courses of Instruction

CRP-241. Introduction to Statistical Methods. This course is an introduction to the fundamental concepts in biostatistics and their use in clinical research. Through directed readings and discussion of representative research reports from peer-reviewed journals, students are introduced to the concepts of hypothesis formulation, descriptive statistics, commonly used research designs and statistical tests, statistical significance, confidence intervals, statistical power, and commonly used statistical models. In addition, the basic concepts of data collection and analysis are presented using Microsoft Access and SAS. 4 credits.

CRP-242. Principles of Clinical Research. The emphasis is on general principles and issues in clinical research design. These are explored through the formulation of the research objective and the research hypothesis and the specification of the study population, the experimental unit, and the response variable(s). In addition, the course content promotes an understanding that allows the student to classify studies as experimental or observational, prospective or retrospective, case-control, cross-sectional, or cohort; this includes the relative advantages and limitations and the statistical methods used in analysis of each type. Emphasis is placed on the traditional topics of clinical epidemiology such as disease etiology, causation, natural history, diagnostic testing, and the evaluation of treatment efficacy. In addition, an introduction to ethical issues in clinical research is included. Corequisite: CRP-241. 4 credits.

CRP-244. Health Economics in Clinical Research. A practical foundation in economic evaluation of medical diagnostic procedures and therapeutic interventions is provided. The focus is on the development, analysis, and communication of economic data in the context of clinical research. Topics include: basic finance and organization of health care, evidence tables, utility theory, tree-structured decision models, health care cost accounting, cost-effectiveness, cost-utility and cost-benefit analysis, and special statistical issues in analysis of economic data. Prerequisite: CRP-242. 2 credits.

CRP-245. Statistical Analysis. This course extends CRP-241 (Introduction to Statistical Methods) to more advanced topics relevant in clinical research. Topics include regression models (linear and logistic regression models, their practical applications in assessing multivariable relationships and formulating predictive models, and the interpretation of model parameters), categorical data analysis (methods for analyzing nominal and ordinal response variables), and survival analysis (inferences from time-to-event data with censored observations, including Kaplan-Meier curves, hazard functions, and the Cox proportional hazards regression model). Prerequisite: CRP-241. 4 credits.

CRP-247. Clinical Research Seminar. This seminar integrates and builds on three core courses (CRP-241, 242, and 245) to provide practical experience in the development and critique of the methodological aspects of clinical research protocols and the clinical research literature. Assigned readings are drawn from contemporary literature and include both exemplary and flawed studies. Prerequisites: CRP-242 and CRP-245. 2 credits.

CRP-248. Clinical Trials. Fundamental concepts in the design and analysis of clinical trials are examined. Topics include protocol management, sample size calculations, determination of study duration, randomization procedures, multiple endpoints, study monitoring, and early termination. Prerequisite: CRP-245. 2 credits.

CRP-249. Health Services Research. Research methods in health services research are explored. Topics include measurement of health-related quality of life, case mix and comorbidity, quality of health care, and analysis of variations in health care practice. Advantages and disadvantages of studies that use large databases, as well as advanced methods in analysis and interpretation of health services outcomes are addressed. This includes application of traditional research designs (e.g., randomized trials) to address health services research questions and the interface between health services research and health policy. Prerequisites: CRP-242 and CRP-245. 2 credits.

CRP-250. Genetic Analysis of Human Disease. This is an introduction to methods associated with the analysis of human genetic data, with an emphasis on applied projects aimed at identifying genes leading to human disease. The course provides an overview of modern techniques in the analysis of complex human disease, with a focus on statistical techniques. Topics include: how a trait is determined to have a genetic component; basic genetic concepts, study design and sampling strategies; testing Hardy-Weinberg equilibrium; utilization of linkage maps; detection and location of genes using linkage disequilibrium and other methods; gene-environment interactions; and a molecular overview of DNA techniques and evolving methodologies (SNPs, microarray analysis, etc). Students are introduced to specialized software and internet-based resources for the analysis of genetic data. Prerequisites: CRP-241 and basic knowledge of genetics. 2 credits.

CRP-251. Questionnaire Design and Psychometrics. An introduction is provided to the elements of psychometric theory that are relevant to the conduct of clinical research. Topics include issues in questionnaire and scale design, types of scales, scale construction and validation; definition, measures, and estimation of reliability and validity; statistical issues resulting from unreliability (such as the effect of reliability on sample size estimation); and methods for assessing the psychometric properties of scales (such as factor analysis and Cronbach's alpha). Prerequisites: CRP-242 and CRP-245. 2 credits.

CRP-252. Principles of Clinical Pharmacology. This course provides a basis for understanding the scientific principles of rational drug therapy and contemporary pharmaceutical development. Topics include evaluation of the physiologic and pathophysiologic factors involved in drug absorption, distribution, metabolism, and elimination. A major focus is on determinants that result in inter- and intra-patient variability in pharmacokinetics/pharmacodynamics. A variety of tests used in a surrogate fashion for evaluation of drug re-

sponse are discussed. A practical guide to pharmacokinetic/pharmacodynamic data analysis provides an introduction to common modeling approaches. Prerequisites: CRP-242 and CRP-245. 2 credits.

CRP-253. Responsible Conduct of Research. This course explores a variety of ethical and related issues that arise in the conduct of medical research. Topics include human subjects and medical research, informed consent, ethics of research design, confidentiality, diversity in medical research, international research, relationships with industry, publication and authorship, conflict of interest, scientific integrity and misconduct, intellectual property and technology transfer, and social and ethical implications of genetic technologies and research. Prerequisite: CRP-242. 2 credits.

CRP-254. Research Management. Operational issues that arise in the conduct of a clinical research project are addressed. Topics include administration (human resources, project management, budget development and management), data management systems (databases, case report forms, data acquisition, quality assurance and quality control (QA/QC), monitoring and auditing), regulation (Investigational New Drug [IND] applications, good clinical practice (GCP), and the Health Insurance Portability and Accountability Act (HIPAA), and sponsorship (sources, sponsor motivations, identifying sponsors). Prerequisite: CRP-242. 2 credits.

CRP-255. Introduction to Proteomics. This course introduces the platform technologies and computational methodologies for protein profiling and interaction analysis. The platform technologies covered include mass spectroscopy, 2D gel electrophoresis, surface plasmon resonance, protein arrays, and flow cytometry. Structural biology and high-throughput screening methods are also discussed. C-L: MGP 208. Prerequisite: Permission of the course director. 2 credits.

CRP-270. Research. An individualized research project under the direction and supervision of the student's mentor and examining committee forms the basis for this culmination of the program of study leading to the degree of Master of Health Sciences in Clinical Research. 12 credits.

The Pathologists' Assistant Program

MASTER OF HEALTH SCIENCES CURRICULUM

Professor and Chairman, Department of Pathology: Salvatore V. Pizzo, M.D., Ph.D.

Director, Pathologists' Assistant Program: James G. Lewis, Ph.D.

Medical Director: Alan D. Proia, M.D., Ph.D.

Medical Director for Surgical Pathology: Marcia Gottfried, M.D.

Surgical Pathology Training Coordinator: Pamela Vollmer, B.H.S.

Director, Autopsy Service, Veterans Affairs Medical Center: Jane Gaede, M.D.

Director of Surgical Pathology, Veterans Affairs Medical Center: Robin Vollmer, M.D.

Chief, OB-GYN Pathology: Stanley Robboy, M.D.

Program of Study. This is a 24-month program beginning with the start of the medical school academic year in August of each year. It provides a broad, graduate level background in medical sciences in support of intensive training in anatomic pathology. With the background in anatomy, histology, physiology, and microbiology, the students learn pathology at the molecular level in the classroom and are trained and given experience in the microscopic and gross morphology of disease in close one-on-one training with pathology department faculty. They learn dissection techniques and all technical aspects of anatomic pathology in summer rotations. The curriculum is designed to produce individuals who fill the gap between the pathologist on the autopsy and surgical pathology services and other technical personnel who work in the tissue processing laboratory.

Accreditation. The curriculum, faculty, facilities, and administration of the program are accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAA-

CLS). Graduates are able to sit for the American Association of Pathologists' Assistants fellowship examination.

Degree Requirements. Passage of 69 units of graduate credit is required for the MHS degree. An additional 11 credits are required to receive a certificate at the end of the program. There is a mandatory, comprehensive oral presentation and examination administered by a panel of pathology department faculty which all students must pass for successful completion of the program.

Grading Policies. The grading system is the same as the medical school: *H* (Honors), *P* (pass), *F* (fail). Rotations are accompanied by written critiques of performance. Failure in any course may result in removal from the program. Poor performance on any rotation, even if passed, may result in the student performing extra work. All incomplete grades automatically revert to *F* if work is not completed within one semester or one summer session following award of the grade. The comprehensive final examination is Pass/Fail, with the award of Honors for outstanding students. Students who fail the final can register for one semester to prepare for and take the examination again. Any student who fails the final twice cannot complete the program.

Curriculum

Year 1

Fall

INTERDIS 100B. Molecules and Cells	8 credits
CELLBIO-201B. Microscopic Anatomy	3 credits
CELLBIO-202B. Medical Physiology	4 credits
BAA-200B. Human Anatomy	3 credits
PATHASST-205. Immunology	3 credits

Year 1

Spring

PATHOL-200B. General Pathology	5 credits
MICROBIO-221. Medical Microbiology	4 credits
PATHASST-200. Introduction to Dissection	2 credits
PATHASST-201. Basic Neuroanatomy	2 credits

Year 1

Summer

PATHASST-210. Introduction to Autopsy Pathology	4 credits
PATHASST-220. Introduction to Surgical Pathology	4 credits
PATHASST-215. Histology Techniques	1 credit

Year 2

Fall

PATHOL-241P. Pathologic Basis of Clinical Medicine	3 credits
PATHOL-223P. Autopsy Pathology	4 credits
PATHASST-230. Surgical Pathology	4 credits
PATHOL-359P. Fundamentals of Electron Microscopy	2 credits
PATHASST-216. Histology Techniques	1 credit
PATHASST-240. Photography	1 credit

Year 2

Spring

PATHOL-241P. Pathologic Basis of Clinical Medicine	3 credits
PATHASST-231. Surgical Pathology	4 credits
PATHOL-223P. Autopsy Pathology	4 credits
PATHASST-217. Histology Techniques	1 credit
PATHASST-241. Photography	1 credit

Year 2

Summer

PATHASST-300. Autopsy Practicum	4 credits
PATHASST-301. Surgical Pathology Practicum	4 credits
PATHASST-302. Elective Forensic Rotations	3 credits

Total* **82 credits**

Prerequisites for Admission

1. A baccalaureate degree in a biological or chemical science from an accredited institution.
2. A baccalaureate degree in a non-science major, but at least 12 credit hours in biological sciences and six credit hours in chemistry.
3. Scores for the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT) taken within the last five years.

Candidates who receive their baccalaureate degrees from institutions outside the United States must submit a transcript evaluation showing degree equivalency and subject matter description.

Application Procedures. Application materials are mailed to prospective candidates for admission up to January 31st of the year of expected matriculation. Applications can be obtained by writing to: Dr. James G. Lewis, Director, Pathologists' Assistant Program, Department of Pathology, Box 3712, Duke University Medical Center, Durham, NC 27710, (919) 684-2159. Application forms may also be downloaded from our website: pathology.mc.duke.edu. All applications must be received by February 28.

Applications must include:

1. A completed application form and a non-refundable application fee of \$50;
2. Official transcripts of all colleges and universities attended;
3. GRE or MCAT scores;
4. Three letters of recommendation.

Candidates are notified of the Admission Committee's decision no later than April 15. Accepted candidates are required to submit a non-refundable deposit of \$350 to retain their places in the class. This deposit applies to tuition.

Tuition, Fees, and Estimated Costs for Year One, 2003-2004

Tuition	\$15,000
Technology fee	1,500
Recreation fee	60
Books	648
Student health fee	786

*. Students enrolled in the Pathologists' Assistant Program are required to complete a minimum of 82 credits – pending approval and subject to change.

Student insurance (single)	1,063
Vehicle registration	65
Rent, food, and miscellaneous	14,748
Total*	13,870

Financial aid information is available for all interested applicants by contacting the Office of Financial Aid, Box 3067, Duke University Medical Center, Durham, NC 27710, or at the School of Medicine's Office of Financial Aid website: <http://finaid.mc.duke.edu>.

Courses of Instruction

BAA-200B. Gross Human Anatomy. This is the medical school and anatomy graduate course in human anatomy. Students participate in a complete lecture series and in laboratory dissections of cadavers. Lectures and laboratory work are supplemented by conferences which emphasize biological and evolutionary aspects. 3 credits. *Staff*

INTERDIS 100B. Molecules and Cells. A course designed for first-year medical students that focuses on the molecular and cellular principles of human disease. The course has four components which are tightly integrated: biochemistry, cell biology, genetics, and a series of clinical correlations. The biochemistry component re-emphasizes the relationship between structure and function of the major classes of macromolecules in living systems including proteins, carbohydrates, lipids, and nucleic acids. The metabolic interrelationships and control mechanisms are discussed as well as the biochemical basis of human diseases. The cell biology component emphasizes the structure and function of the cells and tissues of the body. The laboratory provides practical experience with light microscopy studying and analyzing the extensive slide collection of mammalian tissues. The genetics component emphasizes molecular aspects of the human genome, the structure of complex genes, regulation of gene expression, experimental systems for genetic analysis, human genetics—including population genetics and genetic epidemiology, the use of genetic analysis for the identification of disease causing genes, cytogenetics, cancer genetics, and genetic diagnosis and counseling. The series of clinical correlations links the material covered in the basic science lectures to clinical problems. Many of the correlations include an interview with a patient. Also included are a day symposium on nutrition and a day symposium on aging. 8 credits. *Garcia-Blanco, Nicchitta, Raetz, and staff*

CELLBIO-201B. Microscopic Anatomy. Histology of all major organs of the body. Structure and cell biology at both the level of the light and electron microscope. 3 credits. *McIntosh and staff*

CELLBIO-202B. Medical Physiology. Medical and graduate level course on organ and cell physiology. Human and medical aspects are stressed. 4 credits. *Jakoi and staff*

MICROBIO-221. Medical Microbiology. Intensive study of common bacteria, viruses, fungi, and parasites that cause human disease. The didactic portion focuses on the nature and biological properties of microorganisms causing disease, the manner of replication, and their interaction with the entire host as well as specific organs and cells. 4 credits. *Staff*

PATHOL-200B. General Pathology. This is the medical school core course in pathology. Lectures deal with broad concepts of disease and underlying molecular mechanisms. Laboratories teach gross and microscopic morphology of disease processes. Students participate in one autopsy and clinical-pathological conferences. 5 credits. *Staff*

PATHOL-223P. Autopsy Pathology. A detailed consideration of the morphologic, physiologic, and biochemical manifestations of disease. Includes gross dissection, histolog-

*. Subject to change and board approval.

ic examinations, processing, and analyzing of all autopsy findings under tutorial supervision. 4 credits each course or 8 credits. *Lewis and staff*

PATHOL-241P. Pathologic Basis of Clinical Medicine. This is the medical school and graduate course in the detailed pathology of major organ systems and how it relates to clinical medicine. This course serves as a systemic pathology course for pathologists' assistant students. The course consists of lectures and seminars presenting the latest scientific concepts of disease spanning two semesters. 6 credits. *Bradford and staff*

PATHOL-359P. Fundamentals of Electron Microscopy. Cellular and Subcellular Pathology is presented in this course. The course consists of lectures and seminars on the alterations of cellular structure and associated functions that accompany cell injury. 2 credits. *Shelburne and staff*

PATHASST-200. Introduction to Dissection. This is a course in basic tissue dissection techniques taught through participation in autopsies and using autopsy tissues. 2 credits. *Lewis and staff*

PATHASST-201. Basic Neuroanatomy. This is an intensive course in neuroanatomy designed expressly for pathologists' assistant students. The purpose of the course is to teach students the gross and microscopic anatomy of the brain and how to dissect and take sections for microscopic diagnostic purposes. Non-pathologists' assistant students require permission of the instructor. 2 credits. *Hulette*

PATHASST-205. Immunology. This is a basic survey course in immunology that includes lectures on the function and interaction of the cells of the immune system, cytokine secretion and function, and the generation of humoral and cellular immune responses. 3 credits. *Kostyu*

PATHASST-210. Introduction to Autopsy Pathology. This is a summer rotation given during the first summer session. It is designed to acquaint the student with autopsy projection and workup. Students assist residents in full autopsy dissections. 4 credits. *Lewis and staff*

PATHASST-215, 216, 217. Histology Techniques. These are rotations through various histology laboratories. These are designed to acquaint students with the various techniques used in tissue processing and special procedures. 1 credit each. *Dotson and staff*

PATHASST-220. Introduction to Surgical Pathology. This is a rotation conducted during the first summer session. It is designed to acquaint students with the techniques of gross dissection, descriptions, and submission of tissue samples from surgical specimens. 4 credits. *Vollmer and staff*

PATHASST-230, 231. Surgical Pathology. These courses consist of thorough laboratory training in the orientation, description, and dissection of gross surgical specimens. Students follow many of the cases through to signout by the pathologist. 4 credits each. *Vollmer and staff*

PATHASST-240, 241. Photography. This is an introduction to medical photography. Students become familiar with photography equipment and the fundamentals of gross specimen photography. 1 credit each. *Reeves and Conlon*

PATHASST-300. Autopsy Practicum. This is the final autopsy rotation in which the students must perfect their dissection skills, demonstrate the ability to conduct full autopsy projections in all possible situations, and write full preliminary autopsy reports. In addition, special dissection skills are taught in this course. 4 credits. *Lewis and staff*

PATHASST-301. Surgical Pathology Practicum. This is the final surgical pathology rotation in which the students must perfect their dissection skills and demonstrate the ability to orient, dissect, describe, and submit appropriate tissue samples from all commonly encountered surgical pathology specimens. 4 credits. *Vollmer and staff*

PATHASST-302. Forensic Pathology. Selected seminars and rotations in forensic pathology. 3credits. *Staff*

The Physician Assistant Program

MASTER OF HEALTH SCIENCES CURRICULUM

Department of Community and Family Medicine

Department Chairman: J. Lloyd Michener, M.D.

PA Division Chief and Program Director: Justine Strand, M.P.H., PA-C

Medical Director: Joyce A. Copeland, M.D.

Associate Program Director: Patricia M. Dieter, M.P.A., PA-C

Academic Coordinator: Thomas P. Colletti, M.P.A.S., PA-C

Academic Coordinator: David M. Coniglio, M.P.A., PA-C

Clinical Coordinator: Karen J. Hills, M.S., PA-C

Clinical Coordinator: Elizabeth P. Rothschild, M.M.Sc., PA-C

Instructor: Peggy R. Robinson, M.H.S., PA-C

Director of Recruitment and Minority Affairs: Lovest T. Alexander, M.H.S., PA-C

Surgical Coordinator: Paul C. Hendrix, M.H.S., PA-C

Clinical Laboratory Coordinator: Margaret Schmidt, Ed.D., M.T. (A.S.C.P.)

Behavioral Medicine Coordinator: Victoria Scott, M.H.S., PA-C

Evidence-Based Medicine Coordinators: Colleen McBride, Ph.D., Joellen Schildkraut, Ph.D.

Regional Clinical Coordinators: John Faulkner, M.P.H., PA-C; Gloria J. Jordan, M.H.S., PA-C

Mary Jo Bondy, M.H.S., PA-C

The physician assistant (PA) concept originated at Duke over 35 years ago. Dr. Eugene A. Stead Jr., then chairman of the Department of Medicine, believed that mid-level practitioners could increase consumer access to health services by extending the time and skills of the physician. Today, physician assistants are well-recognized and highly sought-after members of the health care team. Working interdependently with physicians, PAs provide diagnostic and therapeutic patient care in virtually all medical specialties and settings. They take patient histories, perform physical examinations, order laboratory and diagnostic studies, and develop patient treatment plans. In most states, including North Carolina, PAs have the authority to write prescriptions. Their job descriptions are as diverse as those of their supervising physicians, and also may include patient education, medical education, health administration, and research.

PAs practice in all specialty fields; about one-third of all PAs provide primary care services, especially in family and general internal medicine. While PAs remain dependent in that they provide medical services under the supervision of physicians, other non-physician tasks have been integrated into the role, particularly in the institutional and larger clinic setting. While not always clinical in nature, these tasks are essential to the practice of the PA's supervising physician. For example, PAs in the tertiary care setting are often involved in the acquisition, recording and analysis of research data, the development of patient and public education programs, and the administration of their departments' clinical and educational services. Involvement in these other services has provided job advancement for PAs in these settings.

Additional non-clinical positions are developing for PAs. While these positions do not involve patient care, they depend on a strong clinical knowledge base. The M.H.S. curriculum provides PAs with depth of knowledge in the basic medical sciences and clinical medicine, as well as skills in administration and research. With these expanded skills, graduates can take advantage of the wide diversity of positions available to PAs.

Program of Study. The curriculum is 25 consecutive months in duration and is designed to provide an understanding of the rationale for skills used in patient assessment, diagnosis, and management. The first 12 months of the program are devoted to preclinical studies in the basic medical and behavioral sciences, and the remaining 13 months to clinical experiences in primary care, medical and surgical specialties, and research study. Laptop computers are leased to each student for both the first and second years. Computers are used

for a variety of in-class and clinical assignments and activities, as well as for communications and Internet services.

The preclinical curriculum is integrated to introduce the student to medical sciences as they relate to specific organ systems and clinical problems. Learning strategies include the traditional lecture format and basic science laboratory, small group tutorials, and patient case discussions. Regular patient contact is an important part of the first year curriculum. Students begin to see patients during the spring semester as part of the Patient Assessment course; this patient contact continues throughout the summer term of the first year.

As part of the clinical practicum, students are required to take rotations in inpatient medicine, surgery, emergency medicine, primary care, pediatrics, obstetrics/gynecology, and behavioral medicine. In addition, two elective clinical rotations are included in the clinical year schedule, as is a four-week period devoted to advanced study in Evidence-Based Medicine. At least one clinical rotation must be completed in a medically underserved site. The final four weeks of the clinical year are spent in a final preceptorship which often serves as a bridge to employment as a practicing PA.

Because the clinical teaching is carried out in many practice settings throughout North Carolina, students should plan on being able to travel away from the Durham area for many of their clinical experiences. Housing will be made available for out-of-town clinical rotations.

Curriculum. Before proceeding into the clinical phase of the curriculum, students must satisfactorily complete the following:

Preclinical Year

Fall Semester

PHYASST-200. Basic Medical Sciences	5 credits
PHYASST-205. Anatomy	4 credits
PHYASST-210. Laboratory Medicine	4 credits
PHYASST-215. Physical Diagnosis	3 credits
PHYASST-220. Clinical Medicine I	4 credits
Total	20 credits

Spring Semester

PHYASST-211. Laboratory Medicine II	1 credit
PHYASST-221. Clinical Medicine II	9 credits
PHYASST-230. Fundamentals of Surgery	5 credits
PHYASST-235. Patient Assessment I	2 credits
PHYASST-240. Behavioral Aspects of Medicine	2 credits
Total	19 credits

Summer Term

PHYASST-222. Clinical Medicine III	7 credits
PHYASST-236. Patient Assessment II	1 credit
PHYASST-245. Perspectives on Health	2 credits
PHYASST-250. Health Systems Organization	2 credits
PHYASST-255. Evidence-Based Medicine I	3 credits
Total	15 credits

Clinical Year

Following successful completion of the preclinical courses, students enter the clinical phase of the program, completing the following experiences:

PHYASST-300. Primary Care	8 credits
PHYASST-305. Evidence Based Medicine II	3 credits
PHYASST-310. Behavioral Medicine	4 credits
PHYASST-320. Inpatient Medicine	8 credits
PHYASST-340. General Surgery	4 credits
PHYASST-350. Emergency Medicine	4 credits
PHYASST-360. Pediatrics	4 credits
PHYASST-370. Obstetrics/Gynecology	4 credits
Elective	4 credits
Elective	4 credits
PHYASST-390. Preceptorship	4 credits
Total	51 credits

The student receives four credits for rotations which are four weeks in length, and eight credits for rotations which are eight weeks in length.

In addition to successful completion of the preclinical and clinical phases of the program, the PA student must also successfully complete BLS, ACLS, and all components of summative evaluation.

Program Policies and Grading Standards. Grades for all courses and clinical rotations within the Physician Assistant curriculum are assigned on the basis of the following: Honors (*H*), Pass (*P*), and Fail (*F*). The Physician Assistant Program is designed to integrate classroom and clinical learning experiences considered necessary for competency as health care providers. Therefore, the failure of any required course prevents a student from continuing in the program. Determination of satisfactory academic progress is made by the PA faculty at the conclusion of each semester/term.

A grade of "Incomplete" (*I*) may remain on a student's transcript for one year only. After one year, a grade of "Incomplete" automatically is converted to an *F* (Fail). An extension to this one-year limit may be granted by the program director; a request must be submitted in writing to the program director no later than 30 days prior to the expiration of the one-year time limit.

Students in the Physician Assistant Program are participants in a professional training program whose graduates assume positions of high responsibility as providers of health care. Accordingly, students are evaluated not only on their academic and clinical skills, but also on their interpersonal skills, reliability, appearance, and professional conduct. Deficiencies in any of these areas are brought to the student's attention in the form of a written evaluation and may result in probation, suspension, or expulsion from the program.

Satisfactory Academic Progress. Satisfactory academic progress for students in the Physician Assistant Program is construed as the successful completion of all requirements necessary for the advancement from one semester to the next. These requirements are as follows:

Preclinical Year: Completion of all required courses (a total of 54 credits) during the fall, spring, and summer terms within the scheduled semester or term and within one year of initial matriculation.

Clinical Year: Completion of all required core rotations, elective rotations, and a final preceptorship (a total of 51 credits) during the fall, spring, and summer terms; these rotations begin in the semester immediately following the completion of the preclinical year and must

proceed as scheduled without interruption for three semesters/terms (13 and one-half months).

In unusual circumstances (including illness, academic remediation, or irregular sequencing of courses) the determination of satisfactory progress for academic purposes is made by the program director of the Physician Assistant Program.

For financial aid purposes, federal regulations establish the maximum time frame for completion of the program at 150 percent of the minimum time required to complete the program. Any student exceeding the 150 percent maximum time frame is ineligible for Title IV (Stafford and Perkins loans) student financial aid funds.

Attendance and Excused Absences. Students are expected to attend all lectures, laboratories, and seminars. Absences are excused only for illness or personal emergency, and students must notify program faculty in advance of an expected absence.

Leave of Absence. A PA student, after presenting a written request to the PA program director, may be granted an official leave of absence for personal, medical, or academic reasons for a period not to exceed one calendar year. If the leave of absence is approved, the program director provides written notification including applicable beginning and ending dates to the student, the medical school registrar, and the director of financial aid. The student must notify the program director in writing of his or her wish to return to the PA Program or to extend the personal leave at least 60 calendar days prior to the anticipated date of reentry. The student desiring an extension beyond one calendar year may be required to apply for readmission to the PA Program. When a leave of absence is taken, the program director may require the student to repeat some or all of the courses completed prior to the leave of absence. In all cases of leave of absence, the student is required to complete the full curriculum to be eligible to earn the PA certificate.

For purposes of deferring repayment of student loans during a school-approved leave of absence, federal regulations limit the leave to six months.

Prerequisites for Admission. The prerequisites for admission to the M.H.S. physician assistant curriculum include:

1. A baccalaureate degree from an accredited institution. College seniors are eligible to apply, provided they receive the baccalaureate degree prior to the August starting date for the PA Program. Those candidates who received their baccalaureate degrees from colleges and institutions outside of the United States must complete at least one year (30 semester credits) of additional undergraduate or graduate study at a U.S. college or university prior to application to the program.
2. Specific prerequisite college courses:
 - At least five biological science courses of three semester credits or four quarter credits each are REQUIRED. Of these five courses, at least one must be in anatomy, one in physiology, and one in microbiology. Courses in human anatomy and human physiology are preferred to courses of a more general nature, and courses with labs are preferred. To fulfill the remaining biological science course prerequisite, the PA Program recommends courses in cell biology, molecular biology, genetics, embryology, histology, or immunology. While none of the latter courses are required, they provide a good foundation for the study of medicine.
 - At least two chemistry courses with labs are REQUIRED. Each of these courses must be at least four semester credits or five quarter credits each.
 - At least one statistics course of at least two semester credits or three quarter credits is REQUIRED.
 - All prerequisite courses must be completed with grades of C or better (not C minus).

3. Scores of the Graduate Record Examination (GRE general test), taken within the last four years, and no later than October 1 of the year of application. No other test scores are accepted in lieu of the GRE
4. A minimum of 1,000 hours of patient care experience, with direct "hands-on" patient contact, completed by November 1 of the year of application.

Application Procedures. The PA Program application is web-based. It may be accessed via the program's website <http://pa.mc.duke.edu>. The application is revised each year and is available from June 1 – November 1. In addition to completing and submitting the web-based application by November 1, candidates must also submit to the program no later than November 1:

- a non-refundable application fee of \$55
- official transcripts from all colleges/universities and other post-secondary institutions attended;
- scores of the (GRE). The GRE must be taken no later than October 1, and scores must be reported on the application;
- three completed recommendation forms, including at least one from a health care provider with whom the applicant has worked.

Selection Factors. The program has a specific interest in enrolling students from diverse social, ethnic, and educational backgrounds. Emphasis is placed upon personal maturity, quality of health care experience, dedication to the health field, and academic potential. Information submitted by each applicant is carefully reviewed by the Committee on Admissions, and selected applicants are invited to Duke University for personal interviews. These interviews take place in January and February; 44 students are chosen from among those interviewed. Only full-time students are admitted.

Candidates are notified of the Admissions Committee's decision as soon as possible after the interview, and no later than March 1. Those candidates who have been accepted are asked to respond in writing with their decision and to confirm their place in the class by submitting the non-refundable registration and deposit fees by March 15. Each year, a ranked alternate list of 10-15 candidates is selected from those candidates who have been interviewed for a position in the class. Should an accepted candidate withdraw from the program prior to the start of classes, the position is offered to the highest ranked candidate on the alternate list.

***Tuition and Fees.** On notification of acceptance, prospective PA students are required to pay a non-refundable first registration fee of \$75, as well as a non-refundable program deposit of \$425. For those who do matriculate, the program deposit is applied to the cost of tuition.

Estimated yearly expenses[†] for the 2003 entering class of the Master of Health Sciences Physician Assistant Program are as follows:

Tuition, First year	\$24,996
Tuition, Current Second year	24,300
Books, uniforms, and instruments, first year	1,864
Books, uniforms, and instruments, second year	650
Technology Fee, First year	1,750
Technology Fee, Current Second year	1,650
Other fees	205
Food, board, and miscellaneous	14,748

*Subject to change and Board approval

[†]Includes Stead Society/NCAPA dues \$60, Recreation \$60, Parking \$65, Graduate Activity \$20

First Year Fee (laboratory)	1,000
Student Health Fee	786
Student Accident and Hospitalization Insurance per year (single)	1,063
Total, First year	46,312
Total, Second year	43,342

Health Insurance. All students are required to carry full major medical health insurance throughout their enrollment in the PA program. If the student does not elect to take the Duke Student Accident and Hospitalization Insurance policy, evidence of other comparable health insurance coverage must be provided. The Student Health Fee is mandatory for all students.

Financial Aid. All financial aid awards are made on the basis of documented financial need.

Qualified students may be eligible for subsidized Federal Stafford Loans up to \$8,500, unsubsidized Federal Stafford loans up to \$10,000, and alternative private loans up to the cost of education. The Federal Stafford Loans interest rate is dependent on the 91-day Treasury bill, but Stafford loan interest rate cannot exceed 8.25%. Alternative, private lenders will have varying rates based on prime rate, the T-bill rate, or LIBOR. The financial aid office participates in the Duke University School as Lender program. Information about this program will be included on the award notification. The final decision, however, is left solely to the student applicant.

The North Carolina Student Loan Program for Health, Science, and Mathematics provides financial assistance in the form of loans up to \$6,500 per year for North Carolina residents; these loans may be cancelled through approved service in shortage areas, public institutions, or private practice. Applicants may call (919) 549-8614 for further information about this loan program. Additional loans are available from private or alternative lenders. On occasion, there are additional federal loans available.

The U.S. Public Health Service has several programs that offer scholarships, stipends, and loan repayment to PA students who commit to varying periods of employment within USPHS facilities. Interested applicants can call the National Health Service Corps Program directly at 1-800-221-9393 for further information.

Limited scholarship funds are available through the Duke Physician Assistant Program. The Physician Assistant Scholarship Committee will review each applicant and make decisions in early fall. This scholarship will reduce the amount a student borrows. All financial aid awards are made on the basis of documented financial need. Financial aid application packets are distributed on the admissions interview date. The application process includes a Duke application, completion of the Free Application for Federal Student Aid (FAFSA), and submission of the applicant's most recent tax return.

Once all of these have been received, a review will be made and an award notification is mailed to the student. It is extremely important that instructions on the award notification are followed in order to apply for loans in a timely manner and to have funds available at the beginning of the academic year.

Applicants are urged to request information and application forms from clubs, organizations, foundations, and agencies as soon as possible after applying for admission to the program. Many libraries have information on sources of financial aid. Also, the financial aid offices at nearby colleges and universities often have information on sources of funding. Applicants are strongly urged to use web search engines in locating scholarships. At no time, however, should an applicant pay a person or company to search for scholarships.

Scholarship information is available free to applicants by using their local and web resources.

Some first-year students are employed part-time; however, the rigor of the academic curriculum usually prevents the student from maintaining part-time employment. Students who wish to be employed during their training must comply with the program's academic schedule and are prohibited from working more than 20 hours per week. Part-time employment must never interfere with class or clinical schedules. Any student unable to maintain adequate academic standing will be asked to terminate his/her employment. Because of the demands of the clinical year, it is difficult or impossible for the second year student to work.

More detailed information regarding financial aid can be obtained from the Office of Financial Aid, Box 3067, Duke University Medical Center, Durham, NC 27710 or by emailing financial_aid@mc.duke.edu.

Commencement. To receive the M.H.S. degree at the May commencement ceremony, the physician assistant student must successfully complete 89 credits including all preclinical courses, Evidence-Based Medicine II (PHYASST 305), and all clinical rotations scheduled to that date. The PA program certificate of completion is awarded four months later, following the student's completion of a total of 105 credits, the remaining clinical rotations, and the final preceptorship.

PA students should be aware that failure to begin or complete a clinical rotation as scheduled could delay receipt of both the M.H.S. degree and the PA program's certificate of completion. Furthermore, any incomplete rotations must be completed prior to receiving the PA Program certificate.

Courses of Instruction

Course credits are the recognized units for academic work in the PA Program. **All courses are required, no transfer credit is accepted, and no credit is granted for past experiential learning.**

Preclinical Year Courses

PHYASST-200. Basic Medical Sciences. The basic facts, concepts, and principles that are essential in understanding the fundamental mechanisms of human physiology, pathology, pharmacology, and nutrition. This course presents the basic methods of clinical problem solving and serves as a prerequisite to the clinical medicine course by emphasizing the underlying principles of the etiology, management, and prevention of disease processes. 5 credits. *Carter*

PHYASST-205. Anatomy. Functional and applied anatomy stressing normal surface landmarks and common clinical findings. Topics for this course are sequenced with physical diagnosis (PHYASST-215). Cadaver prosections, anatomic models, lectures, and computer software are utilized in teaching this course. 4 credits. *Hendrix*

PHYASST-210, 211, 221. Laboratory Medicine I, II. An introduction to the performance and interpretation of routine hematologic, urinary, microbiologic, and other laboratory procedures commonly used in practice. This course is taught by faculty/staff from the Department of Pathology and the hospital laboratories. 5 credits. *Schmidt*

PHYASST-215. Physical Diagnosis. An introduction to the techniques for performing and recording the physical examination. Taught in lecture and small-group format; lectures and audiovisuals are used, as well as extensive small group practice sessions. 3 credits. *Hills*

PHYASST-220, 221, 222. Clinical Medicine I, II, III. The essentials of diagnosis and management of the most common clinical problems seen by primary care practitioners. Using an organ systems approach, clinical information is presented in conjunction with appro-

appropriate correlative lectures and labs in pathophysiology, pharmacotherapeutics, radiology, and nutrition. Patient simulations are used in the small group setting to enhance readings and lectures. This is a core course around which most other courses are organized. 20 credits. *Colletti, Coniglio, and Robinson.*

PHYASST-230. Fundamentals of Surgery. The basic surgical concepts needed for the PA to function in primary care settings as well as major surgical areas. The course emphasizes surgical technique and emergency procedures as well as asepsis, minor procedures, and anesthesia. The animal surgery laboratory is an essential component of this course. 5 credits. *Hendrix*

PHYASST-235, 236. Patient Assessment I, II. An introduction to medical interviewing and the recording and presentation of clinical information. Teaching methods include lectures, small groups, and clinical assignments to inpatient areas as well as outpatient settings. In January and February, students concentrate primarily on history-taking, and are assigned by their small-group instructors to interview patients on the wards. From March through May, students are assigned in small groups to fellows from the Department of Medicine. Weekly, each student is assigned to a hospitalized patient to perform a complete history and physical examination. 3 credits. *Dieter*

PHYASST-240. Behavioral Aspects of Medicine. An introduction to the skills, knowledge, and sensitivity needed to communicate and intervene effectively in a wide variety of psychosocial situations. 2 credits. *Scott*

PHYASST-245. Perspectives on Health. A professional issues review. This course emphasizes current issues facing the profession, including legal and ethical problems and the unique place of PAs within the health care system. 2 credits. *Colletti*

PHYASST-250. Health Systems Organization. An introduction to the structure and administrative principles in use in health care organizations. A lecture series taught by an interdisciplinary faculty and by community experts in health care organization. Topics include the patient as consumer, third-party payment, public policy trends, and organizational behavior. 2 credits. *Strand*

PHYASST 255. Evidence-Based Medicine I. A lecture and seminar course that provides a practical approach to making sound medical decisions on the basis of current evidence in the medical literature. Through a series of didactic presentations, group exercises, and reading, students will learn the basic principles of evidence-based medicine using a case-based approach. Basic skills in using MEDLINE and other medical databases will be emphasized and practiced. Research principles, ethics, and basic statistical review are introduced. *McBride and Schildkraut*

Clinical Year Courses

COMMUNITY AND FAMILY MEDICINE

PHYASST 300. Primary Care. This rotation emphasizes the outpatient evaluation and treatment of conditions common at the primary care level and the appropriate health maintenance measures for different age groups. Many of the training sites provide care for underserved populations in rural North Carolina communities. 8 weeks, 8 credits. *Staff*

PHYASST 305. Evidence-Based Medicine II. During this month-long course during the clinical year, PA students complete a review paper on a clinical question of interest. They present an evidence-based patient case to faculty and preclinical students, based on a patient they have seen during the clinical year. *Coniglio*

PHYASST-310. Behavioral Medicine. The student is assigned to a psychiatric and/or behavioral clinical setting, either inpatient or outpatient. This rotation facilitates the acquisition of communication and behavioral modification skills which are useful in the primary

care setting. 4 credits. *Staff*

MEDICINE

PHYASST-320. Inpatient Medicine. During this eight-week rotation, the student learns to apply basic medical knowledge to the problems and situations encountered on an inpatient service. By collecting a data base, formulating a complete problem list, and participating in daily rounds and in the management of patient problems, the student develops an awareness of the complexity of disease processes and differential diagnosis. 8 credits. *Staff*

OBSTETRICS/GYNECOLOGY

PHYASST-370. Obstetrics/Gynecology. The student learns about common gynecological problems, pregnancy, and delivery. Assisting at operations may be a significant aspect of the rotation. The rotation emphasizes routine gynecological and prenatal care, clinical experience with cancer detection techniques, abnormal menstruation and bleeding, infections, and contraception counseling. 4 credits. *Staff*

PEDIATRICS

PHYASST-360. Pediatrics. In this rotation, the student is assigned to either an institutional setting or a community-based pediatric site. Special emphasis is placed on communication skills and relating sensitively to both children and parents. The student gains familiarity with normal growth and development, pediatric preventive medicine, and evaluation and management of common childhood illnesses. 4 credits. *Staff*

SURGERY

PHYASST-340. General Surgery. This rotation emphasizes preoperative evaluation and preparatory procedures, assisting at the operating table, and management of patients through the postoperative period to discharge. 4 or 8 credits (4 or 8 weeks). *Staff*

PHYASST-350. Emergency Medicine. This rotation stresses the evaluation and management of surgical problems of the ambulatory patient. In the emergency room, the student gains experience in the initial evaluation of potential surgical conditions and performing problem-specific examinations. Orthopaedic evaluation and minor surgical technique are emphasized. 4 credits. *Staff*

In addition to the above required core rotations, each student is required to complete two electives that can be chosen from among the following rotations. All are four weeks long.

COMMUNITY AND FAMILY MEDICINE

PHYASST-301. Occupational Medicine

PHYASST-302. Geriatrics

GENERAL ELECTIVES

PHYASST-300E Outpatient Medicine

PHYASST-310E Behavior Medicine

PHYASST-320E Inpatient Medicine

PHYASST-340E General Surgery

PHYASST-350E Emergency/Outpatient Surgery

PHYASST-360E Pediatrics

PHYASST-370E Obstetrics/Gynecology

MEDICINE

PHYASST-321. Cardiology
PHYASST-322. Dermatology
PHYASST-323. Endocrinology
PHYASST-324. Emergency Medicine
PHYASST-325. Hematology/Oncology
PHYASST-326. Hyperbaric Medicine
PHYASST-327. Infectious Diseases
PHYASST-331. Nephrology
PHYASST-332. Neurology
PHYASST-333. Pulmonary Medicine
PHYASST-334. Rheumatology
PHYASST-335. AIDS Clinical Trials Unit
PHYASST-336. Medical ICU
PHYASST-337. Coronary Care Unit

OPHTHALMOLOGY

PHYASST-381. Ophthalmology

PEDIATRICS

PHYASST-361. Pediatric Cardiology
PHYASST-362. Pediatric Surgery/Cardiothoracic Surgery
PHYASST-363. Pediatric Hematology/Oncology
PHYASST-364. Pediatric Allergy/Respiratory
PHYASST-365. Pediatric Endocrinology
PHYASST-366. Pediatric Infectious Disease
PHYASST-367. Intensive Care Nursery

SURGERY

PHYASST-341. Cardiothoracic Surgery
PHYASST-342. Otolaryngology
PHYASST-343. Neurosurgery
PHYASST-344. Orthopaedics
PHYASST-345. Plastic Surgery
PHYASST-346. Sports Medicine
PHYASST-347. Urology
PHYASST-351. Emergency Medicine
PHYASST-352. Trauma
PHYASST-353. Adult Surgical ICU

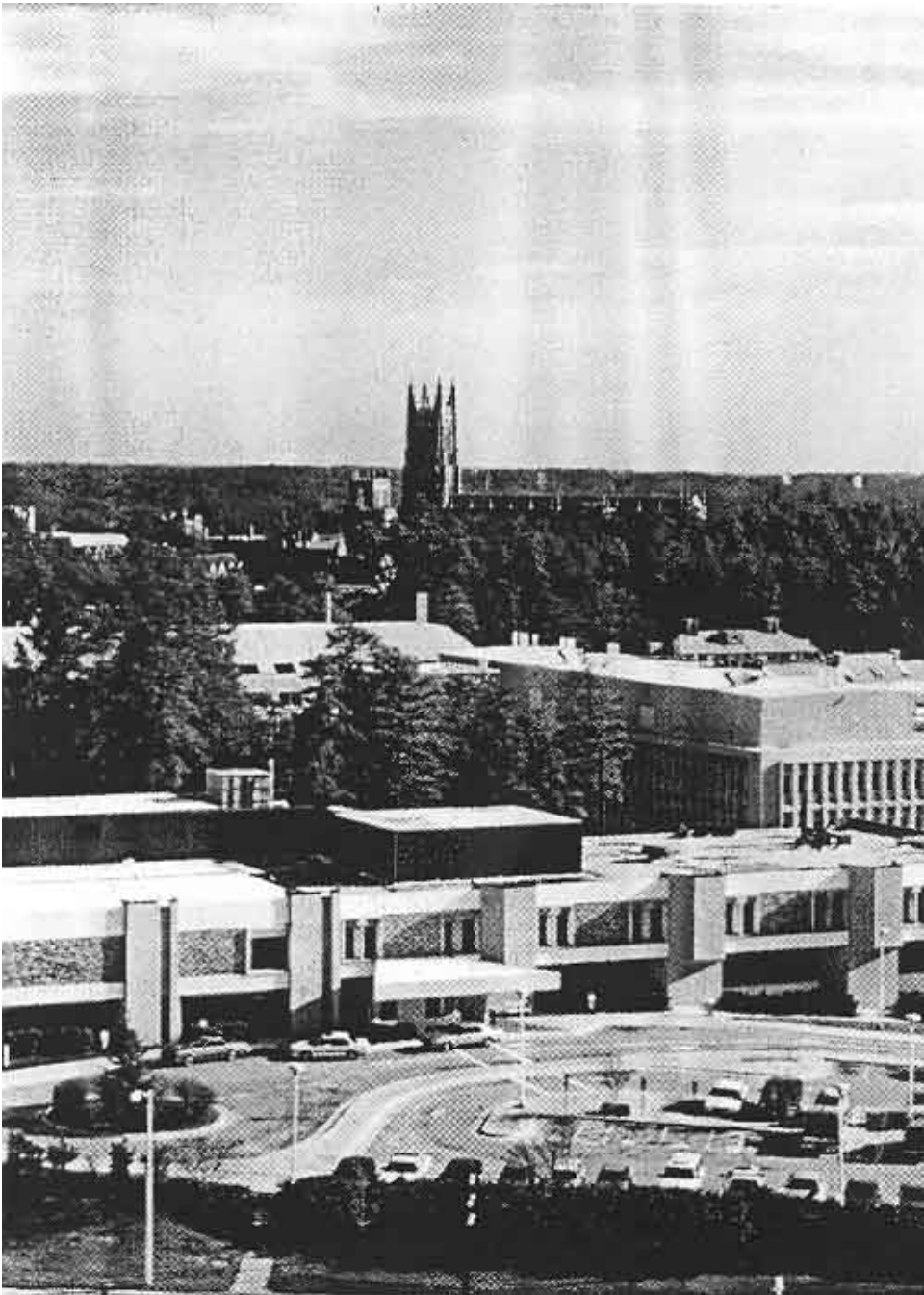
Each of these electives is 4 credits. More detailed information on elective and required rotations may be obtained from the clinical coordinators of the Physician Assistant Program.

The final rotation in the PA program, immediately prior to receiving the program certificate of completion in September, is the preceptorship (PHYASST-390, 4 credits). This required rotation must be completed by all students. Students are encouraged to select a preceptor in the area of their anticipated employment and, during this period of time, to explore the tasks and team aspects of functioning as a mid-level practitioner.

Postgraduate Physician Assistant Course

PHYASST-401. Occupational and Environmental Medicine Certificate Program for PAs. This one-week, on-campus course is offered annually to graduates of accredited physician assistant programs. The course emphasizes safety and work site assessment, electronic resources for occupational/environmental medicine, occupational exposures, occupational illnesses and injuries, drugs and alcohol in the workplace, and occupational health practice management. *Dieter*

Allied Health Certificate Programs



Allied Health Certificate Programs

Duke University Medical Center has responded to the increased need for qualified individuals at all levels in the health care system by developing educational programs designed to equip people for a variety of positions. These programs, which vary in admission requirements and length of training, offer students both clinical and didactic experience. Graduates of these programs are awarded certificates.

Financial information is noted within each program's informational section. For all certificate programs, tuition is refunded according to the following schedule:

Withdrawal from Certificate Programs	Refund*
Before classes begin	full amount
During first week	80%
After first week of classes	None

Clinical Psychology Internship

Director of Clinical Training: Karen C. Wells, Ph.D.

The Division of Medical Psychology, Department of Psychiatry, Duke University Medical Center, offers one year of doctoral-level Internship training in the essential skill areas of Clinical Psychology. Training takes place in a health care setting and offers all interns training in general Clinical Psychology, as well as the opportunity to concentrate on specific areas of Health Psychology. Training takes place within the context of the scientist-practitioner model and has as its overarching goal, to produce a psychologist who is able to integrate science with professional practice knowledge, attitudes, and skills. At the completion of the program, interns are expected to have developed proficiency in observation, interviewing, assessment, report-writing, short-term psychotherapy, cognitive-behavioral treatment, family therapy, and group therapy, which will serve them well in subsequent clinical practice. Graduates of the program may function as clinicians, as researchers, or as both.

The program offers two tracks: Adult Psychology and Child Psychology. Interns apply to one of these two tracks. Within each track, interns also specify an area of concentration: in the Adult track, either Health Psychology, Neuropsychology, or Cognitive-Behavioral Psychology and in the Child track, either Pediatric Psychology or Child Clinical Psychology. Both tracks afford interns the opportunity to integrate the multiple roles and responsibilities of a Clinical Psychologist in a health care setting. Interns learn through clinical experiences in outpatient settings, medical inpatient units, in didactic seminars, through readings, and by participation in ongoing research of their clinical supervisors. All interns participate in weekly core seminars designed to expose them to both basic and advanced concepts in clinical practice, including individual and cultural diversity, ethics and professionalism, and theories and methods of supervision.

For a detailed description of the program and all the rotations and faculty associated with each track of the internship, please see our website: <http://psychiatry.mc.duke.edu/Education/Psychology/Psychology.htm>. Application instructions and application deadlines are also included in the program description. The program offers internship training to students who are currently enrolled in APA-approved Ph.D. programs in Clinical Psychology and who have already completed three years of graduate study. The program is accredited by the American Psychological Association.

Those successfully completing the requirements for the internship are awarded a Duke University Medical Center certificate. Requests for additional information and

* Includes involuntary withdrawal for academic reasons

correspondence concerning admission to the program should be directed to the Director, Clinical Psychology Internship Program, Box 3320, Duke University Medical Center, Durham, North Carolina 27710.

Ophthalmic Medical Technician

Medical Director: David Chesnutt, M.D.

Program Director: Karen Summerville, COMT

The Ophthalmic Medical Technician Training program is sponsored by the Department of Ophthalmology, Duke University Medical Center. This is a one-year certificate program designed to prepare the student to perform adequately as an ophthalmic medical technician. The program consists of didactic lectures and clinical experiences designed to provide the background information necessary for students to understand and perform the technical tasks designated to them by an ophthalmologist. The first two months consist of core curriculum lectures supplemented with clinical introductory labs and workshops. In approximately the third month, clinical rotations begin. Students rotate through various subspecialty departments observing, learning, and demonstrating the skills particular to that service. Students are monitored under the close supervision of clinical support staff and faculty and are evaluated on a routine basis as their skills develop. Orientation and classes begin on the first Monday in July, and consist of 51 instructional weeks including 12 days of personal leave.

Upon satisfactory completion of the curriculum, students receive a certificate from Duke University Medical Center and are eligible to sit for the national certification examination offered by the Joint Commission of Allied Health Personnel in Ophthalmology at the Technician level.

Prerequisites for Admission. Official documentation of prior educational experience is required for applicants to the program. Applicants must have either completed high school or passed a high school equivalency test. Preference will be shown to applicants who have completed college level courses and/or have some ocular-related work experience. Students must be capable of providing adequate ophthalmic medical clinic patient care.

Application Procedures. Applications are reviewed between January 1 and April 1 of the year for which admission is requested and must contain the following:

1. The completed Duke University Medical Center Application for Admission for the Ophthalmic Medical Technician Training Program, which can be sent by mail or found on-line at www.dukeeye.org/education. This includes a nonrefundable processing fee;
2. Official transcript(s) from the most recent schools attended;
3. One original letter of recommendation from a previous employer or course instructor;
4. An essay on your reasons or motivations for wanting to enter the OMT Training Program.

A personal interview with members of the Admissions Committee may be requested following receipt and approval of the application and other information.

The deadline for applications is April 1 of the year for which admission is requested. It is strongly recommended that applications be submitted as early as possible. The Admissions Committee will request that eligible applicants come for an interview following receipt of all necessary information. Applicants are notified no later than May 15 regarding admission to the program. Orientation and classes will begin on the first Monday in July. Requests for further information and application forms should be directed to the Program Director, Karen Summerville, COMT, Box 3802, Duke University Eye Center, Durham, North Carolina 27710. For additional program information, refer to www.dukeeye.org/education.



Fees and Expenses. Tuition for the program is \$2,800. The student is responsible for housing, board, books, the student health fee, and medical insurance. Fifty percent of the tuition is due at matriculation with the balance being due in January.

Transportation Required. Students should be aware that they may rotate to clinical sites outside of the university campus. The university does not provide transportation.

Financial Aid. For information, please contact the Financial Aid Office, Box 3067, Duke University Medical Center, Durham, NC 27710, or refer to <http://finaid.mc.duke.edu>.

Courses of Instruction. Students must satisfactorily complete the following courses. The curriculum includes, but is not limited to, the following:

COURSE TITLE	CLOCK HOURS
Orientation Lectures	50
Basic Science Lecture	125
Visual Acuity Assessment	10
Physiology and Anatomy of the Eye	15
Physical History	24
Cardiopulmonary Resuscitation	8
Instrument Maintenance	5
Visual Fields	24
Optics and Refractometry	40
Medical Terminology	12
Spectacles	10
Pharmacology	5
Glaucoma and Tonometry	15
External Ocular Diseases	8
Physiology of Systemic Diseases	12
Contact Lens and Keratometry	14
Ocular Motility	15
Neuro-Ophthalmology	5
General Psychology	5
Clinical Rotations	1172
Total	1574

Residency in Pharmacy Practice

Director, Pharmacy Practice Residency: D. Byron May, Pharm.D., B.C.P.S.
 Director of Pharmacy Services: Steven C. Dedrick, M.S.

The Pharmacy Practice Residency is a 12-month postgraduate program conducted by the Department of Pharmacy at the Duke University Medical Center. The residency is designed to give the graduate pharmacist extensive training in pharmacy practice.

Admission Standards. Applicants must be graduates of accredited schools of pharmacy and must have a Doctor of Pharmacy (Pharm.D.) degree. Residency candidates must demonstrate superior academic and leadership capabilities and be eligible for licensure in North Carolina. It is preferable that the applicant have previous hospital experience.

Application Procedures. Applications must be submitted by early January of the year for which admission is requested and include the following:

1. ASHP/National Matching Services resident matching, program application, code number;

2. Official transcript from pharmacy school and other professional programs attended;
3. Completed residency application forms; and
4. Letters of recommendation from a minimum of four persons who have known the applicant professionally, at least two of which should be from clinical preceptors.

Applicants are notified in April regarding admission to the program. Requests for further information and application forms should be directed to D. Byron May, Pharm.D., B.C.P.S., Director for Residency Training, Box 3089, Duke University Medical Center, Durham, North Carolina 27710. Email: byron.may@duke.edu or visit our website at: <http://pharmacy.mc.duke.edu>.

Stipend. A stipend of \$33,200 is granted for the 12-month residency.

***Duke University School of Nursing
Program***



The Duke University School of Nursing

Mission

Duke University School of Nursing, a diverse community of scholars and clinicians, fosters leadership in education, the advancement of nursing science, and scholarly practice.

As a center of nursing excellence, we seek to enhance health and quality of life for all people.

Philosophy

The faculty believe nursing is a dynamic, caring process that utilizes well-defined skills in critical thinking, clinical decision-making, communication, and interventions for the promotion and restoration of health and prevention of illness, and provision of comfort for those who are dying. Using a holistic approach, nurses as members of an interdisciplinary team, provide care in and across environments, to diverse individuals, groups and communities in the context of a complex health care system. Nurses transform health care with knowledge of systems and health care services. Fundamental to nursing care is respect for the rights, values, autonomy, and dignity of each person. As a profession, nursing is accountable to society for developing knowledge to improve care, fostering interdisciplinary collaboration, providing cost-effective care, and seeking equal treatment and access to care for all.

Nursing education serves to stimulate intellectual growth, foster ethical well-being, and develop members of the profession. Professional nursing education is based on an appreciation of individual differences and the development of each student's potential. Students are active, self-directed participants in the learning process, while faculty serve as role models, mentors, educational resources, and facilitators of learning. The faculty assume responsibility for the quality of the educational program, simulations of analytical thinking and creative problem-solving, and responsible decision-making. The complexity of societal, environmental, and technological changes necessitates that nursing students develop knowledge about ethical, political, and socioeconomic issues that result from these changes. Students are responsible for continuing the process of personal and professional development, including developing professional expertise, and a commitment to inquiry and leadership. Faculty and students, individually and in community, pursue life-long learning and the development of knowledge to contribute as leaders in health care to their community, nation, and world.

Baccalaureate education is necessary for entry into professional practice by combining the components of a strong liberal arts and sciences foundation with professional values, competencies, core nursing knowledge, and role development. At the baccalaureate level, nurses are providers of evidence-based care, designers and coordinators of care, and clinical

leaders. Baccalaureate education prepares graduates for education at the master's level. At the graduate level, students are prepared to specialize as advanced practitioners, administrators, educators, and researchers. The graduate student prepares to contribute to the profession through leadership in his/her area of specialization, and through the conduct and use of relevant research to expand nursing knowledge and to improve the quality of nursing practice.

Programs

BACHELOR OF SCIENCE IN NURSING

The School of Nursing offers an accelerated BSN curriculum as a full-time, campus-based 16-month program designed for adult learners who have completed an undergraduate degree. The curriculum has 58 total credit hours with 15 graduate credits included in the curriculum. This program incorporates all of the components of a traditional Bachelor of Science in Nursing Program with an additional focus on twenty-first century health care needs and environment, including contemporary topics advanced to the forefront of urgency through technological advances, changes in population demographics, current socio-political influences, and evolving health care needs. These topics include genetics, elder care, palliative care, multicultural care, and care at the end of life. Threads throughout the program also include health promotion, diversity, critical thinking, evidence-based practice, leadership, and technology.

The integration of education, practice, and research serves as the foundation for this program and upon completion of the program, the graduate is able to:

1. Apply critical thinking and nursing processes in the delivery of care within multiple contexts across the lifespan.
2. Demonstrate safe, competent, evidence-based clinical interventions in providing direct/indirect care to patients, families, aggregates, and service to communities.
3. Utilize therapeutic communication skills for assessment, intervention, evaluation, and teaching of diverse groups.
4. Analyze the effect of socio-cultural, ethical, spiritual, economic, and political issues influencing patient outcomes.
5. Utilize leadership and management skills working with interdisciplinary teams to form partnerships with patients, families, and provide service to communities.
6. Demonstrate competence in critical decision-making with the use and management of advanced technology related to patient care and support systems.
7. Assume responsibility and accountability for one's own professional practice and continued professional growth and development.

MASTER OF SCIENCE IN NURSING PROGRAM

The School of Nursing offers a flexible, 39 to 59 credit program leading to the Master of Science in Nursing degree and offers two joint degree programs in conjunction with The Fuqua School of Business (the M.S.N./M.B.A.) and the Divinity School (M.S.N./M.C.M.). Students pursue their educational endeavors with faculty and clinical/consulting associates who have expertise and research in the student's chosen area of specialization. For most programs, students have the ability to pursue full-time or part-time study.

The integration of education, practice, and research undergirds the entire curriculum and the behavior of those individuals involved in the educative process. Upon completion of the program, the graduate is able to:

1. synthesize concepts and theories from nursing and related disciplines to form the basis for advanced practice,
2. demonstrate expertise in a defined area of advanced practice,

3. utilize the process of scientific inquiry to validate and refine knowledge relevant to nursing,
4. demonstrate leadership and management strategies for advanced practice,
5. demonstrate proficiency in the use and management of advanced technology related to patient care and support systems,
6. analyze socio-cultural, ethical, economic, and political issues that influence patient outcomes,
7. demonstrate the ability to engage in collegial intra- and inter-disciplinary relationships in the conduct of advanced practice.

THE POST-MASTER'S CERTIFICATE PROGRAM

The School of Nursing offers a post-master's certificate to students who have earned an M.S.N. from a National League for Nursing or Commission on Collegiate Nursing Education accredited program and are seeking specialized knowledge within a major offered in the School's master's program. The number of credits required to complete the certificate program varies by major; the student must successfully complete the required courses in the chosen nursing major. Completion of the certificate program is documented in the student's academic transcript. Depending upon the major, the student may then meet the qualifications for advanced practice certification in the specialty area. For example, students who complete the post-master's certificate in the nurse practitioner majors are eligible to sit for certification examinations.

Admission

ADMISSION REQUIREMENTS FOR THE ACCELERATED BACHELOR OF SCIENCE IN NURSING DEGREE

Students admitted to the program are expected to be self-directed and committed to a rigorous academic and clinical experience. Admission requirements are:

1. A bachelor's degree from an accredited college in any major.
2. Completion of the following course prerequisites (may be as part of the bachelor's degree):
 - Human Anatomy and Physiology, 6-8 credits
 - Microbiology (lab recommended), 3-4 credits
 - Basic Statistics, 3 credits
 - General Psychology, 3 credits
 - General Sociology, 3 credits
 - English Composition, 3-6 credits
3. Completion of undergraduate coursework in nutrition and growth and development is strongly recommended.
4. A strong academic record with a minimum of a 3.0 GPA on a 4.0 scale.
5. GRE or MAT required
6. A completed application including one copy of all post-secondary educational transcripts.
7. Three letters of recommendation that address the student's academic abilities and strengths as a self directed learner.
8. A personal interview for information-sharing with the applicant.
9. A minimum grade of 2.0 on a 4.0 scale in each nursing prerequisite course.
10. Physical health and emotional stability sufficient to meet the demands of nursing and provide safe patient care.
11. Fluency in speaking, reading, and writing English.
12. \$50 application fee.

Selection will be based on the applicant's qualifications, intellectual curiosity, potential for professional growth, and contribution to the profession. Exception to any of the admission requirements will be considered on an individual basis.

ADMISSION REQUIREMENTS FOR THE MASTER'S DEGREE*

1. Bachelor's degree with an upper division nursing major from a program accredited by the National League for Nursing (NLNAC) or the Commission on Collegiate Nursing Education (CCNE).
2. Completion of application for admission, including two copies of all post-secondary educational transcripts. The bachelor's or post-bachelor's course work must include satisfactory completion of a course in descriptive and inferential statistics.
3. It is recommended, but not required, that applicants have a minimum of one year of nursing experience before matriculation. Applicants with less than one year of experience will be advised to take core courses in the first year of study and to work to meet the experience recommendation.
4. Undergraduate grade point average of 3.0 on a 4.0 scale.
5. Satisfactory performance on the Graduate Record Examination (GRE) or Miller Analogies Test (MAT).
6. Licensure or eligibility for licensure as a professional nurse in North Carolina, unless your license is from a "compact state": Arkansas, Iowa, Maryland, Texas, Utah, or Wisconsin; and that is your primary state of residence (your declared, fixed, permanent, and principal home for legal purposes; domicile) or you are a distance-based student who will not be practicing in North Carolina while enrolled in school and have licensure or eligibility for licensure in your primary state of residence.[†]
7. Three references attesting to personal and professional qualifications. At least two references must be from former employers, faculty members, or deans.
8. \$50 application fee.
9. Telephone or personal interview.

Selection will be based on the applicant's qualifications, intellectual curiosity, potential for professional growth, and contributions to the profession. Exception to any of the admission requirements will be considered on an individual basis.

ADMISSION REQUIREMENTS FOR THE POST-MASTER'S CERTIFICATE OPTION*

1. A master's degree from an NLNAC or CCNE accredited school of nursing.
2. Completion of application for the certificate program including one copy of all undergraduate and graduate transcripts. The bachelor's or post-bachelor's course

*Candidates for admission to the Nurse Anesthesia program at the Duke University School of Nursing have the same admission requirements as all other applicants, with the following additions: 1) Basic and Advanced Cardiac Life Support Certification (ACLS and PALS); and 2) one year of acute care experience as a registered nurse with an emphasis placed on interpretation and use of advanced monitoring, ventilatory care, fine psychomotor skills, and independent decision-making.

[†]Candidates for admission to the Master of Science in Nursing or Post-Master's Certificate program of Duke University School of Nursing who are not from a "compact state" or who are distance-based students must obtain a license to practice as a registered nurse in the state of North Carolina before matriculation. All students from a "compact state" and all distance-based students must provide proof of licensure on an annual basis to the Office of Admissions and Student Services. Students licensed by the state of North Carolina will have their licenses verified via the Board of Nursing website by the Office of Admissions and Student Services. Information on licensure procedures for the State of North Carolina may be obtained from the North Carolina Board of Nursing, P.O. Box 2129, Raleigh, North Carolina 27602, or by calling 919-782-3211.

work must include satisfactory completion of a course in descriptive and inferential statistics.

3. It is recommended, but not required, that applicants have a minimum of one year of nursing experience before matriculation.
4. Licensure or eligibility for licensure as a professional nurse in North Carolina, unless your license is from a “compact state”: Arkansas, Iowa, Maryland, Texas, Utah or Wisconsin; and that is your primary state of residence (your declared fixed permanent and principal home for legal purposes; domicile) or you are a distance-based student who will not be practicing in North Carolina while enrolled in school and have licensure or eligibility for licensure in your primary state of residence.*
5. Two letters of academic and/or professional reference.
6. Personal interview. Other arrangements will be made when distance is a factor.

ADMISSION REQUIREMENTS FOR THE NON-DEGREE OPTION

An individual may take graduate level courses as a non-degree student, provided he or she has a bachelor’s degree. Non-degree students are admitted to individual classes by permission of the instructor on a space-available basis. To apply, an official copy of all transcripts must be sent to the School of Nursing Office of Admissions and Student Services along with a completed Non-Degree Application for Admission and a \$50 application fee. Students who register for clinical courses must also submit two letters of reference from their employer and evidence of licensure as a nurse in North Carolina or a “compact” state.*

All non-degree application requirements are to be submitted by the deadline for the semester during which the course will be offered; applications received after the deadline will be considered on a space-available basis only. If permission is granted by the faculty, the student will be notified by the Office of Admissions and Student Services.

Admission as a non-degree student in the School of Nursing does not imply or guarantee admission to degree status in any school of the university. Admission to the School of Nursing is limited to those applicants whose previous academic work or training indicates an ability to perform satisfactorily at the level established for the university’s students. If a non-degree student is later admitted to the M.S.N. program, a maximum of seven credits earned as a non-degree student will be accepted toward the M.S.N. degree.

ADDITIONAL ADMISSION REQUIREMENTS FOR INTERNATIONAL APPLICANTS

Duke welcomes the unique cultural and personal perspectives of all people. International students are encouraged to apply early in the academic year prior to the year they wish to attend Duke to ensure time to complete the following additional requirements:

1. evidence of adequate financial support for the duration of the program;
2. a minimum score of 550 on the paper-based test or of 213 on the computer-based test on the Test of English as a Foreign Language (TOEFL) if English is not the primary language;
3. a passing score on the Commission on Graduates of Foreign Nursing Schools (CGFNS) examination.

The Commission on Graduates of Foreign Nursing Schools (CGFNS) examination is a prerequisite for taking the Registered Nurse licensing examination in the state of North

*Candidates for admission to the Master of Science in Nursing or Post-Master’s Certificate program of Duke University School of Nursing who are not from a “compact state” or who are distance-based students must obtain a license to practice as a registered nurse in the state of North Carolina before matriculation. All students from a “compact state” and all distance-based students must provide proof of licensure on an annual basis to the Office of Admissions and Student Services. Students licensed by the state of North Carolina will have their licenses verified via the Board of Nursing website by the Office of Admissions and Student Services. Information on licensure procedures for the State of North Carolina may be obtained from the North Carolina Board of Nursing, P.O. Box 2129, Raleigh, North Carolina 27602, or by calling 919-782-3211.

Carolina and for obtaining a non-immigrant occupational preference visa (H1-A) from the United States Immigration and Naturalization Service. CGFNS offers a two-part certification program that includes a credentials review followed by a test of nursing and English language skills. The CGFNS examination dates can be found at <http://www.cgfns.org>. Application materials may be requested from CGFNS, 3624 Market Street, Philadelphia, Pennsylvania 19014 (215-349-8767) or via the CGFNS website. The registration deadlines for these exams are approximately four months prior to their administration. Early application is therefore essential.

TOEFL information can be obtained at P.O. Box 6151, Princeton, NJ (609-771-7100) or from the TOEFL website at <http://www.toefl.org>.

OFFICE OF ADMISSIONS AND STUDENT SERVICES CONTACT INFORMATION

Prospective students wishing to obtain program information and admissions materials should contact the Office of Admissions and Student Services toll free at 1-877-415-3853, locally at (919)684-4248, or by email at Admissions@son3.mc.duke.edu. Information can also be accessed at the School of Nursing's website: <http://www.nursing.duke.edu>.

FULL-TIME AND PART-TIME DEGREE STATUS

Opportunities for part-time and full-time study are available for most programs. For on-campus students, full-time status is defined as taking a minimum of nine (9) credits or three (3) courses per semester, except when fewer credits are needed to complete program requirements. Full-time status in distance-based programs is defined as taking 18 credits per calendar year except when fewer credits are needed to complete program requirements. Students who wish to change from full-time or part-time status must notify both their academic advisor and the Office of Admissions and Student Services.

HEALTH AND IMMUNIZATION RECORD

North Carolina law requires that all new students present proof of selected immunizations before matriculation. The Duke University Student Health Immunization Form and Report of Medical History, furnished by Duke University, should be completed and returned to the Director of the Student Health Center, Box 2899, DUMC, Duke University, Durham, North Carolina 27710 (919-684-3367).

Students should begin classes with complete, verified immunization forms. For those who are unable to do so, the Durham County Health Department, (919) 560-7600, on Main Street provides some of the necessary inoculations free of charge. Online students should send in their completed and verified forms at least two weeks prior to the start of the semester.

ADMISSION APPLICATION INFORMATION

All applicants to graduate programs at the Duke University School of Nursing must complete an application and submit it to the Office of Admissions and Student Services. A check or money order for the non-refundable processing fee of \$50 must accompany each application.

Students applying to the Duke School of Nursing must complete either the Graduate Record Exam or the Miller Analogies Test. Testing dates and locations for the Graduate Record Examination can be obtained from most colleges or from the Educational Testing Service, P. O. Box 6000, Princeton, New Jersey 08541-6000 (609-771-7670 or <http://www.gre.org>). Information for the Miller Analogies Test can be obtained from The Psychological Corporation, 555 Academic Court, San Antonio, Texas 78204-3956 (210-921-8801 or 800-622-3231). **The number to use on the GRE to indicate that you want**

a copy of your scores sent to the School of Nursing is R5173. The number to use on the MAT is 2734.

Once the Office of Admissions and Student Services receives all of the above information, a faculty member will contact the applicant and arrange a personal interview. Following this interview, the Admissions Committee reviews the student's information, and a final recommendation is forwarded to the dean of the School of Nursing.

APPLICATION DATES

For individuals applying for the Accelerated B.S.N. Program, the Duke University School of Nursing gives preference to applications received by March 1st for fall matriculation. Preference for applicants for the Nurse Anesthesia Program is given to applications received by August 1st for spring matriculation. Applications received after these dates will be considered on a space-available basis. For all other programs, the Duke University School of Nursing gives preference to applications received by March 1st for summer and fall matriculation and October 1st for spring matriculation. Applications received after these dates will be considered on a space-available basis.

NOTIFICATION OF STATUS

Admission may be accepted, accepted with conditions, or denied admission. Each applicant will receive written notification of all decisions. The process of admission is not complete until the School of Nursing Office of Admissions and Student Services has received the acceptance forms and non-refundable tuition deposit. The tuition deposit is \$500 for the Accelerated B.S.N. Program and \$150 for all graduate nursing programs except the nurse anesthesia program, which requires a \$1,000 deposit. This fee will be credited toward tuition or forfeited if the student decides not to matriculate.

COMPUTER SKILLS

The School of Nursing is dedicated to technology-enhanced learning. Courses integrate technology in curriculum delivery and require an intermediate level of computer literacy, including proficiency in MS Word, file management skills, browser management skills, and basic computer security. During Orientation week, on-campus students are required to complete a half-day Technology Seminar; alternative arrangements for meeting the basic skills requirement will be made for distance education students who are unable to attend Orientation. For more information on recommended computer hardware/software and computer literacy needs, please refer to the School of Nursing's website: <http://www.nursing.duke.edu>.

ADVISEMENT

Upon admission to the program, each student is assigned an interim academic advisor. This advisor will direct the student's academic activities until a permanent academic advisor is assigned. The permanent academic advisor is selected following consultation with both the interim and proposed academic advisors, and in accordance with the student's clinical and research interests. The permanent academic advisor then assists the student in planning and implementing his/her course of study throughout the master's program.

CHANGE OF ADVISOR

Students may request a change in assignment to an academic advisor by filing a "Change of Advisor" form, available in the Office of Admissions and Student Services. In order for the form to be processed, students must secure all needed signatures, and the form must be filed before changes in assignment of academic advisors can be made; a verbal agreement with a faculty member does not constitute a change in advisors. The School of Nursing reserves the right to change a student's advisor as needed. In the event that the School of Nursing changes a student's advisor, the new advisor will explain to the student the reason for the change.

FINANCIAL AID

Applicants who wish to be considered for financial assistance are highly encouraged to complete and submit a Free Application for Federal Student Aid (FAFSA) while applying for admission. An application for the School of Nursing Merit Scholarship must also be submitted prior to March 1st for fall and summer matriculation or October 1st for spring matriculation. Applications for merit for the Accelerated B.S.N. Program must be submitted by March 1st. These forms are available at the Office of Admissions and Student Services at the School of Nursing. For additional financial aid information, please refer to the complete Financial Aid section located at the end of the School of Nursing Bulletin.

Progression

ACCELERATED BACHELOR OF SCIENCE IN NURSING PROGRAM

For the Accelerated Bachelor of Science Degree, the student must complete 58 credit hours of required courses with a grade point average of 2.0 on a 4.0 scale.

GRADES

All courses in the School of Nursing counting toward the bachelor's degree must be taken for the following grades: *A*(4.0); *A-*(3.7); *B+*(3.3); *B*(3.0); *B-*(2.7); *C+*(2.3); *C*(2.0); *C-*(1.7); *F*(0.0). The letter to number conversion for course work is as follows: *A* (93-100); *A-* (90-92); *B+* (87-89); *B* (83-86); *B-* (80-82); *C+* (77-79); *C* (73-76); *C-* (70-72); *F* (69 and below). A minimum grade of a *C-* must be obtained in all required nursing courses. A student receiving less than a *C-* in a course prerequisite to another nursing course may not advance until the course is repeated and a grade of *C-* or better is obtained. In case of illness or other non-academic problems, it is the student's responsibility to negotiate with the professor for an *I* (Incomplete grade). In the case of an *I*, the professor issuing the *I* will specify the date by which the student is to remove the deficiency.

ACADEMIC WARNING AND ADMINISTRATIVE WITHDRAWAL

Students who have a cumulative GPA less than 2.0 at any time after completing 30 credits will be asked to withdraw from the program. Prior to the completion of 30 credits, students whose cumulative GPA falls below 2.0 will be placed on academic probation and must meet with their academic advisor to develop a personal plan for improvement. Students whose cumulative GPA falls below 2.5 at any time will receive a letter of academic warning, and the student is required to meet with his/her academic advisor. These measures are designed to encourage students to reflect critically on their academic performance from semester to semester and continue to improve and excel. An *F* (0.0) in any course will result in administrative withdrawal from the program at the end of the semester in which the grade is received.

COURSE ADD/DROP/INTERRUPTION AND WITHDRAWAL

Dropping courses must be done during the designated period of time in the semester. If a student withdraws from a course after the add/drop period, the status of the student at the time of withdrawal from the course will be indicated on the student's transcript as Withdrew Passing (*WP*) or Withdrew Failing (*WF*). A student who is failing a course may withdraw from the course no later than one (1) week prior to the scheduled final exam or one (1) week prior to the last day of classes (if there is no final exam). In exceptional circumstances, the student may petition the dean to receive a Withdrew (*W*). Refunds of tuition and fees will not be made except as applicable within the established parameter of a total withdrawal from the program. If a student withdraws from a course, he or she withdraws from the program. Students withdrawing from the program for any reason will be considered for readmission on a space-available basis. Students who find it necessary to interrupt their program of study should request in writing a leave of absence addressed to the dean of the School of Nursing.

A maximum of one calendar year's leave may be granted. The School of Nursing reserves the right, and matriculation by the student is a concession of this right, to request the withdrawal of any student whose performance at any time is not satisfactory to the School of Nursing.



TRANSFER OF CREDIT

All upper division nursing courses must be taken at the School of Nursing.

Graduate and Post Master's Certificate

GRADES

All courses in the School of Nursing counting toward the master's degree, except those listed in the next paragraph, must be taken for the following grades: *A* (4.0); *A-* (3.7); *B+* (3.3); *B* (3.0); *B-* (2.7); *C+* (2.3); *C* (2.0); *C-* (1.7); *F* (0.0). The letter-to-number conversion for course work is as follows: *A* (93-100); *A-* (90-92); *B+* (87-89); *B* (83-86); *B-* (80-82); *C+* (77-79); *C* (73-76); *C-* (70-72); *F* (69 and below).

The professor will assign a designation of “*Cr*” or “*NCr*” for credits earned toward completion of the thesis (N313), the non-thesis option (N314), directed research (N315), independent study (N359), the residency and those elective courses offered with a Credit/NoCredit option. The designation of “*Cr*” indicates that the student has successfully completed all the requirements for those credits registered. The designation “*NCr*” indicates that the student has failed the course and “*NCr*” is treated as an “*F*.” A minimum of six credits must be earned for N313 or N314; however, these credits may be earned in any amount of whole number increments to total six.

In case of illness or other non-academic problems, it is the student's responsibility to negotiate with the professor for an *I* (Incomplete grade). In the case of an *I*, the professor issuing the *I* will specify the date by which the student is to remove the deficiency; in no case will this be more than one calendar year from the date the course ended.

ACADEMIC WARNING AND ADMINISTRATIVE WITHDRAWAL

Master's students who have a cumulative GPA less than 2.7 at any time after completing 20 credits will be asked to withdraw from the program. Post Master's Certificate students who have a cumulative GPA less than 2.7 at any time after completing ten credits will be asked to withdraw from the program. An *F* (0.0) in any graduate level course will result in administrative withdrawal from the school at the end of the semester in which the grade is received. Prior to the completion of 20 credits (M.S.N. students) or ten credits (P.M.C. students), students whose cumulative GPA falls below 2.7 will be placed on academic probation and must meet with their academic advisor to develop a personal plan for improvement. A student whose cumulative GPA falls between 2.7 and 3.0 at any time will receive a letter of academic warning and is encouraged to meet with her or his academic advisor. These measures are designed to encourage students to reflect critically on their academic performance from semester to semester and continue to improve and excel.

COURSE ADD/DROP/WITHDRAWAL

Students may make changes in their schedule before the end of the add/drop period at the beginning of each semester. Precise dates are provided to students with registration information. The student's advisor must review and approve the student's request to drop or add courses. Dropping or adding courses must be done during the designated period of time in the semester. If a student withdraws from a course after the add/drop period, the status of the student at the time of withdrawal from the course will be indicated on the student's transcript as Withdrew Passing (*WP*) or Withdrew Failing (*WF*). A student who is failing a course may withdraw from the course no later than one (1) week prior to the scheduled final exam or one (1) week prior to the last day of classes (if there is no final exam). Withdrawal is constituted by the submission of a completed *Course Withdrawal* form with all requisite signatures to the Office of Admissions and Student Services. A student who withdraws failing (*WF*) from more than one course will be administratively withdrawn from the program.

In exceptional circumstances, the student may petition the dean to receive a Withdrew (*W*). Refunds of tuition and fees will not be made except as applicable within the established parameter of a total withdrawal from the program.

INTERRUPTION OF PROGRAM AND WITHDRAWAL FROM THE GRADUATE PROGRAM

The School of Nursing reserves the right, and matriculation by the student is a concession of this right, to request the withdrawal of any student whose performance at any time is not satisfactory to the School of Nursing. If a student for any reason wishes to withdraw from the school, notification should be made to the dean before the expected date of withdrawal. Students who have withdrawn from the school must re-apply for admission according to regular admission policies.

Students who find it necessary to interrupt their program of study should request in writing a leave of absence addressed to the dean of the School of Nursing. A maximum of one calendar year's leave may be granted; this will be counted toward the total time allowed to complete the program.

TRANSFER OF GRADUATE CREDITS

A maximum of six units of graduate credit may be transferred for graduate courses completed at other accredited institutions (or in other graduate programs at Duke). Transfer credit will be given only for academic work completed within the five years prior to matriculation at Duke. Such units are transferable only if the student has received a grade of *B* (3.0 on a 4.0 scale or its equivalent) and after the student has earned a minimum of six units of graduate credit at Duke University School of Nursing. A student wishing to transfer course work should make a written request to his/her academic advisor and provide a transcript and a syllabus or other description of the course he/she wishes to have considered for transfer credit.

TIME FOR COMPLETION OF THE MASTER'S DEGREE

The master's degree student should complete all requirements for the degree within five calendar years from the date of initial matriculation. No full-time residence is required; however, all students enrolled in the school who have not been granted a leave of absence by the dean must register for fall, spring, and summer semesters until all degree requirements are completed.

Information For All Students

SERVICES FOR STUDENTS WITH DISABILITIES

Duke University is prepared to explore possible coverage, reasonable academic adjustments, and accommodations to permit students with disabilities participation in the programs and activities available to students without disabilities. Students with disabilities needing information about academic accommodations should consult with the Office of Services for Students with Disabilities (919) 684-5917.

The vice-president for Institutional Equity is the designated compliance officer for the Americans with Disabilities Act of 1990 and the Rehabilitation Act of 1970. The compliance office can be reached at (919) 684-8222.

Graduates of the B.S.N. Program who are candidates for the NCLEX and are requesting testing modification due to disability are required by the North Carolina Board of Nursing to supply the following documentation:

Letter from candidate defining what their disability is, specific testing modifications desired, and the test center at which they want to test.

Letter from director of Nursing Program defining what accommodations the candidate was afforded during the educational process.

Letter of diagnosis from appropriate medical professional including: an identification of the specific standardized tests and assessments given to diagnose the disability, the scores resulting from testing, interpretation of the scores, and the evaluations.

The North Carolina Board of Nursing will contact the candidate when the request has been evaluated.

COMMUNICATION BETWEEN DUKE UNIVERSITY AND STUDENTS

Electronic mail (email) is the official medium by which Duke University communicates policies, procedures, and items related to course work or degree requirements to students enrolled at the university. All students matriculated at the School of Nursing are assigned a Duke University email account upon acceptance of an offer of admission. It is the student's responsibility to check this email account regularly and to respond promptly to requests made by email.

INTER-INSTITUTIONAL AGREEMENTS

Under a plan of cooperation between Duke University and the University of North Carolina at Chapel Hill, North Carolina Central University in Durham, and North Carolina State University in Raleigh, students properly enrolled in the Graduate School of Duke University during the regular academic year, and paying full fees to this institution, may be admitted to a maximum of two courses at one of the other institutions in the cooperative plan. Credit so earned is not considered transfer credit. All inter-institutional registrations involving extra-fee courses or special fees required of all students will be made at the expense of the student and will not be considered a part of the Duke tuition coverage.

STUDENT ACADEMIC APPEALS PROCEDURES

A graduate student in the School of Nursing who seeks resolution to academic problems is to confer with the faculty of the course and his/her academic advisor(s). If these discussions do not result in plans for problem resolution that are acceptable to the student, then the student may formally appeal. Appeals should adhere to established guidelines which are explained on the School of Nursing website: <http://www.nursing.duke.edu> or can be obtained from the Office of Admissions and Student Services.

CONFIDENTIALITY OF STUDENT RECORDS

Duke University adheres to a policy permitting student's access to their educational records and certain confidential financial information. Students may request in writing review of any information contained in their educational records and may, using appropriate procedures, challenge the content of these records. An explanation of the complete policy on educational records may be obtained from the registrar's office. No information, except directory information, contained in any student record is released to persons outside the university or to unauthorized persons on the campus, without the written consent of the student. It is the responsibility of the student to provide the Office of the Registrar and other university offices, as appropriate, with the necessary specific authorization and consent. Directory information includes name, addresses, telephone listing, date and place of birth, photograph, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and most recent, previous educational institution attended. This information may be released to appear in public documents and may otherwise be disclosed without student consent, unless a written request not to release this information is received by the Office of Admissions and Student Services and the Office of the Registrar by the end of the second week of classes each term.

COMMENCEMENT

Graduation exercises, including the Duke University School of Nursing Hooding and Recognition ceremony, are held once a year in May, when degrees are conferred and diplomas issued to students who have completed all requirements. Students who complete degree requirements by the end of the fall or by the end of the summer term receive diplomas dated December 30 or September 1, respectively. There is a delay in the mailing of September and December diplomas because diplomas cannot be issued until approved by the Academic Council and Board of Trustees. All graduates, including those receiving degrees in December and September, are expected to attend both the Hooding and Recognition Ceremony and the graduation exercises in May.*

REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN NURSING

Completion of the Bachelor of Science in Nursing Program requires the completion of 58 credit hours of study and 1,000 hours of clinical experience.

Fall Courses	Credits
N201. Introduction to Professional Nursing and Evidence- Based Practice	3
N202. Foundations of Evidence-Based Nursing Practice	5
N330. Selected Topics in Advanced Pathophysiology	3 [†]
N332. Diagnostic Reasoning and Physical Assessment for Advanced Nursing Practice	4 [†]
Spring Courses	
N210. Pharmacology and Therapeutic Modalities for Nursing	3
N211. Adult Health Nursing	6
N308. Applied Statistics	2 [†]
N212. Mental Health Nursing	3
Summer Courses	
N220. Nursing Care of the Childbearing Family	3
N221. Pediatric Nursing	3
N222. Contemporary Issues in Nursing Practice	2
N502. Health Promotion/Disease Prevention	3 [†]
N223. Leadership and Resource Management in Health Care Systems	3
Fall Semester	
N230. Nursing Care of Older Adults and Their Families	3
N231. Community Health Nursing	3
N232. Senior Seminar	2
N233. Nursing Specialty Synthesis	4
N307. Research Methods	3 [†]

REQUIREMENTS FOR THE MASTER'S DEGREE

Each of the school's majors requires the completion of 39 to 59 units of credit. These units include core courses required of all master's students, the research options, courses in the major, and electives.

*. The Hooding and Recognition Ceremony is held on the Saturday evening prior to Sunday Commencement exercises.

[†]. Signify Graduate Courses and Graduate Credit.

Required Core Courses *	Credits
N301. Population-Based Approaches to Health Care	3
N303. Health Services Program Planning and Outcomes Analysis	3
N307. Research Methods	3
N308. Applied Statistics	2
Total	11

Research Options (Select One)*	Credits
N312. Research Utilization in Advanced Nursing Practice	3
N313. Thesis	6
N314. Non-thesis Option	6
N315. Directed Research	3–6
Total	3–6
Total Required Core Courses for all M.S.N. students	14-17

Major Fields of Study

Health Systems Leadership and Outcomes

The Duke University School of Nursing is committed to creating health care leaders for the twenty-first century. The M.S.N. program in Health Systems Leadership and Outcomes is founded upon strong core and research courses. This foundation is augmented by a series of courses in complex systems, organizational theory, financial management, and outcomes analysis. Students also select a concentration area based upon individual professional interests and goals. For example, Duke offers a minor in informatics. The minimum number of credits required for graduation is 39. Course work includes the following:

	Credits
M.S.N. Core Courses	14-17
N400. Organizational Theory for Integrated Health Care Delivery Systems	3
N401. Dynamics of Management	3
N402. Financial Management and Budget Planning	3
N404. Health Economics	3
N419. Leadership Residency	4
Electives	9
Total Minimum Number of Credits for Graduation	39 - 42

Informatics Clinical Nurse Specialist	Credits
M.S.N. Core Courses	14-17
N400. Organizational Theory for Integrated Health Care Delivery Systems	3
N401. Dynamics of Management	3
N402. Financial Management and Budget Planning	3
N409. Overview of Health Care Information Systems	3
N410. Informatics Issues in Nursing Systems	2
N411. Nursing Informatics Theory and Application	3
N412. Health Systems Project Management	2

* Signify Graduate Courses and Graduate Credit.

N413. Informatics Infrastructure for Safe Patient Care	3
N417. Informatics Capstone Seminar	2
N418. Nursing Informatics Residency	3
Total Minimum Number of Credits for Graduation	41-44

M.S.N. – M.B.A. Program

The School of Nursing also offers, in conjunction with the Fuqua School of Business, a joint M.S.N./M.B.A. degree. Course work for the joint M.S.N./M.B.A. includes the following:

	Credits
M.S.N. Core Courses	14-17
N400. Organizational Theory for Integrated Health Care Delivery Systems	3
N401. Dynamics of Management	3
N419. Leadership Residency	4
BA 390 ILE I: Team Building and Leadership Development	2
BA 300. Managerial Economics	3
BA 311. Probability and Statistics	3
BA 320. Managerial Effectiveness	3
BA 395. Individual Effectiveness	2
BA 340. Financial Accounting	3
BA 350. Global Financial Management	3
BA 360. Marketing Management	3
BA 396. Individual Effectiveness	2
BA 312. Decision Models	3
BA 341. Managerial Accounting	3
BA 370. Operations Management	3
BA 397. Individual Effectiveness	2
BA 391. ILE II: Competitive Business Strategy	2
BA 301. Global Economic Environment of the Firm	3
BA 398. Individual Effectiveness	2
BA Elective	6
ILE III: Competitive Advantage Through People and Processes	2
ILE IV: Complex Management Problems: Age of Asia	2
BA Electives	17
Total Minimum Number of Credits for Graduation	93

Leadership in Community-Based Long-Term Care

Graduates of the Leadership in Community-Based Long Term-Care program will combine health administration and clinical expertise to design and implement innovative management practices that improve care for the elderly. The curriculum for this program synthesizes clinical gerontology, health care management, and information science, and prepares graduates to assume clinical nursing and managerial positions in corporate and community long-term care organizations. The comprehensive and flexible program provides both full-time and part-time options. A minimum of 39 credits is required for graduation. Course work in the major includes the following:

	Credits
M.S.N. Core Courses	14-17

N400. Organizational Theory for Integrated Health Care Delivery Systems	3
N401. Dynamics of Management	3
N402. Financial Management and Budget Planning	4
N403. Synthesis of Clinical and Management Decision Making	4
N419. Leadership Residency	4
N480. Social Issues, Health, and Illness in the Aged Years	3
N481. Managing Care of the Frail Elderly	4
Elective	1-3
Total Minimum Number of Credits for Graduation	42

Clinical Research Management

Duke University and Duke University Health Systems are internationally recognized for excellence in research, education, and patient care. Graduates from the Clinical Research Management Program at Duke University have an opportunity to access a world-class learning environment and call on resources that are among the best in the nation. The Clinical Research Management Program integrates training from many disciplines to provide a solid program strong in business and financial practices, regulatory affairs, and research management with an emphasis in the management of clinical drug, biological, and device trials. Graduates of this program will be prepared to work in research in industry, service, or academic settings. This program is intended to be flexible and conducive to the adult learner. Students complete the core M.S.N. courses plus four specialty courses in the major. The program is rounded out by electives from sciences, management, or other specialty courses. The capstone course, a 300-hour residency, places the student as a member of a project team working on a drug, biological, or device development project in industry, academia, or government. Seminars in the residency will address issues associated with transition to the role of clinical trial manager. Course work includes the following:

Clinical Research Management	Credits
M.S.N. Core Courses	14-17
N490. CRM: Trials Management	4
N491. CRM: Business and Financial Practices	4
N492. CRM: Regulatory Affairs	4
N499. CRM: Residency	4
Electives	6
Total Minimum Number of Credits for Graduation	39-42

Family and Adult Nurse Practitioner Majors: Adult Acute Care, Adult Primary Care, Cardiovascular, Oncology/ HIV, Family and Gerontology

Nurse practitioner majors focus on developing the knowledge and skills necessary to provide primary and/or acute care across settings, including care of individuals in rural and under-served areas. The family and adult nurse practitioner majors include adult acute care, adult primary care, cardiovascular, oncology/HIV, family, and gerontology. All students take the practitioner core courses, which include pathophysiology, pharmacology, diagnostic reasoning, and physical assessment and management of common acute and chronic health problems (listed below as practitioner core courses). Each of these majors requires specialty course work consistent with the clinical practice of the major. The general pattern includes two courses that are didactic or a combination of clinical and didactic, and a

residency course. All family, gerontology and adult nurse practitioner majors have at least 600 hours of clinical experience, the minimum recommended by the National Organization of Nurse Practitioner Faculties (NONPF) and the American Association of Colleges of Nursing (the number of clinical hours varies by major). As a capstone experience, all N.P. students are required to complete a final clinical residency under the mentorship of an experienced clinician in his/her respective area of expertise. The residency includes seminars that encourage the synthesis of clinical learning and the transition to the role of nurse practitioner. The total minimum number of credits required for graduation varies by major. Course work in the major includes 16 credits of practitioner core courses and 11 to 13 additional credits including the residency in the major. The minimum number of credits for graduation is 43-48.

Practitioner Core Courses	Credits
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
Total	16
Acute Care Nurse Practitioner	Credits
M.S.N. Core Courses	14-17
Nurse Practitioner Core Courses	16
N442. Sexual and Reproductive Health	2
N450. Management of Critically Ill Adult Patients I	4
N451. Management of Critically Ill Adult Patients II	4
N458. Nurse Practitioner Residency: Adult Acute Care	3
Total	43 – 46
Adult Nurse Practitioner – Primary Care	Credits
M.S.N. Core Courses	14-17
Nurse Practitioner Core Courses	16
N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Primary Care	3
Clinical Elective	3
Elective	5
Total	43 – 46
Adult Nurse Practitioner – Cardiovascular	Credits
M.S.N. Core Courses	14-17
Nurse Practitioner Core Courses	16
N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Primary Care	3
N460. Advanced Management of Patients with Cardiovascular Diseases	3
N461. Care Management of Patients with Selected Cardiovascular Illnesses	4
N469. Nurse Practitioner Residency: Adult Cardiovascular	1
Elective	2
Total	45 – 48

Adult Nurse Practitioner – Oncology/HIV	Credits
M.S.N. Core Courses	14-17
Nurse Practitioner Core Courses	16
N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Primary Care	3
N470. Oncology/HIV AIDS Nursing I: Epidemiology and Pathophysiology	3
N471. Oncology/HIV AIDS Nursing II: Symptom and Problem Management	3
N479. Nurse Practitioner Residency: Adult Oncology/HIV AIDS	1
HIV Course or Elective	2
Total	44 – 47
Family Nurse Practitioner	Credits
M.S.N. Core Courses	14-17
Nurse Practitioner Core Courses	16
N441. Child Health in Family Care	4
N442. Sexual and Reproductive Health	4
N449. Nurse Practitioner Residency: Family Elective	3
Total	45-48
Gerontology Nurse Practitioner	Credits
M.S.N. Core Courses	14-17
Nurse Practitioner Core Courses	16
N442. Sexual and Reproductive Health	2
N480. Social Issues, Health, and Illness in the Aged Years	3
N481. Managing Care of the Frail Elderly	4
N489. Nurse Practitioner Residency: Gerontology	3
Elective/Independent Study	2
Total	44 – 47

Nurse Practitioner: Pediatric and Neonatal

The neonatal and pediatric nurse practitioner majors prepare graduates as nurse practitioners in primary, secondary, tertiary, long-term, or home care settings for pediatric patients across the age and illness continuum. Emphasis is placed on family-centered culturally sensitive care. The Pediatric Nurse Practitioner, Pediatric Acute/Chronic Care Nurse Practitioner, Neonatal Nurse Practitioner, and combined Neonatal/Pediatric Nurse Practitioner in Rural Health majors build on core pediatric nurse practitioner courses that include neonatal/pediatric pathophysiology, neonatal/pediatric pharmacology, and neonatal/pediatric physical assessment. Courses in the specialty address management of pediatric or neonatal patients and families within the framework of the patient's stage of growth and development. The specialty courses are supplemented by clinical hours which may include primary care pediatric clinics, pediatric intensive care, pediatric cardiology, neonatal/pediatric radiology, pediatric surgery, pediatric/neonatal transport, neonatal intensive care, neonatal transitional care, pediatric and neonatal step-down units, pediatric rehabilitation, pediatric home care, and school-based health clinics. The capstone course is the residency. Under the guidance of a mentor, students manage cohorts of patients in selected clinical facilities. Integral to the residency are seminars that address transition to the

practitioner role, integration of clinical and didactic learning, and preparation for a position as a nurse practitioner. The total clinical hours required for graduation are 600 hours, except for the Pediatric Acute/Chronic Care Nurse Practitioner, which requires 1,104 hours. This meets the requirements of the specialty organizations and qualifies the student to sit for certification examinations in the specialty.

Pediatric Practitioner Core Courses	Credits
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N324. Health Care of Infants and Children in Rural Settings	3
N336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N357. Physiological Monitoring	2
N430. Advanced Concepts of Development in Pediatric Nursing Practice	3
Total	18
Pediatric Nurse Practitioner	Credits
M.S.N. Core Courses	14-17
Nurse Practitioner Core Courses	18
N322. Common Pediatric Management Issues I	4
N323. Common Pediatric Management Issues II	4
N439. Nurse Practitioner Residency: Pediatrics	4
Total	44-47
Neonatal Nurse Practitioner/Pediatric Practitioner in Rural Health	Credits
M.S.N. Core Courses	14-17
Nurse Practitioner Core Courses	18
N322. Common Pediatric Management Issues I	4
N323. Common Pediatric Management Issues II	4
N420. Managing Acute and Chronic Health Conditions in the Newborn I	4
N421. Managing Acute and Chronic Health Conditions in the Newborn II	4
N423. Nurse Practitioner Residency: Neonatal	4
N439. Nurse Practitioner Residency: Pediatrics	4
Total	56-59
Neonatal Nurse Practitioner	Credits
M.S.N. Core Courses	14-17
Nurse Practitioner Core Courses	18
N420. Managing Acute and Chronic Health Conditions in the Newborn I	4
N421. Managing Acute and Chronic Health Conditions in the Newborn II	4
N423. Nurse Practitioner Residency: Neonatal	4-6
Total	44-49
Pediatric Acute Care Nurse Practitioner	Credits
M.S.N. Core Courses	14-17
Nurse Practitioner Core Courses	18
N322. Common Pediatric Management Issues I	4
N323. Common Pediatric Management Issues II	4
N439. Nurse Practitioner Residency: Pediatrics	4

N426. Managing Acute and Chronic Health Conditions in Children I	4
N427. Managing Acute and Chronic Health Conditions in Children II	4
N428. Nurse Practitioner Residency: Pediatric Acute Care	3
Total	55-58

Clinical Nurse Specialist

The clinical nurse specialist (C.N.S.) majors focus on developing the knowledge and skills necessary to provide care to patients with complex health problems and their families; care is provided in a variety of settings. Course work includes core courses and credits in the major as listed by individual programs. Elective credits are used to support the major. Core courses include: physical assessment, pharmacology, and pathophysiology. Clinical Nurse Specialist students take courses specific to their specialty areas. The number of courses and clinical hours vary by major; however, each major (with the exception of gerontology) requires a residency as the capstone course. The minimum number of credits required for the master's degree for C.N.S. students is 41-44.

Clinical Nurse Specialist – Gerontology	Credits
M.S.N. Core Courses	14 – 17
N309. Professionalism in Advanced Practice	3
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	2
N480. Social Issues, Health, and Illness in the Aged Years	3
N481. Managing Care of the Frail Elderly	4
Elective/C.N.S. Residency	2
Total	44-47

Clinical Nurse Specialist – Oncology/HIV	Credits
M.S.N. Core Courses	14 – 17
N309. Professionalism in Advanced Practice	3
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N442. Sexual and Reproductive Health	2
N470. Oncology/HIV AIDS Nursing I: Epidemiology and Pathophysiology	3
N471. Oncology/HIV AIDS Nursing II: Symptom and Problem Management	3
N478. Clinical Nurse Specialist Residency: Oncology	2
Electives/Independent Study/HIV Course	2
Total	39-42

Clinical Nurse Specialist – Pediatrics	Credits
M.S.N. Core Courses	14 – 17

N309. Professionalism in Advanced Practice	3
N320. Neonatal and Pediatric Pathophysiology	3
N324. Health Care of Infants and Children in Rural Settings	3
N331. Clinical Pharmacology and Intervention for Advanced Practice Nursing	3
N336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N426. Managing Acute and Chronic Health Conditions in Children I	4
N427. Managing Acute and Chronic Health Conditions in Children II	4
N430. Issues in Infant and Young Child Development	3
N357. Physiologic Monitoring	2
N438. Clinical Nurse Specialist Residency: Pediatrics	3
Total	46 – 49
Clinical Nurse Specialist – Neonatal	Credits
M.S.N. Core Courses	14 – 17
N309. Professionalism in Advanced Practice	3
N320. Neonatal and Pediatric Pathophysiology	3
N324. Health Care of Infants and Children in Rural Settings	3
N331. Clinical Pharmacology and Intervention for Advanced Practice Nursing	3
N357. Physiologic Monitoring	2
N336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N420. Managing Acute and Chronic Health Conditions in the Newborn I	4
N421. Managing Acute and Chronic Health Conditions in the Newborn II	4
N424. Clinical Nurse Specialist Residency: Neonatal	3
N430. Issues in Infant and Young Child Development	3
Total	46-49
Clinical Nurse Specialist – Critical Care	Credits
M.S.N. Core Courses	14 – 17
N309. Professionalism in Advanced Practice	3
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N442. Sexual and Reproductive Health	2
N450. Management of Critically Ill Adult Patients I	3-4
N451. Management of Critically Ill Adult Patients II	3-4
N457. Critical Care Clinical Nurse Specialist Residency	3
Electives/Independent Study	3
Total	40 – 43

Health and Nursing Ministries

The Master of Science in Nursing with a major in Health and Nursing Ministries is designed to offer nurses advanced nursing preparation as clinicians and coordinators of health and nursing ministries while equipping them with a basic theological education offered by the Divinity School. Graduates of this program will be prepared to serve as parish nurses,

health systems parish nurse coordinators, health systems care managers, and community health nurses. The degree requires the completion of 47 credit hours (or equivalents), including the summer field clinical experience. The typical applicant for this degree will be an accomplished nurse with a desire and aptitude for advanced nursing education who also understands the value of basic theological education. Coursework in the major includes the following:

	Credits
M.S.N. Core Courses	14-17
N332. Diagnostic Reasoning and Physical Assessment in Advance Nursing Practice	4
HN11. Seminar in Parish Nursing I	1
HN12. Seminar in Parish Nursing II	1
HN200. Health and Nursing Ministries Residency	3
HN290. Seminar on Care and the End of Life: Suffering and Dying Well	3
HN300. Seminar in Health and Nursing Ministries	3
N502. Health Promotion and Disease Prevention	3
Divinity Electives	6
CT32. Christian Theology	3
CHE33. Christian Ethics	3
CHE266. Ethics in Health Care	3
Total	47-50

Health and Nursing Ministries – Joint Master of Church Ministries/ Master of Science in Nursing

The M.C.M./M.S.N. is a joint degree program offered by the Divinity School and the School of Nursing for those students who desire both thorough preparation in advanced nursing practice and theological education. Graduates of this program will be well prepared to develop, implement, and coordinate comprehensive parish and community nursing programs. This program requires the completion of 74 semester hours, including 300 hours of clinical field experience. The typical applicant for this degree will be a nurse who sees the need for both advanced clinical education and substantial theological preparation and is interested in advancing the scope of parish nursing practice at a conceptual level. Applicants for this program must meet all requirements for admission to both the Divinity School and the School of Nursing. Courses required for this dual degree include the following:

	Credits
M.S.N. Core Courses	14-17
N332. Diagnostic Reasoning and Physical Assessment in Advance Nursing Practice	4
HN11. Seminar in Parish Nursing I	1
HN12. Seminar in Parish Nursing II	1
HN200. Health and Nursing Ministries Residency	3
HN290. Seminar on Care and the End of Life: Suffering and Dying Well	3
HN300. Seminar in Health and Nursing Ministries	3
N502. Health Promotion and Disease Prevention	3
Nursing Elective	6
CT32. Christian Theology	3

CHE33. Christian Ethics	3
OT11. Introduction to the Old Testament	3
NT18. Introduction to the New Testament	3
CH13. Early and Medieval Christianity	3
CH14. Modern European Christianity	3
CHE266. Ethics in Health Care	3
CM Limited Elective	3
Divinity Electives	12
Total	74-77

Nurse Anesthesia

The Nurse Anesthesia Program is a 24-month program of study for full-time students leading to the degree of Master of Science in Nursing. There is no provision for part-time study. The Nurse Anesthesia program integrates theory, research, physiology, pharmacology, pathophysiology, chemistry, and physics. Students enrolled in the Nurse Anesthesia Program will complete a minimum of 52 course credits, including over 800 clinical hours. In addition to the School of Nursing required core courses, students will take specialty courses required by the Council on Accreditation (COA) of Nurse Anesthesia Educational programs. A post-master's certificate option is available.

	Credits
M.S.N. Core Courses	14-17
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N353. Advanced Physiology	3
N512. Pharmacology of Anesthetic Agents	4
N513. Basic Principles of Anesthesia	2
N515. Chemistry and Physics related to Anesthesia	3
N517. Advanced Principles of Anesthesia I	2
N518. Advanced Principles of Anesthesia II	2
N519. Advanced Principles of Anesthesia III	2
N521. Advanced Pathophysiology for Nurse Anesthetists I	3
N522. Advanced Pathophysiology of Nurse Anesthetists II	2
N524. Physiology and Pathophysiology for Nurse Anesthetists	3
N526. Professional Aspects of Nurse Anesthesia Practice	3
N529. Clinical Anesthesia Practicum (6 rotations at 1 credit per rotation)	6
Total	52-55

Nursing Education

The Master in Nursing Education is a distance-based program designed for students who are seeking a master's degree but are unable to pursue a residential program. This program allows students to maintain their nursing positions and personal lives while pursuing a graduate education. The curriculum will be delivered using an on-line asynchronous instructional mode (instructional material can be accessed by students anytime, anyplace). However, since it is important for students to work with faculty and peers directly, and to feel part of Duke University, there will be scheduled on-campus activities related to specific courses. Students will be able to complete the program in seven semesters. An individualized teaching residency of 150 hours, with a mentor in the clinical/academic area of choice, is the capstone course in the program.

Graduates of the Nursing Education program are prepared for roles in nursing education, staff development, hospital education, continuing education, and practice consultation. Courses in the program include the M.S.N. core course and the following:

	Credits
M.S.N. Core Courses	14-17
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning/Physical Assessment in Advanced Nursing Practice	4
N359. Independent Study in Scientific Writing	1
N502. Health Promotion/ Disease Prevention	3
N540. Principles of Clinical and Classroom Teaching and Learning	3
N541. Tests and Measurements	3
N542. Technology and Curriculum Design	3
N545. Nursing Education Residency	3
Total	40 - 43

Post-Master's Certificate Program

The purpose of the post-master's certificate program is to provide opportunities for students who already have an M.S.N. degree to gain specialized knowledge within a major offered by Duke University School of Nursing. The post-master's certificate represents the student's successful completion of the required courses in the chosen nursing major. Course requirements for the post-master's certificate for each program are listed below.

HEALTH SYSTEMS LEADERSHIP AND OUTCOMES	Credits
N400. Organizational Theory for Integrated Health Care Delivery Systems	3
N401. Dynamics of Management	3
N402. Financial Management and Budget Planning	3
N404. Health Economics	3
N419. Leadership Residency	4
Electives	9
Total	25

INFORMATICS	Credits
N401. Dynamics of Management	3
N409. Overview of Health Care Information Systems	3
N410. Informatics Issues in Nursing Systems	3
N411. Nursing Informatics Theory and Application	3
N412. Health Systems Project Management	2
N413. Informatics Infrastructure for Safe Patient Care	3
N417. Informatics Capstone Seminar	2
N418. Nursing Informatics Residency	3
Total	21

CLINICAL RESEARCH MANAGEMENT	Credits
N315. Directed Research	3
N351. Scientific Writing	3

N490. CRM: Trials Management	4
N491. CRM: Business and Financial Practices	4
N492. CRM: Regulatory Affairs	4
N499. CRM: Residency	4
Total	22
ACUTE CARE	
Nurse Practitioner	Credits
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	2
N450. Management of Critically Ill Adult Patients I	4
N451. Management of Critically Ill Adult Patients II	4
N458. Nurse Practitioner Residency: Adult Acute Care	3
Total	29
Clinical Nurse Specialist – Critical Care	Credits
N309. Professionalism in Advanced Practice	3
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N442. Sexual and Reproductive Health	2
N450. Management of Critically Ill Adult Patients I	3-4
N451. Management of Critically Ill Adult Patients II	3-4
N457. Critical Care Clinical Nurse Specialist Residency	3
Total	24-26
ADULT NURSE PRACTITIONER –PRIMARY CARE	Credits
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Primary Care	3
Clinical Elective	3
Elective	3
Total	27

ADULT NURSE PRACTITIONER – CARDIOVASCULAR	Credits
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Primary Care	3
N460. Advanced Management of Patients with Cardiovascular Diseases	3
N461. Care Management of Patients with Selected Cardiovascular Illnesses	4
N469. Nurse Practitioner Residency: Adult Cardiovascular	1
Total	29
FAMILY NURSE PRACTITIONER	Credits
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N441. Child Health in Family Care	4
N442. Sexual and Reproductive Health	4
N449. Nurse Practitioner Residency: Family	4
Total	28
GERONTOLOGICAL NURSING	
Nurse Practitioner	Credits
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	2
N480. Social Issues, Health, and Illness in the Aged Years	3
N481. Managing Care of the Frail Elderly	4
N489. Nurse Practitioner Residency: Gerontology	3
Total	28
Clinical Nurse Specialist	Credits
N309. Professionalism in Advanced Practice	3
N330. Selected Topics in Advanced Pathophysiology	3

N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	2
N480. Social Issues, Health, and Illness in the Aged Years	3
N481. Managing Care of the Frail Elderly	4
Elective/Residency	2
Total	30

ONCOLOGY/HIV NURSING

Nurse Practitioner	Credits
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Care	3
N470. Oncology/HIV AIDS Nursing I: Epidemiology and Pathophysiology	3
N471. Oncology/HIV AIDS Nursing II: Symptom and Problem Management	3
N479. Nurse Practitioner Residency: Adult Oncology/HIV AIDS	1
Total	28

Clinical Nurse Specialist	Credits
N309. Professionalism in Advanced Practice	3
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N442. Sexual and Reproductive Health	2
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N470. Oncology/HIV AIDS Nursing I: Epidemiology and Pathophysiology	3
N471. Oncology/HIV AIDS Nursing II: Symptom and Problem Management	3
N478. Clinical Nurse Specialist Residency: Oncology	4
Total	25

NEONATAL NURSING

Nurse Practitioner	Credits
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N324. Health Care of Infants and Children in Rural Settings	3
N336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4

N357. Physiologic Monitoring	2
N420. Managing Acute and Chronic Health Conditions in the Newborn I	4
N421. Managing Acute and Chronic Health Conditions in the Newborn II	4
N423. Nurse Practitioner Residency: Neonatal	4 – 6
N430. Issues in Infant and Young Child Development	3
Total	30 – 32
Clinical Nurse Specialist	Credits
N309. Professionalism in Advanced Practice	3
N320. Neonatal and Pediatric Pathophysiology	3
N324. Health Care of Infants and Children in Rural Settings	3
N331. Clinical Pharmacology and Intervention for Advanced Practice Nursing	3
N336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N357. Physiologic Monitoring	2
N420. Managing Acute and Chronic Health Conditions in the Newborn I	4
N421. Managing Acute and Chronic Health Conditions in the Newborn II	4
N424. Clinical Nurse Specialist Residency: Neonatal	3
N430. Issues in Infant and Young Child Development	3
Total	32
PEDIATRIC NURSING	
Nurse Practitioner	Credits
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N322. Common Pediatric Management Issues I	4
N323. Common Pediatric Management Issues II	4
N324. Health Care of Infants and Children in Rural Settings	3
N336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N357. Physiological Monitoring	2
N430. Issues in Infant and Young Child Development	3
N439. Nurse Practitioner Residency: Pediatrics	4
Total	30
Clinical Nurse Specialist	Credits
N309. Professionalism in Advanced Practice	3
N320. Neonatal and Pediatric Pathophysiology	3
N324. Health Care of Infants and Children in Rural Settings	3
N336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N358. Physiologic Monitoring	2
N426. Managing Acute and Chronic Health Conditions in Children I	4
N427. Managing Acute and Chronic Health Conditions in Children II	4
N430. Issues in Infant and Young Child Development	3
N438. Clinical Nurse Specialist Residency: Pediatrics	3
Total	32

PEDIATRIC ACUTE CARE NURSE PRACTITIONER	Credits
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N322. Common Pediatric Management Issues I	4
N323. Common Pediatric Management Issues II	4
N324. Health Care of Infants and Children in Rural Settings	3
N357. Physiological Monitoring	2
N430. Issues in Infant and Young Child Development	3
N439. Nurse Practitioner Residency – Pediatrics	3
N426. Managing Acute and Chronic Health Conditions in Children I	4
N427. Managing Acute and Chronic Health Conditions in Children II	4
N428. Nurse Practitioner Residency: Pediatric Acute Care	4
Total	47
NEONATAL NURSE PRACTITIONER/PEDIATRIC NURSE PRACTITIONER IN RURAL HEALTH	Credits
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N322. Common Pediatric Management Issues I	4
N323. Common Pediatric Management Issues II	4
N324. Care of Medically Fragile Infants and Children in Rural Settings	3
N336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N357. Physiological Monitoring	2
N420. Managing Acute and Chronic Health Conditions in the Newborn I	4
N421. Managing Acute and Chronic Health Conditions in the Newborn II	4
N423. Nurse Practitioner Residency: Neonatal	4
N430. Issues in Infant and Young Child Development	3
N439. Nurse Practitioner Residency: Pediatrics	3
Total	41
NURSE ANESTHESIA	Credits
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N353. Advanced Physiology	3
N512. Pharmacology of Anesthetic Agents	4
N513. Basic Principles of Anesthesia	2
N515. Chemistry and Physics Related to Anesthesia	3
N517. Advanced Principles of Anesthesia I	2
N518. Advanced Principles of Anesthesia II	2
N519. Advanced Principles of Anesthesia III	2
N521. Advanced Pathophysiology for Nurse Anesthetists I	3
N522. Advanced Pathophysiology for Nurse Anesthetists II	2
N524. Physiology and Pathophysiology for Nurse Anesthetists	3
N529. Clinical Anesthesia Practicum (6 rotations)	6

N531. Professional Aspects of Nurse Anesthesia Practice	3
Total	38
HEALTH AND NURSING MINISTRIES	Credits
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
HNM 11. Seminar in Parish Nursing I	1
HNM 12. Seminar in Parish Nursing II	1
HNM 200. Health and Nursing Ministries Residency	3
HNM 290. Seminar on Care and the End of Life: Suffering and Dying Well	3
HNM 300. Seminar in Health and Nursing Ministries	3
N502. Health Promotion/Disease Prevention	3
CT32. Christian Theology	3
CHE33. Christian Ethics	3
CHE 266. Ethics in Health Care	3
Divinity Electives	6
Total	33
NURSING EDUCATION	Credits
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning/Physical Assessment in Advanced Nursing Practice	4
N359. Independent Study in Scientific Writing	1
N502. Health Promotion/Disease Prevention	3
N540. Principles of Clinical and Classroom Teaching and Learning	3
N541. Tests and Measurements	3
N542. Technology and Curriculum Design	3
N545 Nursing Education Residency	3
Total	26

Courses of Instruction *

201. Introduction to Professional Nursing and Evidence- Based Practice. Focuses on the historical and societal context of nursing as a discipline. Provides an overview of core, nursing, problem-solving frameworks including the nursing process, functional health patterns, and evidence-based practice. Fall. Instructor: Renaud. 3 credits.

202. Foundations of Evidence-Based Nursing Practice. Focuses on the application of critical thinking and reasoning to the core competencies needed for nursing situations. Uses decision support systems in evidence-based practice. Clinical experiences in skills laboratory and selected health care facilities provide students the opportunity to practice basic psychomotor skills and therapeutic interventions for patients with health alterations across the lifespan. Fall. Instructors: Renaud and White. 3 credits.

210. Pharmacology and Therapeutic Modalities for Nursing. Focuses on principles of pharmacology and drug therapies including nursing implications, genetic, and social-cultural factors. Explores drug information resources and alternative therapies to pharmacolog-

*Course offerings and content subject to change.

ic intervention. Fall. Prerequisites: Nursing 201, 202, 330, and 332. Instructors: Miller-Bell and Bradshaw. 3 credits.

211. Adult Health Nursing. Focuses on the problem-solving process for nursing care of young and middle-aged adults with health problems across the illness continuum. The clinical component focuses on the professional role in providing patient care and evaluating outcomes in collaboration with other health team members. Spring. Prerequisites: Nursing 201, 202, 330, and 332. Prior or current enrollment in Nursing 210. Instructor: White. 6 credits.

212. Mental Health Nursing. Focuses on the care of individuals, group, and families experiencing mental health challenges. The clinical component encompasses a broad range of mental health services in a variety of environments and provides the opportunity to utilize therapeutic communication skills. Spring. Prerequisites: Nursing 201, 202, 210, 330, and 332. Instructor: Martin. 3 credits.

220. Nursing Care of the Childbearing Family. Focuses on nursing care of the childbearing family from preconception through postpartum, including genetics and care of the normal neonate. The clinical component includes nursing care in acute and primary care settings as well as a prenatal education. Summer. Prerequisites: Nursing 211 and 212. Enroll concurrently with Nursing 221. Instructor: Dodgson. 3 credits.

221. Pediatric Nursing. Focuses on developmentally appropriate nursing care for children and their families experiencing acute and chronic pediatric problems. The clinical component encompasses acute and primary care settings and includes care for children with special needs. Summer. Prerequisite: Nursing 211. Taken concurrently with Nursing 220. Instructor: Renaud. 3 credits.

222. Contemporary Issues in Nursing Practice. Focuses on the legal, ethical, political, social and economic context, and policy implications of nursing practice within the health care delivery system. Applies ethical principles and frameworks for decision-making in nursing practice and bioethical issues. Summer. Prerequisites: Nursing 210, 211, and 212. Instructor: Martin and Nevidjon. 2 credits.

223. Leadership and Resource Management in Health Care Systems. Focuses on the concepts and principles of leadership and management. Students experience various professional roles and apply leadership and management to nursing situations. Summer. Prerequisites: Nursing 210, 211, and 212. Instructor: Kennedy. 3 credits.

230. Nursing Care of Older Adults and Their Families. Focuses on caring for older adults and their families experiencing acute and chronic health problems of the aged population. The clinical component includes planning and coordinating patient and family care services in assisted living and long term care facilities. Fall. Prerequisites: Nursing 220, 221, 222, 223, and 502. Concurrent with Nursing 231. Instructor: Bailey. 3 credits.

231. Community Health Nursing. Focuses on the synthesis of population-based health and public health concepts to promote, maintain, and restore health to families, populations, and communities. Community assessment, risk identification, and application of community health nursing strategies are emphasized and applied in the clinical component. Fall. Prerequisites: Nursing 220, 221, 222, 223, and 502. Concurrent with Nursing 230. Instructor: Utley-Smith. 3 credits.

232. Senior Seminar. Focuses on the integration of behaviors essential for the role transition from student to professional nurse. Fall. Prerequisite: N233 Co-requisite. Nursing 233. Instructors: Renaud and Staff. 2 credits.

233. Nursing Specialty and Synthesis. Capstone course that promotes the synthesis of professional values, complex theoretical knowledge, core clinical competencies, and leadership skills in a selected clinical specialty. Clinical experience mentored by a profes-

sional nurse preceptor. Fall. Prerequisite: N232 Co-requisite. Instructors: Renaud and Staff. 4 credits.

259. Selected Topics/Independent Study. Independent study specific for the Accelerated Bachelor of Science in Nursing Students. A specific topic within a specialty area or in support of a prerequisite to be studied with a faculty member. Specific objectives, evaluation method, and other requirements are determined prior to registering for the course of study. Consent of instructor required. Instructor: Staff. Variable credit.

301. Population-Based Approaches to Health Care. Provides an overview of population-based approaches to assessment and evaluation of health needs. Selected theories are the foundation for using scientific evidence for the management of population-based care. Enables the health care professional to make judgments about services or approaches in prevention, early detection and intervention, correction or prevention of deterioration, and the provision of palliative care. Fall, spring. Instructor: Denman. 3 credits.

303. Health Services Program Planning and Outcomes Analysis. An analysis of theory and practice in the design, implementation, and evaluation of the outcomes of health services programs within an integrated health care system. From a health services planning paradigm, students conduct organizational and community needs assessments, determine priorities, plan and monitor implementation, manage change, evaluate outcomes, and provide planning reports. Spring, summer. Prerequisite: Nursing 307. Instructors: Anderson and Corrazini-Gomez. 3 credits.

307. Research Methods. Focuses on research methods needed for systematic investigation and expansion of nursing knowledge. Critical appraisal of research and development of a research proposal is covered. Fall, spring. Instructors: Turner and Rapp. 3 credits.

308. Applied Statistics. Emphasizes the application and interpretation of statistical procedures used in health care and nursing research. Data management and the relationship between research design and statistical techniques are also studied. Spring, fall. Prerequisite or concurrent: Nursing 307 or consent of instructor. Instructors: Champagne and Coombs. 2 credits.

309. Professionalism in Advanced Practice. Study of the multiple roles integrated into advanced practice nursing in order to assist individuals, families, groups, and communities to attain, maintain, and regain optimal health. Principles of education, ethical decision-making, management, leadership, consultation, and collaboration will be discussed. Fall. Instructors: Brandon and Schneider. 3 credits.

312. Research Utilization in Advanced Nursing Practice. Focuses on methods of implementing research findings to solve identified clinical problems. Students develop skill in creating and writing research-based protocols and in using research methods to evaluate nursing care. Summer. Prerequisites or concurrent: Nursing 307 and 308, or consent of instructor. Instructors: Turner and Denman. 3 credits.

313. Thesis. 1 to 6 credits. Fall, spring, summer. Instructor: Staff. Variable credit.

314. Non-thesis Option. 1 to 6 credits. Fall, spring, summer. Instructor: Staff. Variable credit.

315. Directed Research. Working on active research protocols under the guidance of a faculty member, students gain experience and skills in study design, implementation, and/or analysis. Human and animal use issues in research are explored throughout the experience. Course may be repeated for up to 6 credits. If taken in lieu of Nursing 312, 313, or 314, a minimum of 3 credits is required for graduation. Consent of instructor required. Fall, spring, summer. Prerequisites: Nursing 307 and 308 recommended but not required as pre/co-requisites. Instructor: Staff. Variable credit.

320. Neonatal and Pediatric Pathophysiology. Focuses on advanced pathophysiological knowledge as a basis for understanding alterations in biologic processes in the developing organ systems of neonatal and pediatric patients. With this foundation, students learn to differentiate normal from abnormal findings in patients from birth through 18 years. Fall. Instructor: Brandon. 3 credits.

321. Neonatal and Pediatric Pharmacology. Focuses on principles of pharmacologic management of pediatric patients with various conditions. Data collection and diagnostic reasoning are emphasized in relation to drug selection, delivery, monitoring, and evaluation of pharmacologic interventions. Family education is incorporated. Spring. Instructors: Miller-Bell and Bradshaw. 3 credits.

322. Common Pediatric Management Issues I. Focuses on comprehensive assessment and management of selected, pediatric, and primary care problems. Includes information on acute and chronic illnesses, health maintenance issues, and recognition of circumstances that require interdisciplinary collaboration or referral within the areas of dermatology, ophthalmology, otolaryngology, cardiac, pulmonary, immunology, rheumatology, gastrointestinal, and urology. Integration of pathophysiology and the pharmacological management of common problems. Emphasis on advanced practice role development in care management discussions and supervised clinical practice. Clinical practice opportunities in a variety of settings are arranged with the course instructor. Spring. 104 clinical hours. Prerequisites: Nursing 330, 331 (may be taken concurrently), 336, and consent of instructor. Current BCLS certification including the Heimlich maneuver; PALS certification highly recommended. Instructors: Blood-Siegfried and Lorimer. 4 credits.

323. Common Pediatric Management Issues II. Focuses on comprehensive assessment and management of selected, pediatric, and primary care problems. Includes information on acute and chronic illnesses, health maintenance issues, and recognition of circumstances that require interdisciplinary collaboration or referral within the areas of hematology, gynecology, neoplastic disorders, endocrinology, musculoskeletal disorders, neurology, emergency care, and HIV/AIDS. Integration of pathophysiology and the pharmacological management of common problems. Emphasis on advanced practice role development in care management discussions and supervised clinical practice. Clinical practice opportunities in a variety of settings are arranged with the instructor. Summer. 104 clinical hours. Prerequisites: Nursing 301, 322, 330, 331, and 336 and consent of the instructor. Current BCLS certification including the Heimlich maneuver; PALS certification highly recommended. Instructors: Blood-Siegfried and Lorimer. 4 credits.

324. Care of Medically Fragile Infants and Children in Rural Settings. The course prepares the advanced practice nurse (A.P.N.) to anticipate and recognize problems associated with the neonates and children; to provide accepted stabilization techniques and initiate safe transport; and conduct family-centered care in a crisis situation. Issues of access and limitation to health care will be emphasized. Programs and services available to the medically fragile infants, children, and their families will be discussed. The course will also provide awareness of local and regional services available to neonates, children, and the family; foster patient and family education related to the health of infants and children, including their prognosis and outcomes; and prepare the nurse practitioner to maximize patient and family integration into the community. Fall. Prerequisite: N320, N321, or permission of instructor. Instructor: Brandon. 3 credits.

330. Selected Topics in Advanced Pathophysiology. Focuses on developing advanced pathophysiological knowledge sufficient for understanding alterations in biological processes that affect the body's dynamic equilibrium or homeostasis. With this knowledge, students learn to differentiate normal from abnormal physiological function and to consider the causality of pathophysiological alterations in illness. Topics covered include the patho-

physiology of common health problems and complex physiological alterations encountered in advanced clinical practice. Fall. Instructor: Turner. 3 credits.

331. Clinical Pharmacology and Interventions for Advanced Nursing Practice. Combines lecture and case analyses to increase skills in assessment and pharmacological management of patients with a variety of common acute and chronic health problems. Data collection and diagnostic reasoning are emphasized in relation to drug selection, patient/family education, monitoring, and evaluation of pharmacological interventions. Spring. Instructors: Bowers and Pleasants. 3 credits.

332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice. Combines lecture and laboratory experiences to develop advanced skills in assessment of physical, cognitive, nutritional, cultural, and functional domains. Practitioner-patient interactions, data collection, diagnostic reasoning, and oral and written presentation of data are emphasized. Consent of instructor required. Fall. Instructors: Denman and Adinolfi. 4 credits.

333. Managing Common Acute and Chronic Health Problems I. Emphasizes assisting adult patients to reach or maintain the highest level of health and functioning, with a focus on health promotion, health maintenance, and primary care management of common acute or chronic respiratory, cardiac, genitourinary, endocrine, dermatological, and musculoskeletal problems encountered by patients and families. Pharmacological management is systematically integrated. Clinical practice is in a variety of primary care settings including public and private, internal, and family medicine practices, and community health clinics. Advanced practice role development is examined in seminars and supervised clinical practice. Spring. 104 clinical hours. Prerequisites: Nursing 330 and 332; prerequisite or concurrent: Nursing 331. Instructors: Hendrix and Bowers. 3 credits.

334. Managing Common Acute and Chronic Health Problems II. Emphasizes assisting adult patients to reach or maintain the highest level of health and functioning, with a focus on primary care management of common acute or chronic respiratory, cardiac, gastrointestinal, musculoskeletal, neurological, and mental health problems encountered by patients and families. Pharmacological management is systematically integrated. Clinical practice is in a variety of primary care settings including public and private, internal, and family medicine practices, and community health clinics. Advanced practice role development is examined in seminars and supervised clinical practice. Summer. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, and 333. Instructors: Hendrix and Adinolfi. 3 credits.

336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice. Combines lecture and laboratory experiences to develop advanced skills in assessment of physical, cognitive, nutritional, cultural, and functional domains of pediatric patients ranging in age from newborn to adolescent. Practitioner-patient interactions, data collection, diagnostic reasoning, and oral and written presentation of data are emphasized. Consent of instructor required. Fall. Instructors: Bradshaw and Lorimer. 4 credits.

351. Scientific Writing. Provides a review of the principles and practice of scientific writing, with emphasis on research proposals, theses, other scientific papers, and articles for publication. Students are expected to complete a proposal for a thesis or a non-thesis option, an article, or other scientific work as part of the course. Fall, spring. Instructors: Hurley and Tornquist. 3 credits.

353. Advanced Physiology. Focuses on developing advanced knowledge for understanding normal human physiological phenomena with an emphasis on cellular and molecular mechanisms of homeostasis. Spring. Prerequisite: Bachelor of Science in Nursing or consent of instructor. Instructor: Karlet. 3 credits.

356. Ethics in Nursing. Focuses on the historical development of ethics in nursing, analysis of moral language, codes of ethics, frameworks for ethical decision-making with case analysis, and strategies for discussion of ethics in nursing. Summer. Instructor: Staff. 3 credits.

357. Physiological Monitoring. Provides an in-depth understanding of selected invasive and non-invasive physiologic monitors used in clinical settings. Emphasis is placed on monitors used in intensive care. Content on the reliability, validity, sensitivity, stability, drift, and artifacts with respect to mechanisms of measurement assists students to interpret output. Highly recommended for students in acute care majors. Summer. Instructor: Turner. 2 credits.

359. Selected Topics or Independent Study. Instructor: staff. Variable credit. Fall, spring, summer.

400. Organizational Theory for Integrated Health Care Delivery Systems. Focuses on organizational behavior theory and research as the foundation for managerial and leadership interventions in integrated health care systems. Students learn how patient care system behaviors, structures, processes, and outcomes are affected by the actions of health system leaders. Fall. Instructors: Kennedy and Nevidjon. 3 credits.

401. Managing Complex Systems in Health Care. This course is an in-depth analysis of health care organizations as complex adaptive systems. The continuous change and unpredictability of complex systems, such as health care delivery systems, the importance of relationships, and the role of self-organization, emergence, and co-evolution will be explored. Implications for management will be explored including sense-making, learning, improvisation, thinking about the future, and designing as substitutes for traditional activities of command, control, prediction, and planning when managing complex health care systems. Spring. Prerequisite: Nursing 400 or consent of instructor. Instructors: Anderson and Nevidjon. 3 credits.

402. Financial Management and Budget Planning. Designed for managers in complex organizations. Focuses on the knowledge and skills needed by the manager to plan, monitor, and evaluate budget and fiscal affairs for a defined unit or clinical division. Health care economics, personnel, and patient activities are analyzed from a budgetary and financial management perspective in an environment of regulations and market competition. Spring. Prerequisite: Nursing 303 suggested. Instructor: Zelman. 4 credits.

403. Synthesis of Clinical and Management Decision-Making. Prepares health care leaders to be informed decision-makers. Students use information-processing techniques to synthesize the theoretical and practical components of strategic management and clinical gerontology. Using various organizational information systems, students will analyze administrative and clinical problems common in health care settings and design system, level, managerial, and clinical interventions to resolve these problems. The course includes classroom, computer laboratory, and clinical leadership experiences. Fall. Prerequisites: Nursing 400, 401, 402, 480, 481 (may be taken concurrently), or by consent of instructor. Instructor: Anderson. 4 credits.

404. Health Economics. Health care costs continue to be an increasing percentage of the United States' gross national product. This course focuses on health care financing as an essential foundation for the delivery of health care services. Students will study the principal ways in which health care is organized and financed and how policy influences health care environment, particularly related to access, cost and quality. Current issues in health care organizational structure and financing will be analyzed through case studies. Summer. Instructors: Kennedy and Nevidjon. 3 credits.

407. Leadership for Ethical Decision-Making in Health Care. Applies ethical principles and decision-making models to complex health care organizations and administrative structures. Course content assists students to understand the relationships between the current state of patient care, organizational and administrative functions, and the complex issues involved in health care leadership. Research, ethical, social, cultural, economic, privacy/confidentiality, professional standards, and legal issues are discussed. Consent of instructor required. Spring. Instructor: Goodwin. 3 credits.

408. New Ventures in Health Care. Focuses on imparting personal, organizational, and/or economic value to an idea in the current health care environment. The conditions and actions necessary for successful entrepreneurial and/or intrapreneurial endeavors in a managed care environment will be examined. Consent of instructor required. Summer. Prerequisite: demonstrated computer competency. Instructor: Staff. 3 credits.

409. Overview of Health Care Information Systems. This course provides an overview of historical, current, and emerging information systems in health care. Privacy and security issues will be covered in the context of ethical behaviors and legal/regulatory requirements. Multiple systems, vendors, processes, and organizations will be studied. Students will learn features and functions that are common to most health care information systems. Criteria, tools, and methods for evaluating health care information systems will be explored. Spring. Instructor: Goodwin. 3 credits.

410. Informatics Issues in Nursing Systems. Focuses on the field of “nursing informatics,” which combines nursing science, computer science, and information/decision science. Students examine issues in applying nursing informatics in complex health care organizations and administrative structures, and master problem-solving skills on selected issues. Research, ethical, social, cultural, economic, privacy/confidentiality, and legal issues are included. Consent of instructor required. Summer. Prerequisites: Nursing 303. Instructor: Goodwin. 3 credits.

411. Nursing Informatics Theory and Application. Focuses on nursing informatics and examines both theoretical and practical issues for nursing. Students develop theoretical knowledge and technology skills through laboratory application of didactic content and a real world project involving systems analysis, information specification, and project management. Consent of instructor required. Fall. Prerequisites: Nursing 303 and 410. Instructor: Goodwin. 3 credits.

412. Health Systems Project Management. This course is designed to leverage health care providers' expertise in facilitating both strategic planning and management of complex projects in health care organizations. Content focuses on project management throughout the systems life cycle, and implements these skills in a health-related website development project to demonstrate and reinforce concepts learned. Fall. Prerequisites: Nursing 410 and 411. Instructor: Goodwin. 2 credits.

413. Informatics Infrastructure for Safe Patient Care. This course is designed to facilitate the design and development of informatics solutions for real-world problems of providing safe patient care. Domain experts (health care providers) will learn tools and strategies for building data-to-outcome information systems that build on teamwork concepts, as well as knowledge of informatics issues and standards in developing a single-user (or small group) personal digital assistant (PDA), and database application for tracking patient safety data in real-world domain. Fall. Prerequisites: Nursing 410 and 411. Instructor: Goodwin. 3 credits.

417. Capstone Seminar in Clinical Informatics Practice. This final capstone seminar course is designed to help graduating students synthesize prior learning as they transition from the academic environment into new professional roles in nursing and clinical informat-

ics. The course will simultaneously facilitate tools to assist with a new job search while focusing seminar discussion on relevant hot topics in informatics that require students to use critical and creative thinking skills synthesizing program content, clinical expertise, and personal values. Spring. Prerequisites: Nursing 410, 411, 412, and 413. Instructor: Goodwin. 2 credits

418. Nursing Informatics Residency. Builds the student's knowledge and experience in nursing informatics within the context of advanced nursing practice. Students develop independent problem-solving skills in the synthesis of advanced practice nursing and informatics under the guidance and mentorship of a practicing informatics specialist (preceptor). Consent of instructor required. 3 to 9 credits. Spring. Minimum 156 residency hours. Prerequisites: Nursing 410 and 411. Instructor: Goodwin. Variable credit.

419. Leadership Residency. Provides the student an opportunity to develop beginning competence in the role of nurse manager/administrator/executive under the guidance of a preceptor. Emphasis on incorporation of clinical and business skills into the role of health systems leader in an integrated health care delivery system. Students make a comprehensive assessment of the organizational setting and design strategies for agenda setting, network building, problem resolution, and outcome attainment. Experiential learning is emphasized. Summer. Requires 156 residency hours. Prerequisites: Nursing 301, 303, 307, 308, 400, 401, 402, and/or consent of instructor. Instructor: Nevidjon. 4 credits.

420. Managing Acute and Chronic Health Conditions in the Newborn I. Comprehensive assessment and management of the newborn from birth through hospitalization and discharge. Course content includes anatomical, pathophysiological, and pharmacological management of the newborn with a focus on high-risk delivery, transport, and cardiorespiratory alterations. Integration of the newborn into the family is an overarching theme. Clinical practice opportunities in a variety of settings. Spring. 104 clinical hours. Prerequisite: Nursing 336. Instructors: Brandon, Bradshaw and staff. 4 credits.

421. Managing Acute and Chronic Health Conditions in the Newborn II. Comprehensive assessment and management of the newborn infant during hospitalization. Course includes anatomical, pathophysiological, and pharmacological management of the newborn with varying conditions. Advanced practice role development is emphasized. Clinical practice opportunities in a variety of settings. Summer. 104 clinical hours. Prerequisite: Nursing 420. Instructors: Brandon and Bradshaw. 4 credits.

423. Nurse Practitioner Residency: Neonatal. Focuses on the synthesis of theory and clinical management skills for the neonatal nurse practitioner within a collaborative model of practice in Level I, II, and III newborn units as well as follow-up clinics and transport. 4 to 6 credits. Fall, spring, summer. 400 to 600 residency hours. Prerequisites: Nursing 320, 321, 336, 420, 421, and 430. Instructors: Brandon and Bradshaw. Variable credit.

424. Clinical Nurse Specialist Residency: Neonatal. Focuses on the synthesis of theory and clinical skills for the clinical nurse specialist within a collaborative practice. Emphasis is placed on education, consultation, research, and clinical practice. 1 to 3 credits. Fall, spring, summer. 100 to 300 residency hours. Prerequisites: Nursing 320, 321, 336, 420, 421, and 430. Instructor: Brandon. Variable credit.

426. Managing Acute and Chronic Health Conditions in Children I. Focuses on the pathophysiological mechanisms, clinical decision-making, and treatment modalities in managing health problems seen in acutely, intensively, and chronically ill pediatric patients in the hospital, home, or long-term care facility. Integration of the family into the health care plan is an overarching theme. Primary care issues such as immunization and minor illness and health promotion are emphasized. Students have clinical rotations in a variety of settings. Fall. 104 clinical hours. Prerequisites: Nursing 320, 321, and 336. Instructor: Dochterty. 4 credits.

427. Managing Acute and Chronic Health Conditions in Children II. Addresses the complex management issues with critically, chronically, and acutely ill children cared for in hospitals, the home, or long-term facilities. Complex technology used in the management of pediatric patients is integrated into the course. The role of the family in the child's illness and developmentally appropriate care is emphasized. Spring. 104 clinical hours. Prerequisites: Nursing 320, 321, and 336. Instructors: Docherty and staff. 4 credits.

428. Nurse Practitioner Residency: Pediatric Acute Care. Provides the students an opportunity to synthesize theory and clinical management skills in the management of acutely and intensively ill pediatric patients in a collaborative model of practice. Residency sites and preceptors are individually arranged based on the needs of the students and availability of clinical sites. The emerging role of nurse practitioners in tertiary care settings is discussed. Consent of instructor required. 2 to 4 credits. Fall, spring, summer. 200 to 400 residency hours. Prerequisites Nursing 320, 321, 336, 426, 427, and 430. Instructor: Docherty. Variable credit.

430. Issues in Infant and Young Child Development. The discussion of important issues related to health maintenance and of complex medical and social problems in the first five years of life. Normal cognitive, motor, social/emotional, and language development, and the usual developmental challenges of each age group are addressed. Spring. Prerequisite: Nursing 336 or consent of instructor. Instructor: Blood-Siegfried. 3 credits.

438. Clinical Nurse Specialist Residency: Pediatrics. Supervised clinical practicum exploring the role of the clinical nurse specialist in a pediatric setting of the student's choice. Fall, spring, summer. Minimum 300 clinical hours. Prerequisites: Nursing 330, 331, 336, 430, and 431 (431 may be taken concurrently). Instructors: Blood-Siegfried and Lorimer. 3 credits.

439. Nurse Practitioner Residency: Pediatrics. Supervised clinical practice which allows opportunities for practice as a pediatric nurse practitioner. 1 to 4 credits. Fall, spring, summer. 100 to 400 residency hours. Prerequisites: Nursing 322, 323, 330, 331, 336, 430, and 431. Instructors: Blood-Siegfried and Lorimer. Variable credit.

441. Child Health in Family Care. Focuses on children from infancy through adolescence within the contextual frameworks of family, school, and community. The course addresses growth and development, health maintenance, and anticipatory guidance needs of various age groups. The role of the family nurse practitioner in the management of common primary health care problems of children is emphasized. Clinical practice is in primary care settings that serve children: public health departments, school-based clinics, public and private family and pediatric practice sites, and rural/urban community health clinics. Fall. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, 333, 334, and 440. Instructors: Blood-Siegfried and staff. 4 credits.

442. Sexual and Reproductive Health. Focuses on women and men from adolescence through maturity within the context of their sexual and reproductive development. Module I will cover prenatal and postnatal care. Module II will cover preconceptional health, family planning, sexually transmitted diseases, and sexual health of special populations. Module III will cover adult reproductive problems and changes in sexual health of men and women related to aging. The clinical practice component is in primary care settings that serve women and men at different points in the sexual and reproductive continuum. 1 to 4 credits. Fall, spring. Family nurse practitioner majors have 104 hours of direct patient care. Prerequisites: for family nurse practitioner majors: Nursing 330, 331, 332, 333, and 334; for other majors: Nursing 332. Instructor: Price. Variable credit.

449. Nurse Practitioner Residency: Family. Supervised practice in family primary care nursing. Management of common acute and chronic illnesses of patients across the life

span. Development of the domains and competencies of nurse practitioner practice in family health care settings. Intense clinical practice under the mentorship of experienced clinicians including performing health assessments; ordering, performing, and interpreting diagnostic tests; determining a plan of care for patients and families; collaborating with the health care team; and referring patients to other health care providers. Seminars encourage the synthesis of clinical learning and the transition to the role of family nurse practitioner. 1 to 4 credits. Fall, spring, summer. 100 to 400 residency hours. Prerequisites: Nursing 330, 331, 332, 333, 334, 440, 441, and 442. Instructors: Denman and Price. Variable credit.

450. Management of Critically Ill Adult Patients I. Focuses on pathophysiological mechanisms (cardiovascular, pulmonary, and hepatic), clinical decision-making, and treatment modalities for managing common problems seen in acutely/critically ill patients. Integration of technological aspects of care is emphasized in both the didactic and clinical components. Fall. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, 333, and 334. Instructors: Harshaw-Ellis and Staff. 3-4 credits.

451. Management of Critically Ill Adult Patients II. Focuses on pathophysiological mechanisms (neurologic, endocrine, abdominal, trauma), clinical decision-making, and treatment modalities for the management of health problems seen in acutely/critically ill patients. Consent of instructor required. Spring. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, 333, 334, 442, and 450. Instructors: Harshaw-Ellis and Staff. 3-4 credits.

457. Critical Care Clinical Nurse Specialist Residency. Focuses on the synthesis of research, theory, and clinical management skills in the care of adults in acute/critical care settings. Uses a collaborative practice model in delivering education, consultation, case management, research, and administrative issues in the acute/critical care unit. Sites and preceptors are individually arranged based on the needs of students. Fall, spring, summer. Prerequisites: Nursing 330, 331, 332, 333, 334, 450, and 451. Instructor: Harshaw-Ellis. 3 credits.

458. Nurse Practitioner Residency: Adult Acute Care. Focuses on the synthesis of theory and clinical management skills with implementation of the acute care nurse practitioner role in a collaborative model of practice. Consent of instructor required. 1 to 3 credits. Fall, spring, summer. 100-300 residency hours. Minimum 300 residency hours for A.C.N.P. Prerequisites: Nursing 330, 331, 332, 333, 334, 442, 450, and 451. Instructors: Harshaw-Ellis and Staff. Variable credit.

459. Nurse Practitioner Residency: Adult Primary Care. Supervised practice in adult primary care nursing. Management of common acute and chronic illnesses of adult patients. Development of the domains and competencies of nurse practitioner practice in primary care settings. Intense clinical practice under the mentorship of experienced clinicians including performing health assessments; ordering, performing, and interpreting diagnostic tests; determining a plan of care for patients and families; collaborating with the health care team; and referring patients to other health care providers. Seminars encourage the synthesis of clinical learning and the transition to the role of adult nurse practitioner. 1 to 3 credits. Fall, spring, summer. 100 to 300 residency hours. Prerequisites: Nursing 330, 331, 332, 333, 334, and 442. Instructors: Adinolfi and Staff. Variable credit.

460. Advanced Management of Patients with Cardiovascular Diseases. Focuses on the pathophysiology and management of patients with major cardiovascular disorders. Content includes diagnostic and treatment options, recovery of patients following major cardiac events, symptom management during chronic illness, and prevention of disease. Students also obtain skill in ECG interpretation and cardiac physical exam. Fall. Prerequisites: Nursing 330, 332, and 334; concurrent: Nursing 331 and 333. Instructor: Staff. 3 credits.

461. Care Management of Patients with Selected Cardiovascular Illnesses. Provides the student with supervised experience in care management of adult patients with selected cardiovascular illnesses in a variety of clinical settings. Students use the knowledge and critical thinking skills developed in Nursing 460 in patient evaluations and care management. Weekly seminars focus on paradigm cases from clinical practice and provide students opportunities for experience in making case presentations. Spring. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, 333, 334, and 460. Instructor: Staff. 4 credits.

469. Nurse Practitioner Residency: Adult Cardiovascular. Provides the student with supervised practice as a nurse practitioner. Clinical experiences focus on the management of common acute and chronic illness through transitions in care. Emphasis is on development of the domains and competencies of nurse practitioner practice in the care of cardiovascular patients. Consent of instructor required. 1 to 4 credits. Fall. 100 to 400 residency hours. Prerequisites: Nursing 330, 331, 332, 333, 334, 460, and 461. Instructors: Bowers and staff. Variable credit.

470. Oncology/HIV AIDS Nursing I: Epidemiology and Pathophysiology. Focuses on the epidemiology, pathophysiology, and biobehavioral aspects of cancer/HIV AIDS across the adult years. Major topics include cancer physiology, prevention, detection, role of the immune system, treatment, and responses to cancer/HIV AIDS. Spring. Instructor: Schneider. 3 credits.

471. Oncology/HIV AIDS Nursing II: Symptom and Problem Management. Provides the student with a broad framework for coordinating the domains and competencies of advanced practice roles in adult oncology/HIV AIDS nursing. The Oncology Nursing Society (ONS) Guidelines for Advanced Oncology Nursing Practice and Competencies in Advanced Practice Oncology Nursing, including HIV/AIDS and rehabilitation, serve as a framework for examination of problems and symptom management in patients. Case management and case studies are used to explore clinical problems. Summer. 104 clinical hours. Prerequisite: Nursing 470 or permission of instructor. Instructor: Schneider. 3 credits.

472. HIV Concepts and Management. Provides the basic concepts of human immunodeficiency virus (HIV) epidemiology, pathophysiology, management, and traditional and complementary approaches to care. Consent of instructor required. Summer. Instructor: Adinolfi. 3 credits.

478. Clinical Nurse Specialist Residency: Oncology. Provides the student with supervised practice as a clinical nurse specialist in a specialized area of interest including ambulatory/clinic care, inpatient care, bone marrow transplant care, community/preventive care, home or hospice care, and care of persons with HIV and AIDS. Case management, care maps, case studies, and ONS Guidelines for Oncology Nursing Practice serve as frameworks for the practicum and seminars. 2 to 4 credits. Fall, spring, summer. 200 to 400 residency hours. Prerequisites: Nursing 330, 331, 332, 470, and 471. Instructor: Schneider. Variable credit.

479. Nurse Practitioner Residency: Adult Oncology/HIV AIDS. Supervised practice in adult oncology nursing. Management of the care of patients with cancer/HIV AIDS in ambulatory and inpatient settings. Development of the domains and competencies of nurse practitioner practice in oncology settings. Intense clinical practice under the mentorship of experienced clinicians including performing health assessments; ordering, performing, and interpreting diagnostic tests; determining a plan of care for patients and families; collaborating with the health care team; and referring patients to other health care providers. Seminars encourage the synthesis of clinical learning and the transition to the role of adult nurse practitioner. 1 to 3 credits. Fall, spring, summer. 100 to 300 residency hours. Prerequisites: Nursing 330, 331, 332, 333, 334, 442, 470, and 471. Instructors: Schneider and Adinolfi. Variable credit.



480. Social Issues, Health, and Illness in the Aged Years. Examines diversity in development and adaptation to environmental, social, psychological, and biological changes. Theories of aging, health and aging; intimacy and sexuality; rural-urban health care patterns; minority health care patterns; demographic trends; and death, dying, and loss are discussed. Spring. Instructor: Corrazini-Gomez. 3 credits.

481. Managing Care of the Frail Elderly. Emphasizes assessment, rehabilitation, and management of complex problems of elders who reside in community and institutional settings. Research projects and innovative care strategies are explored. Organizational and managerial effectiveness and consultative roles of the geriatric nurse practitioner/clinical nurse specialist are examined. Fall. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, 333, and 334. Instructors: McConnell and Hendrix. 4 credits.

489. Nurse Practitioner Residency: Gerontology. Supervised practice as a nurse practitioner in gerontological nursing. Management of common acute and chronic illnesses of the elderly. Development of the domains and competencies of nurse practitioner practice in geriatric care settings. Intense clinical practice under the mentorship of experienced clinicians including performing health assessments; ordering, performing, and interpreting diagnostic tests; determining a plan of care for patients and families; collaborating with the health care team; and referral of patients to other health care providers. Seminars encourage the synthesis of clinical learning and the transition to the role of gerontological nurse practitioner. 1 to 3 credits. Fall, spring, summer. 100 to 300 residency hours. Prerequisites: Nursing 330, 331, 332, 333, 334, 442, 480, and 481. Instructors: Ouimette and Hendrix. Variable credit.

490. Clinical Research Management: Trials Management. Focuses on the overall management of Phase I, II, and III clinical trials in industry, academia, and government settings. Emphasis is placed on development, initiation, and execution of clinical trials. Course content includes intensive training in the processes involved in site evaluation and selection, preparation for investigator meetings, site initiation, site management, clinical research

monitoring, auditing and compliance practices, clinical research management tracking and reporting systems, adverse event reporting, data safety review boards, data management, site termination, and clinical trial material. Fall, spring. Instructors: Hill, Dren, and Turner. 4 credits.

491. Clinical Research Management: Business and Financial Practices. Familiarizes the student with the drug, device, and biologic development industry as a business. The overarching framework is the organizational structure, processes, procedures, and legal and ethical standards common to the industry. Integral to the course is the development/refinement of critical thinking skills with respect to problem-solving real life actual and potential problems arising out of drug development. Knowledge of contracts, business ethics, cultural differences, and legal issues will be stressed. Spring, summer. Instructors: Hill, Dren, and Turner. 4 credits.

492. Clinical Research Management: Regulatory Affairs. Provides the student with an overview of the FDA and regulatory requirements in the drug development process. In-depth content includes: the development and submission of Investigational New Drug Applications, New Drug Applications, Biological License Applications, Orphan Drug Applications; biomedical auditing and compliance; MedWatch and Safety reports; Phase-IV studies and Post Marketing Surveillance; and International Harmonization Guidelines for multinational, pharmaceutical development projects. Fall, summer. Instructors: Hill, Dren, and Turner. 4 credits.

499. Clinical Research Management: Residency. Focuses on the synthesis and integration of previous course work in clinical research management applied in research settings. Students spend rotations in industry, academia, or government settings gaining skills and experience working as integral members of a project team on clinical product development research projects. 1 to 4 credits. Fall, spring, summer. 300 residency hours. Instructors: Hill, Dren, and Turner. Variable credit.

HNM 11. Introduction to Parish Nursing. This seminar provides a basic introduction to the fundamentals of congregational nursing ministry. Students are introduced to an overview of the various roles filled by the congregational nurse: health counselor, referral agent, coordinator, facilitator, advocator, and supporter. Fall. Instructors: Ouimette and Breisch. 1 credit.

HNM 12. Parish Nursing II. Building upon the principles of Introduction to Parish Nursing, students in Parish Nursing II begin to implement the aspects of basic congregational nursing within the context of a faith community. This course provides opportunities for discussion and exploration of congregational nursing as both a ministry of the church and a subspecialty of professional nursing. 50 hours field experience. Spring. Prerequisite: HNM 11. Instructors: Ouimette and Meador (Divinity). 1 credit.

HNM 200. Health and Nursing Ministries Field Experience. Provides the student the opportunity to implement the nursing component of health ministry within a faith community. The student integrates the theological dimensions of faith while utilizing skills in individual and group assessment, principles of health education, and program planning and evaluation. Students have the opportunity to develop a continuity relationship within a specific faith community. The field experience includes 300 hours over three semesters with weekly seminars. Fall, spring, summer. Prerequisites: Nursing 500 and 501. Also taught as Health and Nursing Ministries 200. Instructors: Ouimette and Meador (Divinity). 3 credits.

HNM 290. Seminar on Care at the End of Life: Suffering and Dying Well. Students examine contemporary efforts to recover the ancient practice of *ars moriendi*, the “art of dying.” Students examine the phenomena of chronic illness, suffering, and dying from a variety of historical, biblical, theological, medical-physiological, and psychosocial perspectives.

Students also examine contemporary modalities of care for persons at the end of life, including tertiary palliative care, the hospice movement, and ancillary “death with dignity” organizations. Course goals include developing the student’s ability to imagine ways of caring for individuals with chronic and terminal illness. Fall. Also taught as Health and Nursing Ministries 290. Instructors: Ouimette and Meador (Divinity). 3 credits.

HNM 300. Seminar in Health and Nursing Ministries. Students work toward the development of a philosophy of parish-based health care grounded in the core practices and the corresponding, central, theological commitments of their respective religious communities. Under the leadership of faculty from both the School of Nursing and the Divinity School, students analyze contemporary theories and practices of health care; particular attention is given to the complex relationship between faith and health. Fall. Also taught as Health and Nursing Ministries 300. Instructors: Ouimette and Meador (Divinity). 3 credits.

502. Health Promotion and Disease Prevention. Provides the student the opportunity to incorporate health promotion and disease prevention assessment and intervention into the health of clients across the life span. Applying the principles of health education, the course prepares students to use the tools and skills necessary to provide health promotion and disease prevention services to individuals, families, groups, and communities. The definition of health and the factors that impact an individual’s or group’s health framework is the basis for understanding health maintenance interventions. Summer. Instructors: Friedman and Price. 3 credits.

512. Pharmacology of Anesthetic Agents. Addresses uptake, distribution, biotransformation, and excretion of intravenous, local, and inhalation anesthetics, neuromuscular blocking agents, and adjunctive medications used in anesthesia practice. Emphasis is given to mechanisms of drug action, drug effects, factors modifying drug dosage, and adverse responses. Consent of instructor required. Spring. Instructor: Karlet. 4 credits.

513. Basic Principles of Anesthesia. Focuses on basic principles of comprehensive, perioperative patient assessment, operating room preparation, interpretation of preoperative data, diagnostic reasoning, and perioperative documentation. The anesthesia machine and adjunct equipment, airway management, positioning, infection control, and basic concepts of anesthetic administration are also presented. Consent of instructor required. Spring. Instructor: Staff. 2 credits.

515. Chemistry and Physics Related to Anesthesia. Investigates the principles of chemistry and physics as applied to anesthesia care, operation of equipment, and operating room safety. Biomedical instrumentation pertinent to anesthesia patient care is described. Consent of instructor required. Summer. Instructor: Karlet. 3 credits.

517. Advanced Principles of Anesthesia I. Addresses anesthetic principles associated with specific specialty procedures and management of patients with special problems. Advanced airway management techniques are taught. Principles and anesthetic management for orthopaedic, abdominal, outpatient, gynecology, EENT, and genitourinary procedures are presented. Specific anesthetic considerations and management principles for pediatric and geriatric populations are presented. Consent of instructor required. Summer. Instructor: Staff. 2 credits.

518. Advanced Principles of Anesthesia II. Addresses anesthetic principles associated with specific specialty procedures and management of patients with special problems. Principles and anesthetic management for transplants, obstetric, plastic, burns, cardiovascular, thoracic, neurosurgical, and trauma procedures are presented. Use of advanced physiologic monitoring during anesthetic management is addressed. Consent of instructor required. Fall. Instructor: Staff. 2 credits.

519. Advanced Principles of Anesthesia III. Focuses on nurse anesthesia scope of practice, economics of a small anesthesia department, and quality management issues specific to the rural setting. The role of hospital and governmental regulatory agencies is discussed. Pharmacological, anatomical, and technical considerations for the administration and management of selected regional blocks for anesthesia and perioperative pain control is emphasized. Consent of instructor required. Spring. Instructor: Staff. 2 credits.

521. Advanced Pathophysiology for Nurse Anesthetists I. Describes the underlying pathophysiology of selected conditions affecting the cardiovascular, respiratory, musculoskeletal, and renal systems. Implications and effects that various disease states have on anesthesia selection and perioperative management are highlighted. Consent of instructor required. Spring. Instructor: Karlet. 3 credits.

522. Advanced Pathophysiology for Nurse Anesthetists II. Describes the underlying pathophysiology of selected conditions affecting the neurological, hematological, gastrointestinal, endocrine, and immunological systems. Implications and effects that various disease states have on anesthesia selection and perioperative management are highlighted. Consent of instructor required. Summer. Instructor: Karlet. 2 credits.

524. Physiology and Pathophysiology for Nurse Anesthetists. A study of the physiology and pathophysiology governing respiratory, cardiovascular, neurological, hematological, and renal systems. The course focuses on developing an advanced knowledge base to understand normal physiological and pathophysiological phenomena as it relates to anesthesia practice. Fall. Instructor: Karlet. 3 credits.

526. Professional Aspects of Nurse Anesthesia Practice. Analysis of nurse anesthesia professional associations and councils, legal aspects governing nurse anesthesia practice, hospital and governmental regulator agencies, nurse anesthesia scope of practice, the impaired practitioner, and ethical and professional considerations relating to the nurse anesthesia profession. Consent of instructor required. Fall. Instructor: Staff. 3 credits.

529. Clinical Anesthesia Practicum. Graduated, guided instruction in the clinical management of patients receiving various types of anesthesia. Selected topics, journal articles, and case reports are presented, critically analyzed, and discussed by presenters and participants once a week at a clinical and literature review conference. Students must complete five rotations to meet degree requirements. It is expected that students will continue clinical rotations through university-designated break periods, for example, spring break. Three days/week. Consent of instructor required. Fall, spring, summer. Instructor: Staff. 1 credit.

531. Medical Spanish and Cultural Competency for Health Care—Beginner Level I. Conversationally-focused language course designed to develop beginning cultural competency and beginning language skills in medically-focused Spanish language. The course is appropriate for anyone who works in the health care field and wants to acquire a basic level of medical Spanish. Conversational Spanish as spoken in Latin America is emphasized. Aspects of Latin American culture, especially those most pertinent to health care, are included in each lesson. Fall, spring, summer. Instructor: Denman. 1 credit.

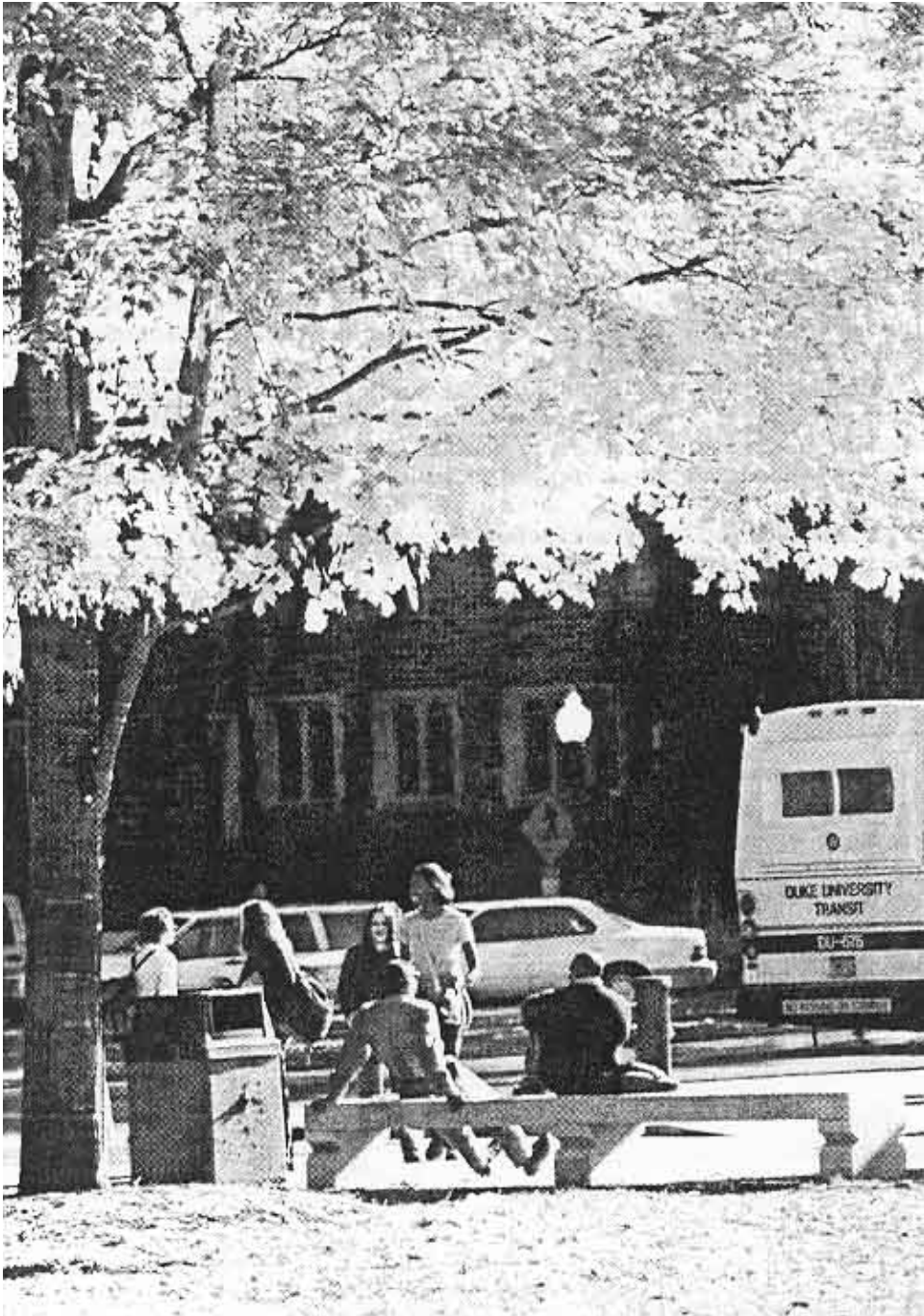
532. Medical Spanish and Cultural Competency for Health Care—Beginner Level II. Conversationally-focused language course designed to build on the beginning cultural competency and beginning language skills from medically-focused Spanish language acquired in Beginner Level I. The course is appropriate for anyone who works in the health care field, has previous background in basic Spanish, and wants to acquire more skill in medical Spanish. Conversational Spanish as spoken in Latin America is emphasized. Aspects of Latin American culture, especially those most pertinent to health care, are included in each lesson. Fall, spring, summer. Instructor: Denman. 1 credit.

533. Medical Spanish and Cultural Competency for Health Care–Intermediate Level I. Conversationally-focused language course designed to build on the cultural competency and language skills from-medically focused Spanish language acquired in Beginner Level II. The course is appropriate for anyone who works in the health care field, has completed two or more courses in basic Spanish, and wants to acquire more skill in medical Spanish. Conversational Spanish as spoken in Latin America is emphasized. The class is conducted as much as possible in Spanish, and students are expected to have mastered the content in Nursing 531 and Nursing 532. Aspects of Latin American culture, especially those most pertinent to health care, are included in each lesson. Prerequisite: Nursing 531, 532, advanced basic Spanish, or consent of instructor. (Medical vocabulary is not a prerequisite.) Fall, spring, summer. Instructor: Denman. 1 credit.

534. Medical Spanish and Cultural Competency for Health Care–Intermediate Level II. Conversationally-focused language course designed to develop advanced language skills in medically-focused Spanish. The course is appropriate for anyone who works in the health care field, has already progressed in Spanish language to an intermediate level, and wants to advance their Spanish language skills toward fluency. Conversational Spanish as spoken in Latin America is emphasized, and the class is conducted almost entirely in Spanish. Aspects of Latin American culture, especially those most pertinent to health care, are included in each lesson. Prerequisites: Nursing 533, intermediate Spanish, or consent of instructor. (Medical vocabulary is not a prerequisite.) Fall, spring, summer. Instructor: Denman. 1 credit.

540. Principles of Clinical and Classroom Teaching and Learning. Students will focus on the key concepts and principles which form the rationale for understanding the teaching and learning process. Spring. Instructor: Edwards. 3 credits.

General Information



Student Life

CONDUCT OF STUDENTS

Duke University expects and requires of all its students cooperation in developing and maintaining high standards of scholarship and conduct.

All students are subject to the rules and regulations of the university which are currently in effect or which, from time to time, are put into effect by the appropriate authorities of the university.

Any student, in accepting admission, indicates the willingness to subscribe to and be governed by these rules and regulations and acknowledges the right of the university to take such disciplinary action, including suspension and/or expulsion, as may be deemed appropriate for failure to abide by such rules and regulations or for conduct adjudged unsatisfactory or detrimental to the university.

LIVING ACCOMMODATIONS

Duke University has two apartment facilities on campus. One is dedicated solely to graduate and professional students (Town House Apartments) and the other is a subset of the undergraduate housing on Central Campus. The apartments are available for either continuous or academic term occupancy, are fully furnished and wired for cable, telephone and DukeNet. Information, including an on-line application, can be found at the Residence Life and Housing Services website at <http://rlhs.studentaffairs.duke.edu>.

The Town House Apartments are located approximately three blocks from the main East-West Campus bus line. These apartments are more spacious than other apartments on campus. Because of its location, residents find that these apartments offer more privacy and a change from the routine campus life and activities.

Each air-conditioned Town House Apartment includes a living room, a master bedroom, a second bedroom, a bath and a half and an all electric kitchen with dining room. Spacious closets and storage space are provided within each apartment. A swimming pool, located in the center of the complex, is open during the late spring and throughout the summer months. All utilities—water, heat, air-conditioning, gas and electricity—are provided. Residents must make arrangements with Duke University OIT Residential Services to connect cable, voice, and data services.

A portion of the Central Campus Apartments complex is set aside for graduate and professional students. Air-conditioned efficiency, two-bedroom, and three-bedroom apartments are rented to students. Efficiency units are very limited in number and are generally not available to new students. All utilities—water, heat, and electricity—are provided. Residents must make arrangements with Duke University OIT Residential Services to connect cable, voice, and data services.

Both facilities house single and married students. Single students may choose their own roommates, or Residence Life and Housing Services will assign students with similar

interests and schedules together. Each single student pays rent per academic term to Duke University. Married rental rates are available on the website.

Application Procedures. Information about Graduate and Professional Student Housing and an on-line application can be found at <http://rlhs.studentaffairs.duke.edu>. In recognition of the unique challenges that face newly accepted international students, priority for assignment to graduate student housing is awarded to students who arrive from abroad on student visa status. Due to limited availability of space, assignment to university housing cannot be guaranteed.

Off Campus Housing. Duke Community Housing is a resource to locate off-campus rental housing options in the Durham area. Duke Community Housing maintains a database of available rental housing which is accessible through the Duke Community Housing website, <http://communityhousing.duke.edu> or the campus office. The Duke Community Housing office is located at 402 Oregon Street, Room 102, telephone (919) 660-1785, email communityhousing@duke.edu. Staff assistance is available during office hours, 8:30 a.m. to noon and 1:30 p.m. to 5:00 p.m. Monday-Friday.

Dining Facilities. In addition to the food service venues in the Medical Center, a number of dining facilities are located within a short distance from the Medical Center. Duke Dining Services operates a variety of dining facilities including coffee bars, traditional cafeteria-style facilities, full-service restaurants, and fast food facilities. The many dining locations on campus give Duke students, faculty, staff, and visitors virtually unlimited dining options. For more information about campus dining options, contact Dining Services, 029 West Union, Box 90898, Durham, NC 27708-0898, (919) 660-3900, <http://auxweb.duke.edu/Dining>.

Food and Other Expenses. Duke Dining Services and Duke University Stores operations are located on campus to service the needs of the Duke community. The Duke University identification card, the DukeCard, serves as official identification for activities such as library book check out, recreational center, parking gate, and academic building access. The DukeCard is also the means of accessing the Dining and Flexible Spending (FLEX) Accounts. These two prepaid accounts allow students to make purchases with their DukeCard at certain Medical Center and campus Dining Services locations, retail stores, photocopiers, vending, and laundry machines. The Dining and FLEX Accounts may also be used to purchase pizza and sub sandwiches delivered to campus from several approved off-campus merchants. A FLEX Account can be opened via cash or check at either of the two DukeCard Office locations (Medical Center Parking Garage II and West Union Building) or by sending a signed contract and check in the mail to the address listed below. Additional deposits can be made at the DukeCard Office or by visiting any of the Value Transfer Stations located across campus and the Medical Center. The Dining Accounts can be activated at the DukeCard Office and will be billed to the student's bursar account. For more information about establishing an account, contact The DukeCard Office, 100 Union West, Box 90911, Durham, NC 27708-0911, (919) 684-5800, <http://dukecard.duke.edu>.

MOTOR VEHICLE REGISTRATION

Each motor vehicle operated on Duke University campuses by students enrolled in the School of Medicine must be registered at the Medical Center Traffic Office, PRT Level, Parking Deck II, within five days after operation on the campus begins, and thereafter must display the proper registration decal.

All students must pay an annual fee of \$128 for each four-wheeled motor vehicle and \$34 for each motorcycle, motorbike, or motor scooter registered. Payment is accepted by cash or check only. To register a vehicle, the student must provide the license

tag number of each vehicle to be registered. Bicycles are registered free of charge at University Transportation Services, 2010 Campus Drive.

Parking, traffic, and safety regulations are given to each student at the time of registration of the vehicle(s). Students are required to abide by these regulations.

COMMUNICATION BETWEEN DUKE UNIVERSITY AND STUDENTS

Electronic mail (email) is the official medium by which Duke University communicates policies, procedures, and items related to course work or degree requirements to students enrolled at the university. All students matriculated at the university are assigned a Duke University email account upon acceptance of an offer of admission. It is the student's responsibility to check this email account regularly and to respond promptly to requests made by email.

SERVICES AVAILABLE

Student Health Center. The Student Health Center, (919) 681-WELL, is a joint program supported by the Department of Community and Family Medicine, Duke University Medical Center, and Student Affairs. A wide variety of services is available: general medical care, laboratory, pharmacy, travel and immunization, x-rays, cold/flu self-help table, and allergy clinic. The Student Health Center, located on Flowers Drive in the Duke Clinic complex, is the primary location for medical care and health promotion. Medical services are provided by board-certified faculty and by physician assistants, nurse practitioners, and resident physicians under faculty supervision. Students are seen by appointment, (919) 681-WELL, Monday-Friday, 8:30 a.m. - 5:30 p.m. (Wednesday, 9:30 a.m.–5:30 p.m.). During the academic year, a Nurse Advice Clinic operates from 5:30 p.m.–10:30 p.m. on weekdays, and an Acute Care Clinic is held on Saturday and Sunday from 11:00 a.m.–2:00 p.m. After hours nurse advice is available by telephone.

Students are encouraged to use the Student Health Center as their portal of entry to other health resources when needed, including the specialty clinics at Duke University Medical Center. This helps with coordination of appropriate care.

In the event of an obvious life-threatening emergency, students should go directly to the Emergency Department. If necessary, Duke Police (call 911 or (919) 684-2444) provides on-campus transportation to the Emergency Department.

Health Promotion. Health promotion staff are available to assist students in making informed decisions that promote their health. Topics include fitness assessment, alcohol and other drug usage, eating and body image concerns, sexual activity and sexually transmitted diseases, stress management, and others. In addition, nutrition counseling is available at the Wilson Recreation Center office. Consult the Healthy Devil online at <http://healthydevil.studentaffairs.duke.edu>.

Student Health Physical Therapy. The Student Health Physical Therapy Consultation Service is located in the Wilson Recreation Center on West Campus in the basement of Card Gym. A physical therapist is available from 1:00 p.m. - 5:00 p.m. weekdays when undergraduate classes are in session, on a walk-in basis, to assess exercise-related problems and to outline short-term treatment plans, aid recovery, and help prevent re-injury. Call (919) 684-6480 during the summer months for hours.

Confidentiality. Information regarding the physical or mental health of students is confidential and is released only with the student's permission except in life-threatening circumstances. As a member of the Duke University Medical Center, the Student Health Center is fully compliant with HIPAA federal regulations.

Student Accident and Hospitalization Insurance. Health insurance is essential to protect against the high cost of unexpected illnesses or injuries which would require hospi-

talization, surgery, or the services of specialists outside the Student Health Center. Therefore, all students are required to have such insurance. At the beginning of each fall semester, medical students must use the ACES online system to provide proof of coverage under an accident and hospitalization insurance policy or purchase the Duke Student Accident and Hospitalization Insurance policy. This insurance policy provides protection 24 hours per day during the 12-month term of the policy of each student insured and is specifically designed to complement the coverage provided by the student health fee (see below). Students are covered on and off the campus, at home, while traveling between home and school, and during interim vacation periods. Coverage for the student's spouse and dependent children also may be purchased. Further information about this plan can be obtained from Hill, Chesson, and Woody (919) 489-7426.

Health Fee. All currently enrolled full-time students and part-time degree candidates are assessed a mandatory student health fee. This covers most services rendered within the Student Health Center during each enrolled semester. An optional summer health fee for students not enrolled in summer sessions is also available through the Student Health Center.

Services Covered by the Health Fee. The health fee covers most of the services at the Student Health Center if medically indicated and rendered by a student health provider:

- medical care for acute and chronic illness and minor injuries
- one health maintenance examination every two years
- annual gynecological exam
- some routine laboratory services
- administration of allergy shots
- confidential pregnancy testing
- many medications required for short-term treatment of acute problems
- some immunizations excluding prematriculation immunizations
- health promotion, including nutrition consultation
- mental health care at CAPS

Services not Covered by the Health Fee. If you are unsure whether a service is covered, please ask the Student Health reception staff in the clinic prior to receiving the service. You are financially responsible for the following:

- medical care provided in the Emergency Department, hospital, or other non-student health facility
- care provided by specialist consultants, including those working within the student health facilities
- dental care
- pregnancy care or deliveries
- tests, procedures, and prescriptions not medically indicated, not on the approved list, or not ordered by student health providers
- immunizations required for entrance to Duke or other universities or for travel
- medications not on the student health formulary and those required for long-term use; contraceptives

Student Health Center: William A. Christmas, M.D., Director, 00371 Duke Clinic.

Counseling and Psychological Services. Counseling and Psychological Services (CAPS) is located in Suite 214, Page Building on West Campus. CAPS, a component of student services, provides a range of counseling and psychological services designed to address the acute emotional and psychological difficulties of Duke students.

The professional staff is composed of psychologists, clinical social workers, and psychiatrists experienced in working with college students. They provide direct services to students including evaluation and brief counseling/psychotherapy, with issues such as self-esteem and identity, depression, anxiety, family relationships, academic performance, dating, intimacy, and sexual concerns. Ordinarily, students are seen for counseling by appointment. If the concern requires immediate attention, a CAPS staff member assists with the emergency at the earliest possible time.

Each year CAPS offers a series of counseling, therapy, and support groups. Recent groups have focused on stress, anxiety, interpersonal process, meditation, eating and body image concerns, and dissertation support.

Another function of CAPS is to provide consultation regarding student development and mental health issues affecting not only individual students, but the campus community as a whole. The staff works with other campus personnel including administrators, faculty, the student health staff, and student groups in meeting needs identified through such liaisons. Contact CAPS at (919) 660-1000.

Student Personal and Professional Advisory System for M.D. Program Students.

One important objective of Duke University School of Medicine is to promote an informal, cordial student-faculty relationship. It also is felt that this type of relationship fosters better curriculum and career advising for the student. Each entering student is assigned to one of four advisory deans who oversees her or his academic progress and with whom the student meets in small groups and individually for personal advising, curriculum planning, and career counseling. A full-time associate dean is available to students on a strictly confidential basis for personal and crisis counseling or referral.

Resources for Study

The goal of Duke University Medical Center is to provide leadership in fulfilling its core missions which are:

To provide the most advanced and comprehensive education possible; to prepare our students and trainees for lifetimes of learning and careers as leaders, practitioners, or researchers;

To perform biomedical research producing discoveries that add to understanding life processes and lead to preventing and curing disease and maintaining health;

To translate, to practice, and to make available to the public, with compassion, the benefits of the unique clinical and technological resources of the Medical Center and to support our educational and research missions.

To the maximum extent possible, we will apply our core missions in education, research, and health care delivery to develop the means to solve regional and national health care problems, including providing accessible, cost-effective health care of measurable quality.

Library. The Medical Center Library, located in the Seeley G. Mudd Building, provides the services and collections necessary to further educational, research, and clinical activities in the medical field. Services are available to Medical Center faculty, staff, and students from the School of Medicine, School of Nursing, Division of Allied Health, and Duke Hospital, as well as graduate departments in the basic medical sciences. Over 272,767 volumes are available, including the Trent Collection in the History of Medicine. Approximately 2,276 journal subscriptions are currently received, and the library has extensive back files of older volumes. The collection contains over 90 audiovisual items. The Medical Library Education Center (MLEC), located on the lower level of the library, houses an electronic classroom for hands-on computer training. The Frank Engel Memorial Collection

consists of a small group of books on consumer health and non-medical subjects for general reading, together with several newspapers and popular magazines. Traditional library services include reference, circulation, Internet assistance, and document delivery services, which are supplemented by mediated and self-service online database searching. Public workstations for searching databases and the on-line catalog are available in the reference area and other areas of the library. Detailed information on services and resources may be found in the information guides available at the library.

The Medical Center Library is open at the following times: Monday-Thursday, 8:00 am–11:00 pm; Friday, 8:00 am–6:00 pm; Saturday, 10:00 a.m.–6:00 p.m.; Sunday, 2:00 p.m.–10 p.m.. Summer and holiday hours are announced.

Associate Dean for Library Services: Patricia L. Thibodeau, M.L.S. (Rhode Island, 1976), M.B.A. (Western Carolina University, 1991). Deputy Director: Richard A. Peterson, M.S.L.S. (Case Western Reserve University, 1977).

Bookstore. The Medical Center Bookstore offers a wide selection of medical reference books, textbooks, software, and instruments to the Duke University Medical Community. Clothing, including scrubs and uniforms, office supplies, and Duke gifts are also offered. Special orders are welcomed. The store is located in the Facilities Building adjacent to the PRT walkway between Duke Hospital North and Duke Hospital South and is open Monday through Friday from 8:30 a.m.–5:30 p.m., and Saturdays from 10:00 a.m.–4:00 p.m. The telephone number is (919) 684-2717.

Searle Conference Center. The Searle Conference Center for Continuing Education in the Health Sciences provides elegant accommodations for conferences, symposia, lectures, and meetings to support the continuing education activities of the Medical Center and university. Additionally, banquets, dinners, weddings, receptions, and other private events may be held on a space- available basis. Meeting space, audiovisual needs, catering, and assistance with event planning are all provided by the on-site staff. Please call (919) 684-2244.

Manager: Michael A. Evans

Medical Center Commons. The Medical Center Commons restaurant is open for fine dining at lunch time, Monday-Friday. Accepting credit cards, IRs, Flex Account Cards, and reservations at (919) 684-5805, the Commons is located in the Searle Conference Center on the ground floor of the Seeley Mudd Building. The restaurant features gourmet salads, homemade soups, carved meats, hot entrees, and weekly specials. Prices range from \$6 to \$9. Private dining rooms are available as well as morning, evening, or weekend meeting and catering space. For additional information on these services, please call (919) 684-2244.

The Office of Curriculum. The Office of Curriculum offers expertise to the Medical School community in the areas of curriculum and course development, educational research and evaluation studies, standardized patients, faculty development, and curricular support. Interdisciplinary courses are managed from this office.

Support includes space, equipment and supplies, and services. The Thomas D. Kinney Central Teaching Laboratory, located on the fourth floor of the Davison Building, provides laboratory, demonstration, and conference space for all courses taught in the basic sciences with the exception of gross anatomy. The Medical Student Amphitheater in the Clinic Building provides space for 150 learners and is equipped with digital projectors, document and room cameras, computers for the presenter and network access for the learners, and an audience response system. Seven small group rooms in the Student Affairs area in the basement, Purple Zone complement this type of education. A Clinical Skills Lab of eight rooms in the basement, Orange Zone provides a mock clinic experience and is the site for the Clinical Performance Examination (CPX). A Patient Simulator Lab on the fourth floor,

Orange Zone provides “hands on” learning of normal and abnormal physiological processes, as well as a patient’s responses to a variety of pharmaceutical agents in adults and children. The Office of Curriculum has a full-time staff of 16 who provide software support, standardized patients, instructional design, exam grading, on-line courses, in-house microscope cleaning and repair, course evaluation tabulation and reporting, support for personal data assistants (PDAs), and help desk support for medical students and physical therapy students. This enables the faculty of each department to devote their efforts entirely toward student learning. The office also supports curriculum and evaluation databases used in curriculum management and tracking of student progress.

All first year medical students are given space (which they maintain for the entire academic year) in one of the Central Teaching Laboratory (CTL) rooms for their own work. CTL includes a computer cluster with electronic mail capability available to students 24 hours a day and a 24-workstation electronic laboratory for computer-assisted educational training for students, faculty, and employees.

Administrative Director: Carol G. Reilly, B.S.

Clinical Performance Examination (CPX). Duke Medical School, in conjunction with the other three medical schools in North Carolina, has developed a standardized test of clinical performance. During the beginning of the third year, students who have just completed all second-year rotations are required to take this CPX. Study Away students will take it during their last clinical rotation.

The CPX consists of a number of clinical cases for which the student is in the role of primary provider. Each patient has a complaint or reason for the visit. The student begins each case by talking with and sometimes physically examining a patient and then answering questions about the data obtained from the patient. The cases are selected to sample a variety of dimensions including patient age, gender, all organ systems, and specialties represented throughout the clerkship year. The major purposes of the CPX are (a) to evaluate, in a more standardized way, students' approach to patients with common complaints, demonstrating the orchestration of history-taking, physical examination, and communication that cannot be adequately assessed through written tests and (b) to provide a measure of curriculum effectiveness. For some cases, additional radiologic or diagnostic data is available for consideration along with data from the patient in determining a differential diagnosis and possibly an outline of a management plan. The problems/diagnoses in the CPX are selected by the faculty to represent common or core problems. Each student receives written feedback concerning their individual performance as well as the whole class's. Each student's encounters with patients are videotaped. These tapes are available for review at the student's request. Performance on the CPX does not affect clerkship grades or academic standing, but must be passed. Reports are kept in the educational file. Students not meeting the minimal level of performance review videotapes and CPX data, then receive guided learning to overcome areas of low performance. Satisfactory completion of this additional learning fulfills the requirement to pass the examination.

Division of Educational Media Services. As a core technology support center within the School of Medicine and Health System, the Division of Educational Media Services provides total media support for the teaching, research, patient care, and service missions of Duke University School of Medicine, Duke Health System, and the university. The Division has three primary service sections: Medical Photography, Graphics, and Imaging; Creative Art and Web Development; and Instructional Television.

The Creative Art and Web Development Section provides comprehensive web development and electronic media creation. Full computer graphics and manual art

production methods and techniques are possible along with animation and other contemporary media technologies. Web Development services include entire site design, information architecture, page design and graphics creation, and programming. Offerings include E-commerce, Notes, Access and Java Script programming, indexing and search functionality, and hosting with secure web servers for on-line Continuing Medical Education (CME) activities. Streaming video and audio on the Internet and Internet-based live broadcasts are also offered. Special capabilities include production and hosting of on-line educational modules with quizzing and participant tracking.

The Medical Photography, Graphics, and Imaging Section is staffed and equipped to provide a full range of photographic, graphics and imaging services for patient care, teaching, and research. Patient photography activity includes black-and-white and color photos in the studio, on the ward, in the clinic, or in the operating room. Copy photography includes a full range of slide services for internal and external lecture and presentation purposes. An extensive computer graphics creation and imaging service is also available. Graphics services rendered include digital poster session design and printout, imaging of computer files in color and black-and-white for slides, overheads, prints and transparencies; graphics creation for slides, prints, and artwork; and graphic design and other creative services for PowerPoint presentations and desktop publishing. Medical illustration and traditional pen and ink or carbon dust, as well as electronic creations, are offered for scientific and technical publication purposes.

The Instructional Television section also supports teaching, research, and patient-care programs of the Medical Center. It provides educational and commercial video production services for educational, informational, and promotional uses. The four available formats for video recording are Beta SP, DV-cam, VHS, or S-VHS. Script writing, music, graphic support, narration, and full post-production effects are also available for finished productions. Applications include education, training, marketing, and video news releases as well as others. Videoconferencing, satellite downlinking, audiotape services, projection services, and equipment rental are also offered.

Director: Thomas P. Hurtgen, M.B.A.

Duke Hospital. Duke Hospital, one of the largest private hospitals in the South, is part of Duke University Health System and currently is licensed for 1,019 beds. The hospital directs its efforts toward the three goals of expert patient care, professional education, and service to the community. It offers patients comprehensive diagnostic and treatment facilities and special acute care and intensive nursing units for seriously ill patients. Approximately 37,000 patients are discharged annually. Surgical facilities include 26 inpatient operating rooms and 12 ambulatory surgery rooms in which surgeons perform more than 28,000 operative procedures annually. Approximately 2,900 babies are born each year in the delivery suite. Other special facilities for patients include a heart catheterization laboratory, hemodialysis unit, cancer research unit, medical and surgical intensive care units, hyperbaric oxygenation chamber, and cardiac care unit.

Duke's home care, hospice, and infusion services provide opportunities for continued care of patients after they leave Duke Hospital.

Ambulatory services include the outpatient clinics, ambulatory surgery center, the employee health service, and the emergency department, with more than one million combined patient visits annually. The clinical faculty of the Duke University School of Medicine participate in undergraduate and graduate medical education and practice medicine in the hospital and in the Private Diagnostic Clinic.

Duke Hospital, with a house staff of approximately 800, is approved for residency

training by the American Medical Association, the Accreditation Council for Graduate Medical Education, and is accredited by the Joint Commission on Accreditation of Healthcare Organizations for another three years (from 2001).

Veterans Administration Medical Center. The Durham Veterans Administration Medical Center, with 154 beds (plus 120 nursing home beds), annually admits over 6,000 patients. The hospital is within walking distance from the School of Medicine and has closely integrated teaching and training programs for medical students and house staff. These programs are provided by the full-time professional staff who are members of the faculty of Duke University School of Medicine.

Lenox Baker Children's Hospital. On November 1, 1987, the Lenox Baker Children's Hospital became a part of Duke University Medical Center, entering a new phase in its development as an orthopaedic and rehabilitation outpatient center for the children of North Carolina. A full spectrum of outpatient orthopaedic and rehabilitation services is offered to identify and meet realistic goals and to educate, support, and assist families, schools, and communities in providing a rich environment for disabled children.

Durham Regional Hospital. Durham Regional Hospital, a 391-bed acute care facility, became part of Duke University Health System on July 1, 1998 through a lease agreement with Durham County. As the only community hospital with tertiary care services in an eight contiguous county area, Durham Regional has a long tradition of caring for the residents of Durham and surrounding communities. A comprehensive health care facility, Durham Regional provides inpatient, outpatient, and emergency care and features a level II intensive care nursery, on-site radiation oncology service, Durham Rehabilitation Institute, and the Davis Ambulatory Surgery Center. It is also home to the Triangle's only Long-term Acute Care Hospital, operated by Select Medical. Durham Regional participates in many medical and health-related professional training experiences. The Watts School of Nursing, North Carolina's oldest nursing school, is located on-site.

Raleigh Community Hospital. Raleigh Community Hospital, located in north Raleigh, is a 186-bed acute care facility, which became a part of the Duke University Health System on September 15, 1998. Raleigh Community Hospital provides primary and specialty care, including a Sports Medicine Clinic, Outpatient Imaging Center, Pain Clinic, Diabetes Treatment Center, and a Cardiac Rehabilitation Center.

In addition, Raleigh Community Hospital has a comprehensive childbirth center with an LDRP birthing service, Level II NICU, cancer program, same day surgery center, and cardiac diagnostic services.

Other Hospitals. Various cooperative teaching and training programs are available for medical and allied health professional students and house staff at other hospitals including Asheville Veterans Administration Medical Center in Buncombe County, John Umstead Hospital in Butner, Fayetteville Area Health Education Center in Fayetteville, and Cabarrus Memorial Hospital in Concord, North Carolina.

Medical Center and Health System Buildings and Facilities

The 90 buildings and additions which make up the medical education, research, and patient care facilities are located on approximately 200 acres on the West Campus of the university.

The Clinic Zone is contiguous with the main quadrangle of the university and consists of the following: *Duke Clinic*—Ten contiguous buildings, including: *Clinic Reception Building*—Entrance lobby, clinics, food court, and amphitheater. *Edwin A. Morris Building*—Clinics, diagnostic, treatment and support services, Department of Radiation

Oncology administration, departmental research laboratories, and offices. *Davison Building*—Department of Pathology administration, research laboratories and offices, Central Teaching Facility, Division of Audiovisual Education, Medical Center, and Health System Administration, and School of Medicine Administration. *Original Hospital, 1940 and 1957 Additions*—Clinics, diagnostic, treatment, and support services including: Clinical Laboratories, Physical Therapy, Pharmacy, departmental offices, Medical School Admissions, Registrar, Financial Aid, Central Teaching facilities, Educational Media Services and Student Health Clinic. *Baker House*—Department of Obstetrics and Gynecology administration, clinics, diagnostic, treatment and support services including: Speech and Hearing, Oral Surgery, Pastoral Care and Counseling, departmental offices and NeuroOncology Program. *Barnes Woodhall Building*—Psychiatry inpatient care unit, diagnostic, treatment, and support services, outpatient pharmacy, pre-operative screening, Radiology, departmental research laboratories, and offices, and Hospital administration. *Diagnostic and Treatment Building*—Clinics, diagnostic, treatment, and support services, departmental research laboratories and offices. *Ewald W. Busse Building*—Center for the Study of Aging and Human Development, diagnostic, treatment, and support services, department research laboratories, and offices. *Eugene A. Stead Building*—General Clinical Research Center (Rankin), departmental research laboratories and offices. *Clinical Research II*—Department of Psychiatry administration, departmental research laboratories and offices, hyperbaric medicine unit. Other buildings within the Clinic zone include the *Bell Building*—offices for the Departments of Surgery, Pediatrics, Radiology, Obstetrics and Gynecology, Medicine, and Psychiatry, Medical Center Information Systems (MCIS), Gross Anatomy laboratories, and Brain Imaging and Analysis administration and research. *Marshall Pickens Building*—Clinics, Employee Health Services, and *Parking Garage I*.

The Hospital Zone consists of the following buildings: *Duke Hospital (Anlyan Tower and Ancillary Building)*—Inpatient care units, diagnostic, treatment, and support services including surgical suite, cath labs, Emergency Department, Labor and Delivery suite, Operating and Recovery Suite, Full-Term Nursery, Radiology, Clinical Laboratories, MRIs, Respiratory Therapy, Pharmacy, the Departments of Anesthesiology, Medicine, Radiology, Surgery administration, Cardiology Division offices, and Brain Imaging and Analysis research. *Children's Health Center*—Children's clinics, diagnostic, treatment and support services, Department of Pediatrics administrative offices. *Joseph A.C. Wadsworth Building (Eye Center)*—Department of Ophthalmology administration, clinic, diagnostic, treatment, and support services including: operating rooms, recovery, research laboratories and offices. *Civitan Building and Child Development Center*—Clinics, laboratories, and offices for the Departments of Pediatrics and Psychiatry. *Hanes House and Nursing School Addition*—Physician Assistant Program, Clinical Research Training Program, Community and Family Medicine administrative and departmental offices, and School of Nursing administrative and departmental offices, Hospital Education and teaching facilities, and Medical Center News Office. *Seeley G. Mudd Communications and Library*—Medical Center Library, Offices of Communications, Office of Grants and Contracts, Medical Center Commons, the Searle Center for Continuing Education, and the Center of Medical Ethics and Humanity. *Parking Garage II*—House Staff and Student Exercise Facility, and Traffic and Parking.

The Research Zone consists of the following: *Joseph and Kathleen Bryan Research Building for Neurobiology*—Department of Neurobiology administration, Alzheimer's Disease Research Center, Pharmacology and Neurobiology departmental research laboratories and offices. *Nanaline H. Duke Medical Sciences Building*—Departments of Biochemistry and Cell Biology administration, departmental research laboratories and offices. *Alex H. Sands Medical Sciences Building*—Departments of Anesthesiology,

Biological Anthropology and Anatomy, Cell Biology, Obstetrics and Gynecology, Ophthalmology, Medicine and Psychiatry research laboratories and offices. *Edwin L. Jones Basic Cancer Research Building*—Departments of Immunology and Microbiology administration, departmental research laboratories and offices. *Medical Sciences Research Building*—Comprehensive Cancer Center administration, Departments of Medicine, Obstetrics and Gynecology, Ophthalmology, Pathology, Pediatrics, Radiology, Radiation Oncology, Surgery and Cancer Center research laboratories and offices. *Clinical and Research Laboratory Building*—Department of Genetics administration, Howard Hughes Medical Institute, Departments of Cell Biology, Genetics, Medicine and Psychiatry research laboratories and offices. *Leon Levine Science Research Center*—Department of Pharmacology and Cancer Biology administration, research laboratories, and offices. *Surgical Oncology Research Building, Environmental Safety Building, Research Park Buildings I, II, III and IV*—Departments of Anesthesiology, Medicine, Pediatrics, Radiology, and Surgery, research laboratories, offices, and hospital clinic laboratories. *Vivarium. Cancer Center Isolation Facility. The Center for Human Genetics—genomic science research. The Center for the Models of Human Disease—genomic science research.*

The West Zone consists of the *Lenox Baker Children's Hospital*—Clinics, diagnostic, treatment, and support services and departmental offices. *Dialysis Center*—Treatment facility. *Center for Living Campus*—four buildings including: *Sarah Stedman Nutrition Center*—Department of Medicine research laboratories and offices. *Andrew Wallace Clinic Building*—Clinics, diagnostic, treatment, and support services and departmental offices. *Pepsico Fitness Center*—Exercise facilities including indoor track, exercise equipment, swimming pool. *Aesthetic Services and Dermatologic Surgery Clinic*—clinics, diagnostic treatment, and support services and CFL administrative offices.

The North Campus Zone consists of the following buildings: *North Pavilion*—Ambulatory Surgery center, Adult and Pediatric Bone Marrow Transplant, Duke Clinical Research Institute (DCRI), Anesthesiology offices, Office of the University Counsel, and the Office of Continuing Medical Education. *Parking Garage III*, and *Elba and Elder Street Buildings*—Diagnostic and treatment services, offices for the Departments of Pathology, Psychiatry and Medicine, the Center for the Study of Aging, Hospital transport and laboratory services, Occupational and Environmental Safety, Medical Center Engineering and Operations, and PRMO Finance offices.

Graduate Program Information



Graduate Program Information

Accreditation Council for Graduate Medical Education Programs. Appointments are from July 1 through June 30 with a few exceptions. Trainees receive stipends, professional liability insurance, disability insurance, life insurance, health insurance, parking, psychological counseling, uniforms, and laundry of uniforms.

Programs offered with the program training director of each service are as follows:

Allergy and Immunology	Dr. Rebecca Buckley
Anesthesiology	Dr. Catherine Lineberger
Anesthesiology: Critical Care	Dr. Chris Young
Anesthesiology: Pain Management	Dr. Randall Brewer
Cardiovascular Disease	Dr. Thomas Bashore
Child Neurology	Dr. Darrel Lewis
Child Psychiatry	Dr. Linwood Alsbrook
Clinical Cardiac Electrophysiology	Dr. Tristram D. Bahnson
Clinical Neurophysiology	Dr. Atif Husain
Critical Care Pediatrics	Dr. Eva Grayck
Dermatology	Dr. Sarah Myers
Dermatopathology	Dr. Maria Selim
Emergency Medicine	Dr. Susan Promes
Endocrinology/Metabolism	Dr. Mark Feinglos
Family Practice	Dr. Margaret Gradison
Family Practice: Sports Medicine	Dr. Jeffrey Bytomski
Gastroenterology	Dr. Michael Shetzline
General Surgery	Dr. Theodore Pappas
Geriatric Medicine	Dr. Kenneth Lyles
Geriatric Psychiatry	Dr. David Steffens
Hematology/Oncology	Dr. Marilyn Telen
Hematopathology	Dr. Patrick Buckley
Infectious Diseases	Dr. Gary Cox
Internal Medicine	Dr. Diana McNeill
Interventional Cardiology	Dr. Michael Sketch
Medical Genetics	Dr. Marie McDonald
Medical Microbiology	Dr. Barth Reller
Medicine/Pediatrics	Drs. William Yarger/Joseph Majure
Medicine/Psychiatry	Drs. William Yarger/Grace Thrall
Neonatal/Perinatal Medicine	Dr. Ronald Goldberg

Nephrology	Dr. Thomas M. Coffman
Neurological Surgery	Dr. Allan Friedman
Neurology	Dr. Joel Morganlander
Neuropathology	Dr. Roger McLendon
Neuroradiology	Dr. James Provenzale
Nuclear Medicine	Dr. Edward Coleman
Nuclear Radiology	Dr. Edward Coleman
Obstetrics-Gynecology	Dr. Haywood Brown
Ophthalmology	Dr. Pratap Challa
Orthopaedic Surgery	Dr. William Hardaker
Orthopaedic Hand Surgery	Dr. James Urbaniak
Otolaryngology	Dr. Joseph Farmer
Pathology	Dr. Patrick Buckley
Pediatric Rheumatology	Dr. Laura Schanberg
Pediatrics	Dr. Joseph M Majure
Plastic Surgery	Dr. Scott Levin
Preventive Medicine	Dr. Dennis Darcey
Psychiatry	Dr. Grace Thrall
Psychiatry: Forensic	Dr. Sally Johnson
Pulmonary Critical Care Medicine	Dr. Loretta Que
Radiation Oncology	Dr. Larry Marks
Radiology: Diagnostic	Dr. Linda Gray
Rheumatology and Genetics	Dr. David Pisetsky
Surgery: Critical Care	Dr. Mark Sebastian
Thoracic Surgery	Dr. Thomas A. D'Amico
Urology	Dr. Glenn Preminger
Vascular Surgery	Dr. Richard McCann
Vascular/Interventional Radiology	Dr. Paul Suhocki

Duke University Medical Center is a participating member of the National Resident Matching Program, 2450 N Street N.W., Suite 201, Washington, DC 20037-1141. All applicants for first-year, post-medical school appointments must register with this program.

Reasonable requests for reduced scheduling are considered. Inquiries should be directed to the program training directors of approved residencies.

The Durham Veterans Administration Medical Center adjoins the Duke University Campus and is affiliated with Duke University Medical Center. The full-time professional staff of the V.A. Medical Center are all faculty members of the School of Medicine. All training programs are integrated with corresponding programs at the Duke University Medical Center, including rotation of house officers at each hospital.

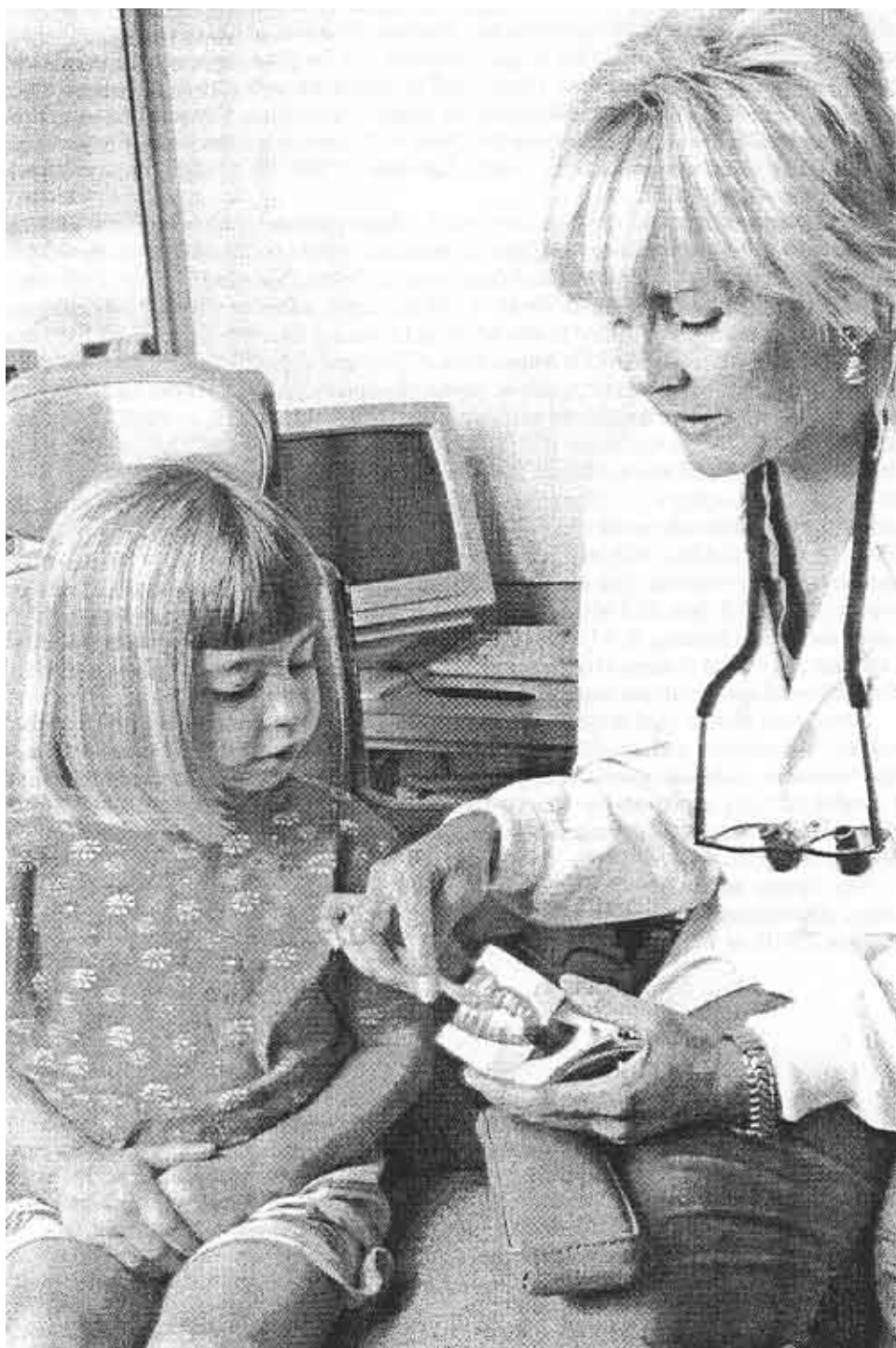
All trainees are required to be licensed by the State of North Carolina. This may be accomplished by: (1) a residency training license that covers only training by Duke and is not convertible to a full North Carolina license, or (2) a full North Carolina license that is a complete medical license. A complete medical license is obtained either by state boards (North Carolina Boards can only be taken upon completion of internship) FLEX, USMLE Step III, or National Boards. North Carolina is not reciprocal with other states for full licenses. Duke University Medical Center cannot make applications for full license. Since house staff members must have a license before beginning duties, arrangements for the license should be made in advance. All incoming house staff must contact the House Staff Office, Box 3951, DUMC, Durham, North Carolina 27710 for current licensure requirements, and to make application for a training license.

Auditing of Courses by House Staff. Residents and fellows at the Medical Center may audit courses through the undergraduate and graduate divisions of Duke University by obtaining the written permission of the course instructor and the dean for continuing education and by paying the current audit fees. House staff members are not permitted to take courses offered through the division of undergraduate medical education. For more information, please contact Dr. Paula Gilbert, Academic Dean for Continuing Education, The Bishop's House, Duke University, Durham, North Carolina 27708, (919) 684-2621; website: www.learnmore.duke.edu.

International Medical Graduates (IMG). Those persons graduating from medical schools outside the United States or Canada, must hold valid certification from the Educational Commission for Foreign Medical Graduates (ECFMG) for admission to and participation in training programs. IMGs obtain ECFMG certification by passing the following combination of exams: the United States Medical Licensing Examination (USMLE), Steps 1 and 2; the ECFMG Clinical Skills Assessment (CSA); and an English examination acceptable to ECFMG for certification purposes. Some physicians may have taken an earlier version of the USMLE under a different name such as NBME, FMGEMS, or VQE. Physicians must contact ECFMG to determine if those exams are acceptable for ECFMG certification. Write to ECFMG, 3624 Market Street, Philadelphia, Pennsylvania, 19104, or visit the website at <http://www.ecfm.org/>. Physicians who are not United States citizens or lawful permanent residents and who need visa sponsorship by ECFMG as J-1 exchange visitors must hold a currently valid ECFMG certificate based on the two-day USMLE Steps 1 and 2, or the equivalent earlier versions. The old, one-day, ECFMG exam is not acceptable for J-1 visa purpose. Under U.S. law, ECFMG is the only J-1 program that has authority to sponsor physicians for clinical training in J-1 exchange visitor status. No other J-1 program is permitted to sponsor physicians in clinical training. Physicians who have passed additional exams and hold additional qualifications may qualify for visas other than the J-1.

Applicants should send applications directly to a department or training program. For program information and on-line applications, visit the House Staff Office website at <http://www2.mc.duke.edu/gme/>. An application from an IMG that does not include a copy of a valid ECFMG certificate, or other evidence from ECFMG confirming passage of all of the required exams, is considered incomplete and may be discarded without further notice to the applicant.

For further information regarding special requirements for IMGs contact Catheryn Cotten, International Office, Box 3882, Duke University Medical Center, Durham, North Carolina 27710, or visit the website at: <http://www.international.duke.edu>.



Roster of House Staff by Departments

ANESTHESIOLOGY

Chief Residents: Richard Griggs, M.D. (Pittsburgh, 1999); John Mitchell, M.D. (Michigan, 1999).

Senior Residents: Shazia Choudry, M.D. (South Carolina, 1999); William Corkey, M.D. (Duke, 1999); Daniel DeMeys, M.D. (North Carolina, 1999); Ellen Flanagan, M.D. (North Carolina, 1999); Daphne Jones, M.D. (George Washington, 1999); Patricia Macha, M.D. (Texas-Galveston, 1999); Eric Miller, M.D. (Baylor College, 1999); Trenton Pierce, M.D. (Loma Linda, 1999); Adam Schow, M.D. (Utah, 1999).

Junior Residents: Aaron Ali, M.D. (Texas-San Antonio, 2000); Genevieve Ali, M.D. (Texas-San Antonio, 2000); Atilio Barbeito, M.D. (Argentina, 1998); Douglas Bell, M.D. (Med. Coll. of Wisconsin, 2000); Dustin Boone, M.D. (Dartmouth, 2001); Carrie Clarke, M.D. (Oklahoma, 1999); Brian Craig, M.D. (South Carolina, 2001); Larry Field, M.D. (Illinois, 2001); Cory Furse, M.D. (Oklahoma, 2001); Timothy Grant, M.D. (South Carolina, 2000); Christopher Gunn, M.D. (Alabama, 2000); George Lappas, M.D. (Eastern Virginia, 2001); Abigail Melnick, M.D. (Mt. Sinai, 2000); John Morreale, M.D. (Wayne State, 2000); Michael Okumura, M.D. (Wayne State, 2000); Jeremy Reading, M.D. (Texas-San Antonio, 2001); John Schlitt, M.D. (Texas-Dallas, 2001); Robert Schlosser (Med. Coll. of Wisconsin, 2000); Paul Shook, M.D. (Wake Forest, 2000); Todd Stevens, M.D. (Georgetown, 2001); Andrew Wiksten, M.D. (Kansas, 2000).

Interns: David Auyong, M.D. (Washington, 2002); Andrea Clark, M.D. (Northwestern, 2002); Andrew Lutz, M.D. (Pittsburgh, 2002); Heather Mummery, M.D. (Duke, 2002); Nathaniel Nonoy, M.D. (Loma Linda, 2002); Christina Noyes, M.D. (Alabama, 2002); Stephen Packer, M.D. (Ohio State, 2002); Reed VanMatre, M.D. (Northwestern, 2002).

COMMUNITY AND FAMILY MEDICINE

Chief Residents: Felice James-Rodriguez, M.D. (Duke, 2000); Margaret A. Scannell, M.D. (Tufts, 1999).

Residents: Robin R. Ali, M.D. (North Carolina, 2000); Blake R. Boggess, D.O. (Midwestern, 2000); Elizabeth D. Bryan, M.D. (Wake Forest, 2001); Joseph A. Cefalu, M.D. (East Carolina, 2001); Durga Rani Chadalawada, M.D. (India, 2000); Marisa F. Christensen, M.D. (Virginia, 2001); Tanika L. Day, M.D. (Maryland, 2000); Janet K. Dear, M.D. (North Carolina, 2001); Karl D. Friedrich, M.D. (Ross, 2002); Janeen M. Hudzinski, M.D. (Med. Coll. of Wisconsin, 2002); John M. Hemmersmeier, M.D. (Utah, 2001); Margaret Kelly, M.D. (Maryland, 1997); Sveta Mohanan, M.D. (India, 1998); Depesh K. Patel, M.D. (Ross, 2001); Jason J. Pirozzolo, D.O. (Southeastern, 2002); Harry C. Stafford, Jr., M.D. (North Carolina, 2002); Mark A. Stefaniuk, M.D. (Saba, 2000); Melinda L. Sutton, M.D. (Meharry, 1998); Melanie K. Trost, M.D. (North Carolina, 2001); Ayaz Virji, M.D. (Georgetown, 2000); Xiaoming S. Wan, M.D. (Robert Wood Johnson, 2000); Kia J. Williams, M.D. (Morehouse, 2001).

MEDICINE

Chief Residents: Donald D. Hegland, M.D. (Florida, 1999); Jacob Laubach, M.D. (Duke, 1999); Jay McDonald, M.D. (Oregon, 1998).

Senior Assistant Residents: Saad M.H. Al-Hasaniah, M.D. (King Saudi, 1995); Albert M. Anderson, M.D. (North Carolina, 2000); Libbie Briley, M.D. (Duke, 1999); Stephanie Bruce, M.D. (Duke, 2000); Marie A. Carlson, M.D. (Duke, 2000); Kenneth R. Carson, M.D. (Southern California, 2000); Peter J. Cawley, M.D. (Georgetown, 2000); Jane A. Chah, M.D. (Maryland, 2000); Vivian H. Chu, M.D. (Columbia, 2000); Thomas C. Crawford, M.D. (Tennessee, 2000); Eric M. Crespo, M.D. (Connecticut, 2000); Susan D. Denny, M.D. (Duke, 2000); Brendan K. Duffy, M.D. (Univ. Coll. of Galway, 1997); Raegan W. Durant, M.D. (Hopkins, 2000); Mark H. Flasar, M.D. (Maryland, 2000); David Gregg, M.D. (Columbia, 1999); Daniel C. Grinnan, M.D. (Med. Coll. of Virginia, 2000); Noah M. Hahn, M.D. (Indiana, 2000); Jeremy Hardison, M.D. (Duke, 2000); Charles W. Hargett, M.D. (Virginia, 1999); Ankie Marie Hata, M.D. (Duke, 2000); Julia L. Inrig, M.D. (Loma Linda, 2000); Maya R. Jerath, M.D. (Vermont, 2000); Marcus P. Kennedy, M.D. (Univ. Coll. of Galway, 1997); Ruediger W. Lehrich, M.D. (Freie, 1995); Christopher Lillis, M.D. (Georgetown, 2000); Lisa A. McDermott, M.D. (Southwestern, 2000); Carlos G. Micames, M.D. (Puerto Rico, 2000); Kelley L. Miller, M.D. (Maryland, 2000); R. Clay Musser, M.D. (Oklahoma, 2000); Wendy G. Owen, M.D. (North Carolina, 2000); Taral N. Patel, M.D. (New York, 2000); Brian C. Pien, M.D. (Hawaii, 2000); Richard F. Riedel, M.D. (Jefferson, 2000); Amy Seidel, M.D. (Hahnemann, 2000); Tanguy Y. Seiwert, M.D. (Johannes-Guttenberg, 1999); Hope E. Uronis, M.D. (SUNY-Buffalo, 2000); Heather E. Whitson, M.D. (Cornell, 2000); Matthew J. Wolf, M.D. (Washington Univ., 2000); Jonathan Woo, M.D. (Kyunpook National, 2000); Arash Zarimani, M.D. (California-San Francisco, 2000).

Senior Assistant Residents-Medicine/Pediatrics: James W. Fox, M.D. (Cincinnati, 1999); Kristin E. Ito, M.D. (Harvard, 1999); Cynthia L. Johnson, M.D. (Rochester, 1999); Scott M. Robert, M.D. (Pennsylvania, 1999); Anita K. Ying, M.D. (Duke, 1999).

Senior Assistant Residents-Medicine/Psychiatry: Jane P. Gagliardi, M.D. (Duke, 1998); Eric J. Park, M.D. (Maryland, 1998); Erin Silvertooth, M.D. (Texas-Galveston, 1998).

Junior Assistant Residents: Deverick J. Anderson, M.D. (Duke, 2001); Brian J. Byrne, M.D. (Temple, 2001); L. Brett Caram, M.D. (Oklahoma-Tulsa, 2001); Hassan A. Chami, M.D. (Beirut, 2000); Steve S. Choi, M.D. (Flinders, 1999); James M. Coghil, M.D. (Med. Coll. of Virginia, 2001); Scott D. Cohen, M.D. (Miami, 2001); Robyn T. Domsic, M.D. (Iowa 2001); Shane P. Dormady, M.D. (New York, 2001); Matthew T. Drake, M.D. (Washington Univ., 2001); Fadi El-Ahdab, M.D. (Beirut, 2000); Wendy G. Evans, M.D. (California-San Diego,

2001); Zareen M. Farukhi, M.D. (Hopkins, 2001); Kenneth E. Fasanella, M.D. (Virginia, 2001); Matthew S. Forcina, M.D. (Temple, 2001); S. Michael Gharacholou, M.D. (East Tennessee, 2001); Arthur G. Grant, M.D. (Louisiana State, 2001); Douglas W. Haden, M.D. (West Virginia, 2001); Wissam A. Jaber, M.D. (Beirut, 2000); Robert R. Jenq, M.D. (Oregon, 2001); W. Schuyler W. Jones, M.D. (Arkansas, 2001); Toufic A. Kachaamy, M.D. (Beirut, 2000); Robert J. Kim, M.D. (Hopkins, 2001); E. Scott Kopetz, M.D. (Hopkins, 2001); Gordon W. Lam, M.D. (Duke, 2001); John M. Lyons, M.D. (Southern California, 2001); Jennifer Matthews, M.D. (Ohio, 2001); Raymond E. Meng, M.D. (Pennsylvania, 2001); Arashk Motiei, M.D. (Aga Khan, 1999); Thomas D. Nielsen, M.D. (Texas-Southwestern, 2001); Patrick H. Pun, M.D. (Vanderbilt, 2001); Andrew R. Rezvani, M.D. (Temple, 2001); Bret A. Rogers, M.D. (Jefferson, 2001); Molly Sachdev, M.D. (Duke, 2001); Chetan Seshadri, M.D. (UMDNJ, 2001); Rahul S. Shimpi, M.D. (North Carolina, 2001); Thomas M. Todoran, M.D. (Indiana, 2001); Arthur Tsai, M.D. (Hopkins, 2001); Aslan T. Turer, M.D. (California-San Francisco, 2001); Christopher S. Vaccari, M.D. (Maryland, 2001); Haoling Weng, M.D. (Duke, 2001); James F. Wharam, M.D. (Dublin, 2001).

Junior Assistant Residents-Medicine/Pediatrics: R. Neal Axon, M.D. (Alabama, 2000); Todd E. Bell, M.D. (Arkansas, 2001); Steven L. Condron, M.D. (New York Med. Coll., 2001); Molly M. Emott, M.D. (Connecticut, 2001); Courtney D. Fitzhugh, M.D. (California-San Francisco, 2001); Matthew J. Gadbow, M.D. (Washington, 2000); Laura E. Helton, M.D. (Emory, 2000); Christopher M. Howard, M.D. (Texas A&M, 2001); Erica L. Peterson, M.D. (Duke, 2000); Holly E. Rawizza, M.D. (Vanderbilt, 2001); Judd L. Watson, M.D. (Tufts, 2000); Steven A. Yukl, M.D. (Michigan, 2000).

Junior Assistant Resident-Medicine/Psychiatry: Susan L. Padrino, M.D. (Maryland, 1999).

Interns: Zarina Alam, M.D. (Duke, 2002); James D. Allred, M.D. (Med. Coll. of Virginia, 2002); Carey Kernodle Anders, M.D. (East Carolina, 2002); Amber R. Atwater, M.D. (Illinois, 2002); Bret D. Atwater, M.D. (Chicago Pritzker, 2002); Matthew C. Becker, M.D. (SUNY-Syracuse, 2002); Jorge Davalos, M.D. (Miami, 2002); John Delmonte, M.D. (California -San Francisco, 2002); Melvin R. Echols, M.D. (Morehouse, 2002); Wendell K. Ellis, M.D. (Meharry, 2002); Rachael L. Fawcett, M.D. (Indiana, 2002); Laura L. Fitzpatrick, M.D. (North Carolina, 2002); Lara B. Gadowski, M.D. (Jefferson, 2002); John M. Galla, M.D. (Univ. of Washington, 2002); Katherine S. Garman, M.D. (Duke, 2002); Steven P. Higgins, M.D. (Duke, 2002); Beatrice Hong, M.D. (Hopkins, 2002); Andrew P. Hope, M.D. (Columbia, 2002); David G. Jones, M.D. (Arkansas, 2002); Rania Y. Kazan, M.D. (Beirut, 1998); Alicia Kerstyn, M.D. (South Florida, 2002); Jason I. Koontz, M.D. (Harvard, 2002); Jean-Paul Kovalik, M.D. (Vanderbilt, 2001); Tahaniyat Lalani, M.D. (Aga Khan, 2000); Gregory K-W. Lam, M.D. (Rochester, 2002); Kathleen E. Lambert, M.D. (Med. Coll. of Virginia, 2002); Mark C. Lanasa, M.D. (Pittsburgh, 2002); Seung-Joon Lee, M.D. (Albert Einstein, 2002); Sheila S. Lee, M.D. (New Mexico, 2002); Sandra M. Malakauskas, M.D. (California-San Francisco, 2002); Tereza Martinu, M.D. (McGill, 2002); Angela M. Meyer, M.D. (Arizona, 2002); Susanna Naggie, M.D. (Hopkins, 2002); Benjamin J. Powers, M.D. (California-San Diego, 2002); Zainab Samad, M.D. (Aga Khan, 2000); Scott J. Samuelson, M.D. (Utah, 2002); Salima Shafi, M.D. (Aga Khan, 2000); Susan A. Sufka, M.D. (Duke, 2002); Mohammadreza Tabesh, M.D. (Hopkins, 2002); Naasha J. Talati, M.D. (Aga Khan, 2000); Carl Wei-Chan Tong, M.D. (Texas A&M, 2002); Cynthia A. Toth, M.D. (Miami, 2002); Jay B. Varkey, M.D. (Wisconsin, 2002); Stanley S. Wang, M.D. (Texas at Dallas, 2001); Anita Wokhlu, M.D. (Hopkins, 2002).

Interns-Medicine/Pediatrics: Christopher D. Carter, M.D. (Med. Coll. of Virginia, 2002); Matthew J. Ellis, M.D. (Duke, 2002); Christopher M. Fortner, M.D. (Cincinnati, 2002); Matthew T. Harbison, M.D. (Texas-Houston, 2002); Sean P. Sharma, M.D. (Indiana, 2002); Jane V. Trinh, M.D. (Duke, 2002).

Interns-Medicine/Psychiatry: Kellie D. Clearo, M.D. (Univ. of Washington, 2002); Cynthia K. Feltner, M.D. (West Virginia, 2002); Xavier A. Preud'homme, M.D. (Universite Libre De Bruxelles, 1993); Sarah K. Rivelli, M.D. (Universite Libre de Bruxelles, 2001); Chanida Siripaparat, M.D. (Chulalongkorn, 1998); Glen Xiong, M.D. (California-Davis, 2001).

Fellows: Joseph C. Adams, M.D. (Mississippi, 1996); Timothy S.E. Albert, M.D. (California-San Francisco, 1999); Adnan Alghadban, M.D. (Tichreen, 1996); Kefah Al-Hayk, M.D. (Yarmouk, 1996); Michael L. Allan, M.D. (Wisconsin, 1997); Stacy Ardoin, M.D. (Ohio 1997); Timothy Bael, M.D. (Pittsburgh, 1999); Rachel Bartz, M.D. (Washington, 1998); Daniel R. Bensimhon, M.D. (Pittsburgh, 1998); Mary A. Bethel, M.D. (Duke, 1999); Mimi S. Biswas, M.D. (California-Los Angeles, 1997); Rhonda B. Brosnan, M.D. (Med. Univ. of South Carolina, 1997); Gwendolen T. Buhr, M.D. (Texas-San Antonio, 1998); Osvaldo Camilo, M.D. (Santo Domingo, 1986); Kevin Campbell, M.D. (Wake Forest, 1996); Mark E. Campbell, M.D. (Mississippi, 1996); Kenneth Chao, M.D. (SUNY-Brooklyn, 1998); Kelly M. Choi, M.D. (Northwestern, 1998); Stephen Chui, M.D. (Duke, 1996); Alison S. Clay, M.D. (Chicago, 1998); Timothy Collins, M.D. (Hopkins, 1994); Christopher E. Cox, M.D. (Med. Univ. of South Carolina, 1997); Lisa Criscione, M.D. (Duke 1998); Scott Cross, M.D. (Ohio State, 1997); Anna L. Crowley, M.D. (Ohio State, 1998); Steven D. Crowley, M.D. (Duke, 1996); Davey Daniel, M.D. (Hopkins, 1999); John J. Dashiell, M.D. (Eastern Virginia, 1998); Brian Dobozi, M.D. (Loyola, 1999); Mark Donohue, M.D. (Cincinnati, 1996); Mark A. East, M.D. (North Carolina, 1995); Katja L. Elbert, M.D. (Michigan, 1999); John Engemann, M.D. (Wayne State, 1996); Kimberley J. Evans, M.D. (UMDNJ, 1998); William L. Fan, M.D. (North Carolina, 1999); Michael J. Feiler, M.D. (New Jersey, 1998); Nishan H. Fernando, M.D. (Duke, 1997); Michael C. Fischl, M.D. (SUNY-Syracuse, 1997); Terry A. Fortin, M.D. (Massachusetts, 1999); Camille G. Frazier, M.D. (Case Western, 1999); Stavros Garantziotis, M.D. (Albert Univ. Hosp., 1994); Robin Geletka, M.D. (Northeastern Ohio, 1997); Diane Gesty-Palmer, M.D. (Duke, 1997); John W. Gibbs, M.D. (Med. Coll. of Virginia, 1998); Timothy F. Goggins, M.D. (Albany, 1997); Indu Gopal, M.D. (Trivandrum, 1996); Abhinav Goyal, M.D. (Northwestern, 1999); Bryan T. Green, M.D. (South Alabama, 1999); Todd Griffith, M.D. (North Carolina, 1997); Susan B. Gurley, M.D. (Washington Univ., 1998); Jonathan Halford, M.D. (Med. Univ. of South Carolina, 1996); Kim Hanson, M.D. (Northwestern, 1998); Douglas B. Hecox, M.D. (Hahnemann, 1999); S. Susan Hedayati, M.D.

(George Washington, 1998); John F. Heitner, M.D. (Albert Einstein, 1997); Adrian F. Hernandez, M.D. (Southwestern, 1997); John Hollingsworth, M.D. (Texas-Galveston, 1997); Dawn Hollins, M.D. (Wake Forest, 1997); Patrick H. Hranitzky, M.D. (Southwestern, 1996); Kim M. Huffman, M.D. (Med. Univ. of South Carolina, 2000); Maria Joyce, M.D. (Boston, 1996); Robert M. Kaiser, M.D. (Med. Coll. of Pennsylvania, 1987); Stephen Kendall, M.D. (Albany, 1999); George P. Keogh, M.D. (Columbia, 1998); Richard P. Konstance, M.D. (Hahnemann, 1999); Wissam M. Kourany, M.D. (Beirut, 1998); Geoffrey A. Kunz, M.D. (Ohio State, 1997); Zoe L. Larned, M.D. (Emory 1999); Ngocdiep Le, M.D. (Stanford, 2000); Lawrence Liao, M.D. (Duke, 1996); Lillian Lien, M.D. (Duke, 1999); Sauyu Lin, M.D. (Vanderbilt, 1999); Lee Maddox, M.D. (Maryland, 1997); David W. Markham, M.D. (Emory, 1995); Charles E. Mayes, M.D. (Vanberbilt, 1995); Jay R. McDonald, M.D. (Oregon Hlth Sci., 1998); Sarah A. McGarry, M.D. (Georgetown, 1997); Heather L. McGuire, M.D. (Washington Univ., 1998); Trip J. Meine, M.D. (Duke, 1998); Amin Meyer, M.D. (Free at Berlin, 1994); Philippa H. Miranda, M.D. (Duke, 1997); Debashish Misra, M.D. (New Delhi, 1993); Robert G. Mitchell, M.D. (California-San Francisco, 1999); Marc D. Noble, (Texas-Dallas, 1999); John C. Parker, M.D. (North Carolina, 1997); Manesh Patel, M.D. (Emory, 1997); Stephanie Perry, M.D. (Wake Forest, 1996); John Petersen, M.D. (Washington, 1995); Cathy Petti, M.D. (Duke, 1995); John Plankeel, M.D. (Ohio, 1996); Troy Plumb, M.D. (Nebraska, 1997); Thomas J. Povsic, M.D. (Harvard, 1995); Arati Rao, M.D. (BJ Med. Coll., 1996); Sunil V. Rao, M.D. (Ohio State, 1996); Brooke Ratliff, M.D. (Tennessee, 1998); Abdallah G. Rebeiz, M.D. (American, 1996); India F. Reid, M.D. (UMDNJ, 1999); Ana Rocha, M.D. (Fed. Univ. of Bahia, 1995); Paulo Rocha, M.D. (Fed. Univ. of Bahia, 1995); Cheryl A. Russo, M.D. (SUNY-Syracuse, 1998); Sumathira T. Sathanandan, M.D. (Amer. Univ. of Carribean, 1996); Troy D. Schmidt, M.D. (Southwestern, 1997); David M. Seo, M.D. (Duke, 1997); Svati H. Shah, M.D. (Washington, 1998); Hasan Shanawani, M.D. (Hopkins, 1997); Kanwar P. Singh, M.D. (McGill, 1999); William T. Smith, M.D. (North Carolina, 1996); Jeremy Spector, M.D. (Vanderbilt, 1998); Gerasimos S. Stavens, M.D. (Kentucky, 1997); Jonathan A. Stiber, M.D. (New York, 1997); Martin Stryjewski, M.D. (Buenos Aires, 1993); Theodore T. Suh, M.D. (Cincinnati, 1998); Shahnaz Sultan, M.D. (SUNY-Downstate, 1996); Bundrarika Suwanawiboon, M.D. (Mahidol, 1998); Teresa Tarrant, M.D. (Florida, 1999); Jennifer L. Taylor, M.D. (Duke, 1998); Kevin L. Thomas, M.D. (North Carolina, 1999); Benjamin H. Trichon, M.D. (Northwestern, 1995); Gina M. Vaccaro, M.D. (Louisiana State, 1998); Gordana Vlahovic, M.D. (Zagreb, 1985); Carey C. Ward, M.D. (Virginia, 1999); Richard E. Waters, M.D. (Vanderbilt, 1998); Amy C. Weintrob, M.D. (Virginia, 1998); Jeffrey Whitehill, M.D. (Baylor, 1996); Jonathan E. E. Yager, M.D. (Harvard, 1997); Jane Ybanez, M.D. (Case Western, 1998); David A. Zidar, M.D. (Duke, 1998).

Division of Dermatology

Lawrence Etter, M.D. (Yale, 1999); William Fangman, M.D. (North Carolina, 2001); Craig S. Heinly, M.D. (Duke, 1999); Andrew L. Kaplan, M.D. (Duke, 2000); Heidi Kong, M.D. (Baylor, 2001); Vikas J. Patel, M.D. (Duke, 2000); Jennifer B. Perone, M.D. (New York, 1999); Joni Glavan Sago, M.D. (Hopkins, 1997); Earl Stoddard, M.D. (Univ. of Washington, 2001); Anne Tuveson, M.D. (Georgetown, 2000).

Division of Neurology

Soe Aung, M.D. (Inst. of Med., 1995); Robbie D. Buechler, M.D. (Chicago, 2001); Paul Burke, M.D. (Rush, 2000); M. Luke James, M.D. (Louisiana State, 1999); Bradley J. Kolls, M.D. (California-Irvine, 2001); Chad Miller, M.D. (Ohio, 1999); Alan R. Moore, M.D. (Mississippi, 1999); Andreas Runheim, M.D. (Wake Forest, 2001); Sith Sathornsumetee, M.D. (Mahidol, 1998); Joohi Shahed, M.D. (Baylor, 2000); Katalin Scherer, M.D. (Albert Szent-Gyorgyi, 1999); Khalid Tabbarah, M.D. (Beirut, 2000); Katherine W. Timoszyk-Lobello, M.D. (SUNY-Buffalo, 1999).

OPHTHALMOLOGY

Chief Resident: Sameer Ahmad, M.D. (Tufts, 1994).

Residents: Scott Blackmon, M.D. (Duke, 2001); John Denny, M.D. (Duke, 2000); Herb Greenman, M.D. (Duke, 1999); Matthew Hammons, M.D. (Baylor, 1999); Paul Kang, M.D. (Indiana, 2000); Tamer Mahmoud, M.D. (Ain Shams, 1992); Dianna Miele, M.D. (Columbia, 2000); Sherman Reeves, M.D. (Johns Hopkins, 2001); Nouman Siddiqui, M.D. (Duke, 1999); Kelly Walton, M.D. (Duke, 2001); Jennifer Weizer (Baylor, 2000); David Yeh, M.D. (Virginia, 2001).

PATHOLOGY

Chief Residents: Mark J. Roubort, M.D., Ph.D. (Duke, 1999); Matthew J. Snyder, M.D. (Med. Coll. of Virginia, 1999).

Residents: Russell T. Alexander, M.D. (Albert Einstein, 1999); Noel A. Brownlee, M.D. (South Carolina, 2002); (Michael B. Datto, M.D. (Duke, 1999); Evelyn L. Falls, M.D. (North Carolina, 2001); John B. Holt, M.D. (Iowa, 1999); Shannon J. McCall, M.D. (Duke, 1999); Duane A. Mitchell, M.D., Ph.D. (Duke, 2001); Crystal A. Moore-Maxwell, M.D., Ph.D. (Med. Coll. of Virginia, 1999); Ryan T. Mott, M.D. (South Florida, 2002); Ruth Y. Peng, M.D. (Albert Einstein, 1999); Teresa Tram Ngoc Pham, M.D. (Louisiana State-Shreveport, 2001); Dimitre Trembath, M.D., Ph.D. (Iowa, 2001); Dina M. Trobbiani, M.D. (Eastern Virginia, 2001); John W. Turner, M.D. (Med. Coll. of Virginia, 2002); Keith E. Volmar, M.D. (SUNY-Buffalo, 1998); Michael S. Waugh, M.D. (Duke, 2001)

Fellows: Landon W. Coleman, M.D. (Utah, 1997); Young S. Kim, M.D. (Texas, 1996); WeiHua Wang, M.D. (Shanghai Med., 1982)

PEDIATRICS

Chief Resident: Yolanda Johnson, M.D. (Emory, 1999).

Chief Resident: Carrie Kitko, M.D. (Ohio State, 1999).

Third Year Residents: Bridget Degele, M.D. (Duke, 2000); Jeffrey Ferranti, M.D. (McGill, 2000); Kristi Gordin, M.D. (Morehouse, 2000); Christine Hale, M.D. (Johns Hopkins, 2000); Olga Hardy, M.D. (California-San Francisco, 2000); Nefertiti Harmon, M.D. (Johns Hopkins, 2000); Abby Kunz, M.D. (Duke, 2000); Aditee Narayan, M.D. (Duke, 2000); Laura Ongiri, M.D. (Morehouse, 2000); Raya Saab, M.D. (American Univ. of Beirut, 1999); Beth Schissel, M.D. (Med. Coll. of Virginia, 2000); Shetal Shah, M.D. (Cornell, 2000); Carolina Smith, M.D. (Arkansas, 2000); Erin J. Staples, M.D. (SUNY-Syracuse, 2000).

Second Year Residents: Robin Ackerman, M.D. (Rochester, 2001); Jane Bellet, M.D. (Cincinnati, 2001); Erica Berger, M.D. (Wisconsin, 2001); Millicent Booker, M.D. (North Carolina, 2001); Stephenie Boykin, M.D. (Yale, 2001); Debra Gemza, M.D. (Northwestern, 2001); Kathleen Greaney, M.D. (UMDNJ/R.W. Johnson, 2001); Jill Helphinstine, M.D. (Indiana, 2001); Michelle Kuperminc, M.D. (New York Med. Coll., 2001); Sydney Partin, M.D. (North Carolina, 2001); Barbara Rath, M.D. (Friedrich-Alexandra-Universitat, 1996); Hemant Sharma, M.D. (Columbia, 2001); Brian P. Smith, M.D. (Mercer, 2001); Bhavya Trivedi, M.D. (Miami, 2001).

First Year Residents: Annette Ansong, M.D. (Howard, 2002); Scott Bailey, M.D. (West Virginia, 2002); Jeremy Baker, M.D. (Univ. of Florida, 2002); Terry Dixon, M.D. (Duke, 2002); Rima Jarrah, M.D. (North Carolina); Robert Lenfestey, M.D. (North Carolina, 2002); Nathalie Maitre, M.D. (Med. Univ. of South Carolina, 2002); Zainab Malik, M.D. (Aga Khan Univ., 2002); George Manousos, M.D. (Duke); Karin Minter, M.D. (Duke, 2002); Sharon Morley, M.D. (Harvard); Mahesh Netravali, M.D. (SUNY-Syracuse, 2002); Shefali Patel, M.D. (Univ. of Virginia, N/A); Jill Wilson, M.D. (North Carolina, 2002).

Medicine/Pediatrics Fourth Year Residents: James Fox, M.D. (Cincinnati, 1999); Kristin Ito, M.D. (Harvard, 1999); Cynthia Johnson, M.D. (Rochester, 1999); Jason Lang, M.D. (Duke, 1999); Scott Robert, M.D. (Pennsylvania, 1999); Anita K. Ying, M.D. (Duke, 1999).

Medicine/Pediatrics Third Year Residents: Neal R. Axon, M.D. (UAB, 2000); Matthew Gadbow, M.D. (Washington, 2000); Laura Helton, M.D. (Emory, 2000); Erica Peterson, M.D. (Duke, 2000); Judd Walson, M.D. (Tufts, 2000); Steven Yukl, M.D. (Michigan, 2000).

Medicine/Pediatrics Second Year Residents: Todd Bell, M.D. (Arkansas, 2001); Steven Condron, M.D. (New York Med. Coll., 2001); Molly Emott, M.D. (Connecticut, 2001); Courtney Fitzhugh, M.D. (California-San Francisco, 2001); Christopher Howard, M.D. (Texas A&M, 2001); Holly Rawizza, M.D. (Vanderbilt, 2001).

Medicine/Pediatrics First Year Residents: Christopher Carter, M.D. (Med. Coll. of Virginia, 2002); Matthew Ellis, M.D. (Duke, 2002); Christopher Fortner, M.D. (Cincinnati, N/A); Matthew Harbison, M.D. (Texas-Houston, 2002); Sean Sharma, M.D. (Indiana, 2002); Jane Trinh, (Duke, 2002).

Fellows: Plato J. Alexander, M.D. (Univ. Texas, Houston, 1993); Amal Al-Seraihy, M.B., Ch.B. (King Abdulagig Univ. Coll. of Med. 1990); Stacy P. Ardoin, M.D. (Ohio State, 1997); Evelyn M. Artz, M.D. (Louisiana State, 1998); Kristi L. Bengtson, M.D. (Illinois, 1997); Pamela F. Bensimhon, M.D. (Pittsburgh, 1998); Michael D. Brandler, M.D. (New York Med. Coll., 1998); Ariana Buchanan, M.D. (Mercer Univ., 1998); Megan Burke, M.D. (Colorado, 1999); Shannon L. Carpenter, M.D. (Med. Coll. of Virginia, 1998); Bassem El-Nabbout, M.D. (American Univ. of Beirut, 1997); Harmony P. Garges, M.D. (Duke, 1998); Jason W. Guin, M.D. (Arkansas, 1997); Vineet K. Gupta, M.D. (Med. Coll. of Ohio, 1998); Maria Silvana Horenstein, M.D. (National Univ. of Cuyo, Argentina, 1994); Salim Idriss, M.D. (Duke, 1996); Theodosia A. Kalfa, M.D. (Aristotle Univ. Med. Sch., 1990); Joseph D. Kay, M.D. (SUNY-Buffalo, 1994); Edith Kocis, M.D. (New York Univ., 1993); M.P.H. (Michigan, 1987); John T. Koepke, M.D. (Rush, 1990); Andrew P. Krivoshik, M.D. (Illinois, 1999); Michael A. Kuluz, M.D. (Texas Houston Hlth. Sci. Ctr., 1998); Abby B. Kunz, M.D. (Duke, 2000); Joanne J. Lager, M.D. (Duke, 1998); Jessica McAdoo, M.D. (North Carolina, 1997); Sharad P. Menon, M.D. (Government Med. Coll., Nagpur, India, 1987); Timothy E. Mitchell, D.O. (Univ. of Hlth. Sci.-Kansas, 1994); Jon Oden, M.D. (Texas Univ. Hlth. Sci. Cntr., 1997); Jennifer H. Peterson, M.D. (Iowa, 1999); Rebecca Piltch, M.D. (Washington, 1997); Philip N. Rancitelli, M.D. (Ohio, 1999); Amy M. Scurlock, M.D. (Arkansas, 1998); Susan Staba, M.D. (Florida, 1997); William J. Steinbach, M.D. (North Carolina, 1998); Anne Marie Valente, M.D. (Vermont, 1996); Eric A. Williams, M.D. (Duke, 1996); Joseph M. Wisniewski, M.D. (Tennessee-Memphis, 1994); Angela T. Wratney, M.D. (Emory, 1998).

PSYCHIATRY

Chief Residents: Christopher Aiken, M.D. (Yale, 1999); Jane Gagliardi, M.D. (Duke, 1998); Heidi Johnson, M.D. (Med. Coll. of Ohio, 1999); Edward McGonigle, M.D. (Temple, 1998); Carolyn Oates, M.D. (Vanderbilt, 1999); Eric Park, M.D. (Maryland, 1998); Victoria Payne, M.D. (Wake Forest, 1999); Joseph Sharpe, M.D. (Tennessee, 1999); Erin Silvertooth, M.D. (Texas, 1998); Michael Slifer, M.D. (Texas-San Antonio, 1999).

Fifth Year Residents: Jane Gagliardi, M.D. (Duke, 1998); Eric Park, M.D. (Maryland, 1998); Erin Silvertooth, M.D. (Texas, 1998).

Fourth Year Residents: Christopher Aiken, M.D. (Yale, 1999); Jonathan Halford, M.D. (Med. Univ. of South Carolina, 1996); Heidi Johnson, M.D. (Med. Coll. of Ohio, 1999); Patrick Keenan, M.D. (Kansas, 1995); Edward McGonigle, M.D. (Temple, 1998); Carolyn Oates, M.D. (Vanderbilt, 1999); Susan Padrino, M.D. (Maryland, 1999); Victoria Payne, M.D. (Wake Forest, 1999); Juandalyn Peters, M.D. (Miami, 1999); Joseph Sharpe, M.D. (Tennessee, 1999); Michael Slifer, M.D. (Texas, 1999); Lihui Tang, M.D., Ph.D. (Harbin Med., 1984).

Third Year Residents: Leslie Bronner, M.D., Ph.D. (Duke, 1999); Andrea Carlsen, M.D. (Vanderbilt, 1999);

Sandra Carty, M.D. (Med. Coll. of Virginia, 2000); Kelly Clouse, M.D. (Iowa, 2000); Robert Guerrero, M.D. (Bologna, 1995); Elizabeth Kelly, M.D. (South Alabama, 2000); Joanne Pizzino, M.D. (Ohio State, 1982); Michelle Scargle, M.D. (Florida, 2000); Chanida Siripraparat, M.D. (Chulalongkorn, 1998); Hansen Su, M.D. (UMDNJ-R. W. Johnson, 2000); Rita Tranquilli, M.D. (Illinois, 1991); William Trost, M.D. (Med. Coll. of Wisconsin, 2000).

Second Year Residents: Thomas Conboy, M.D. (Buffalo, 2001); Harry Enderlin, M.D. (Boston, 2001); Quinne Farrington, M.D. (Eastern Virginia, 2001); Heidi Harrom, M.D. (Loma Linda, 2001); Rosario Hidalgo, M.D. (Buenos Aires, 1991); Alyson Kuroski, D.O. (Chicago Coll. of Osteopathic Med., 2001); Margaret Maytan, M.D. (UMEA, Sweden, 1996); Heath Penland, M.D. (Texas-Southwestern, 2001); Xavier Preud'homme, M.D. (Universite Libre de Bruxelles, 1993); Michael Raida, M.D. (Chicago, 2001); Sarah Rivelli, M.D. (Universite Libre de Bruxelles, 2001); Catherine Soriano, M.D. (Ohio State, 2001); Semone West, M.D. (Tufts, 2001); Glen Xiong, M.D. (California-Davis, 2001).

First Year Residents: Julie Adams, M.D. (Loma Linda, 2002); Rohan Calnaido, M.D. (Florida, 2002); Cynthia Feltner, M.D. (West Virginia, 2002); Jonas Hannestad, M.D., Ph.D. (Universidad de Oveido, Spain, 2000); Joseph Lee, M.D. (Oklahoma, 2002); Simone Litsch, M.D., Ph.D. (Albert-Ludwigs, Germany, 2001); Anandhi Narasimhan, M.B.B.S. (Sri Ramachandra Med. Coll., 2002); Peter Nicholls, M.D. (Columbia, 2002); Phillip Perez, M.D. (Case Western Reserve, 1997); Terri Randall, M.D. (George Washington, 2002); Frauke Schaefer, M.D. (Univ. of Cologne, Germany, 1999); Matthew Soulier, M.D. (Utah, 2002); Sandeep Vaishnavi, M.D., Ph.D. (Alabama, 2002);

Child Psychiatry Chief Resident: Douglas Kondo, M.D. (Utah, 1999).

Child Psychiatry Fellows: Cherry Chevy, M.D. (West Virginia, 1997); Anne Lin, M.D. (Utah, 1999); Eduardo Meza, M.D. (Cartagena, 1984); Jirpesh Patel, M.D. (BJ Med. Sch., 1993); Himabindu Ravi, M.B.B.S. (Osmania Med. Coll., 1995).

Geriatric Psychiatry Fellows: Thomas Patamia, M.D. (Georgetown, 1998); Mugdha Thakur, M.D. (Seth G.S. Med. Coll., 1994); Robert Williams, M.D. (East Carolina, 1998).

GlaxoWellcome Psychiatry Research Fellow: Kurian Abraham, M.D. (M.R. Med. Coll., India, 1983); Wei Zhang, M.D., Ph.D. (Shanghai Med., 1990).

Forensic Psychiatry Resident: Hans Stelmach, M.D. (SUNY-Buffalo, 1998).

RADIATION ONCOLOGY

Chief Resident: Keith Miller, M.D. (Florida, 1985).

Residents: Song Kang, M.D. (Howard, 1998); Mohit Kasibhatla, M.D. (Duke, 2000); John Kirkpatrick, M.D. (Texas, 1999); Nicole Larrier, M.D. (Johns Hopkins, 1999); Brian Quaranta, M.D. (New Jersey, 1998); Katie Raj, M.D. (Duke, 2001); Douglas Rivera, M.D. (Nevada, 2000).

RADIOLOGY

Residents: Andrew Adamson, M.D. (Med. Coll. of Wisconsin, 1998); Matthew Banks, M.D. (Pennsylvania State, 1998); Garyun Blackmon, M.D. (Duke, 2001); Michael Brodsky, M.D. (Duke, 1999); Anthony Bullard, M.D. (Wayne State, 1999); Lynn Carlson, M.D. (Texas-Galveston, 2000); Gene Carpenter, II, M.D. (Michigan, 2000); Dave Cottam, M.D. (Med. Coll. of Wisconsin, 2001); Michele Crockett, M.D. (Johns Hopkins, 2000); Lewis Dudley, M.D. (Med. Coll. of Wisconsin, 2000); Jacob Fleming, II, M.D. (Mercer, 1999); Tasha Foushee, M.D. (Med. Coll. of Georgia, 1998); Kendra Franklin, M.D. (Duke, 2000); Jeff Gregg, M.D. (West Virginia, 2001); Carmelo Gullotto, M.D. (Duke, 1998); Paul Haugan, M.D. (Minnesota-Minneapolis, 1998); Clare Haystead, M.D. (Virginia, 2000); Shari Jackson, M.D. (Washington, 2000); Ian Kurth, M.D. (Michigan State, 2001); Christopher Lascola, M.D. (Chicago, 1998); Ellie Lee, M.D. (Emory, 1996); Val Liberace, M.D., (Temple, 2001); Kelly Lindauer, M.D. (Duke, 2000); Doug Macha, M.D. (Texas-Galveston, 1999); Tim Mihalovich, M.D. (Kansas, 2001); Chad Miller, M.D. (Duke, 1999); Andrew Moran, M.D. (Utah, 1999); Christine Petersen, M.D. (Columbia, 1999); John Rampton, M.D. (Utah, 1998); Duncan Rougier-Chapman, M.D. (Duke, 1998); Jason Sinclair, M.D. (California-San Francisco, 1999); Kush Singh, M.D. (Jefferson, 2001); Aaron Spann, M.D. (Arkansas, 1999); Raj Subramanian, M.D. (Med. Coll. of Wisconsin, 2001); William Taylor, M.D. (New York Med. Coll., 1998); Emily Vinson, M.D. (Duke, 1999); Carolyn Weaver, M.D. (Duke, 1998); Kevin Weber, M.D. (Cincinnati, 2001); Eric Whiting, M.D. (Whiting, 2001); David Williams, II, M.D. (Ohio State, 2000); Michael Youssef, M.D. (West Virginia, 2000).

SURGERY

Division of Cardiothoracic Surgery

Cardiothoracic Residents: Shankha Biswas, (Duke, 1996); William R. Burfeind, M.D. (Columbia Coll. of Physicians and Surgeons, 1994); Paul Chai, M.D. (Duke, 1994); George Chad Hughes, M.D. (Duke, 1995); Shu S. Lin, M.D. (Duke, 1994); Jeffrey S. Martin, M.D. (Med. Coll. of Georgia 1995); Shari Myerson (Chicago, 1996); Ashish S. Shah, M.D. (Pittsburgh, 1995); David White, (Duke, 1996).

Division of General Surgery

Instructors and Chief Residents: Rolf N. Barth, M.D. (Duke, 1997); Patrick W. Domkowski, M.D. (Georgetown, 1997); Sitaram M. Emani, M.D. (Harvard, 1997); Jay M. Lee, M.D. (Georgetown, 1997); Mark W. Onaitis, M.D. (Duke, 1997); Gretchen P. Purcell, M.D. (Stanford, 1997); Kelli R. Brooks, M.D. (Duke, 1999); Christopher E. Touloukian, M.D. (Yale, 1994).

Senior Assistant Residents: Kelli R. Brooks, M.D. (Duke, 1999); Luis H. Diodato, M.D. (Buenos Aires, 1988); Jeffrey G. Gaca, M.D. (Columbia, 1998); Elizabeth S. Grubbs, M.D. (Duke, 1999); Matthew F. Kalady, M.D. (Duke, 1998); William Kendall, M.D. (Michigan, 1995); Aftab R. Kherani, M.D. (Duke, 1999); Jaimie Nathan, M.D. (Yale, 1998); Jason A. Petrofski, M.D. (Johns Hopkins, 1999); Shawn D. Safford, M.D. (Pennsylvania, 1997); John E. Scarborough, M.D. (Duke, 1998); Richard B. Thompson, M.D. (Columbia, 1999); Rebekah R. White, M.D. (Duke, 1997).

Research Fellows: James Z. Appel, M.D. (Jefferson, 2001); Edward Cantu, M.D. (Columbia, 2000); C. Denise Ching, M.D. (Duke, 2000); Jennifer G. Hall, M.D. (East Carolina, 2000); Steven Hanish, M.D. (Indiana, 2000); Matthew G. Hartwig, M.D. (Duke, 2001); Jonathan A. Hata, M.D. (Duke, 2000); Anthony Lemaire, M.D. (Yale, 2001); DuyKhanh Pham (Duke, 2001); Melissa M. Poh, M.D. (Georgetown, 2000); Katherine E. Posther, M.D. (Duke, 2000); Shiva Sarraf-Yazdi (Duke, 1999); Jacob N. Schroder, M.D. (Georgetown, 2001); Christopher L. Tebbit, M.D. (Duke, 2001); Jose Trani, M.D. (Pennsylvania, 2001);

Junior Assistant Residents: Quinton V. Cancel, M.D. (Duke, 2002); Bassem M. Eldaif, M.D. (Duke, 2002); Brian Lima (Duke, 2002); Regina D. Norris, M.D. (Duke, 2002); Mayur B. Patel, M.D. (Vanderbilt, 2002); Rebecca A. Prince, M.D. (Oregon, 2002); Karyn W. Rahn, M.D. (Duke, 1999); Keshava Rajagopal, M.D. (Chicago-Pritzker, 2002); Joseph W. Turek, M.D. (Illinois, 2002); Jin S. Yoo, M.D. (Virginia, 2002);

First Year Residents: Keki R. Balsara, M.D. (Pennsylvania, 2003); Errol L. Bush, M.D. (Duke, 2003); Yessica Cabrera, M.D. (Duke, 2003); Eugene P. Ceppa, M.D. (Johns Hopkins, 2003); Patricia S. Cho, M.D. (Duke, 2003); Daniel A. Clayton, M.D. (Colorado, 2003); Christopher M. Danney, M.D. (Texas, 2003); Sebastian G. dela Fuente, M.D. (Argentina, 1998); Nicholas J. Fitzsimons, M.D. (North Carolina, 2003); Brett J. Gilbert, M.D. (Duke, 2003); Erich S. Huang, M.D. (Duke, 2003); Jason M. Hurst, M.D. (Georgetown, 2003); Brian A. Krenzel, M.D. (Louisville, 2003); Milford H. Marchant, Jr., M.D. (Maryland, 2003); Kristy L. McKiernan, M.D. (Albany, 2003); Jeffrey J. Nienaber, M.D. (Nebraska, 2003); Elizabeth K. O'Halloran, M.D. (Duke, 2003); Ciaran J. Powers, M.D. (Georgetown, 2003); Srinevas K. Reddy, M.D. (Wisconsin, 2003); Tanja C. Schuetz, M.D. (Germany, 2000); Glen A. Toomayan, M.D. (Duke, 2003); Timothy Y. Tseng, M.D. (Duke, 2003); David W. Wang, M.D. (Duke, 2003); Lyman W. Whitlatch, M.D. (Boston, 2003); Michael Q. Wickham, M.D. (Duke, 2003).

Division of Neurosurgery

Chief Residents: David Cory Adamson, M.D., Ph.D., M.L.A. (Johns Hopkins, 1998); Kenneth M. Little, M.D. (Vanderbilt, 1998).

Residents: Lisa H. Fagan, M.D. (Finch, 2002); Peter M. Grossi, M.D. (Duke, 2002); Kent C. New, M.D., Ph.D. (Georgetown, 1998); Parag G. Patil, M.D., Ph.D. (Johns Hopkins, 1999); Ashutosh A. Pradhan, M.D. (Duke, 2000); Lee A. Selznick, M.D. (Washington Univ., 2001); Keyne K. Thomas, M.D. (Pittsburgh, 2001); Ali R. Zomorodi, M.D. (Duke, 2000).

Division of Orthopaedic Surgery

Chief Residents: Christopher J. Barnes, M.D. (Ohio State, 1997); Keith R. Berend, M.D. (Duke, 1997); Matthew J. Garberina, M.D. (Temple, 1997); Michelle A. Ghert, M.D. (Vanderbilt, 1996); Robert D. Graham, M.D. (Duke, 1997); Andrew S. Holmes, M.D. (Thomas Jefferson, 1997); Elizabeth S. Joneschild, M.D. (Duke, 1997); Roy M. Rubin, M.D. (Temple, 1997); William P. Silver, M.D. (Bowman-Gray, 1997).

Residents: Mark J. Albritton, M.D. (Finch, 1999); Julian "Mack" Aldridge, III, M.D. (Bowman Gray, 1998); Todd S. Atkinson, M.D. (Yale, 1998); Michael P. Bolognesi, M.D. (Duke, 1998); James R. Bowers, M.D. (Wisconsin, 1999); Christopher R. Brown, M.D. (Med. Coll. of Virginia, 2000); William C. Clark, Jr., M.D. (Oklahoma, 2001); Justin S. Field, M.D. (Tulane, 2001); Gregory V. Green, M.D. (Baylor, 1998); Jon D. Hernandez, M.D., Ph.D. (California-Los Angeles, 1998); John D. Hewitt, M.D. (Duke, 1999); Shawn B. Hocker, M.D. (North Carolina, 2000); Michael W. Kadrmaz, M.D. (Washington, 1994); Jason E. Lang, M.D. (Duke, 1999); Alexander B. LeGrand, M.D. (Duke, 2001); Nina R. Lightdale, M.D. (Dartmouth, 2001); Colin G. Looney, M.D. (Duke, 2001); Michael C. Maier, M.D. (Texas-Southwestern, 2001); Robert A. Malinzak, M.D. (Duke, 1999); David B. Musante, M.D. (Virginia, 1996); Matthew D. Olin, M.D. (Bowman Gray, 1998); Christopher A. Radkowski, M.D. (Duke, 2000); Anthony S. Rhorer, M.D. (Duke, 1999); D. Todd Rose, M.D. (Duke, 2000); Thomas F. Roush, M.D. (Cincinnati, 2001); James J. Rubano, M.D. (Hahnemann, 1998); J. A. Alexander Seldomridge, III, M.D. (Columbia, 1999); Ryan W. Simovitch, M.D. (Finch, 2000); Hardayal Singh, M.D. (Gov't Med. Coll., 1992); Allston J. Stubbs, IV, M.D. (Duke, 1999); W. Christopher Urban, M.D. (Jefferson, 1998); Jeffrey D. Yergler, M.D. (Indiana, 2000).

Division of Otolaryngology

Chief Residents: Christopher Lansford, M.D. (Michigan, 1999); Adrian Varela, M.D. (Florida, 1999).

Assistant Residents: Christopher Y. Chang, M.D. (Yale, 2000); Andy T.A. Chung (Loma Linda, 2000); Michael Beasley, M.D. (West Virginia, 2001); Kevin Botts, M.D. (Virginia, 2001); Anna Grigoryeva, M.D. (Missouri, 2002); Christopher Walz, M.D. (California, 2002).

Division of Plastic, Reconstructive, Maxillofacial and Oral Surgery

Instructors and Chief Residents: William Bruno, M.D. (Hahnemann, 1995); Denis L. Gonyon, Jr., M.D. (Michigan, 1998); Trung Le, M.D. (SUNY-Brooklyn, 1995).

Assistant Residents: Ricardo A. Meade, M.D. (ITESM, 1997); Tracey H. Stokes, M.D. (Cornell, 1999); Howard Wang, M.D. (Johns Hopkins, 1995); Neil B. Gottlieb, M.D. (Thomas Jefferson, 1998); J. Stewart Humphrey, M.D. (Tulane, 2000); Adam Ravin, M.D. (Duke, 2000).

Division of Urology

Chief Residents: Costas D. Lallas, M.D. (Jefferson Med. Coll., 1998); Ganesh V. Raj, M.D., Ph.D. (Thomas Jefferson, 1997); Robert W. Santa-Cruz, M.D. (Miami, 1998).

Assistant Residents: Fernando Delvecchio, M.D. (Buenos Aires, 1990); Drew Dylewski, M.D. (Baylor, 2001); Brian Evans, M.D. (Med. Coll. of Ohio, 2000); Charles Marguet, M.D. (Indiana, 1998); Ari Silverstein, M.D. (N/A); Jeremy Wiygul, M.D. (Texas Tech., 2001) (Emory, 1999); Alon Weizer, M.D. (Baylor, 1999); Benjamin Yang, M.D. (Stanford, 2001); Matthew Young, M.D. (North Carolina, 2000); Charles Yowell, M.D. (Duke, 2000).

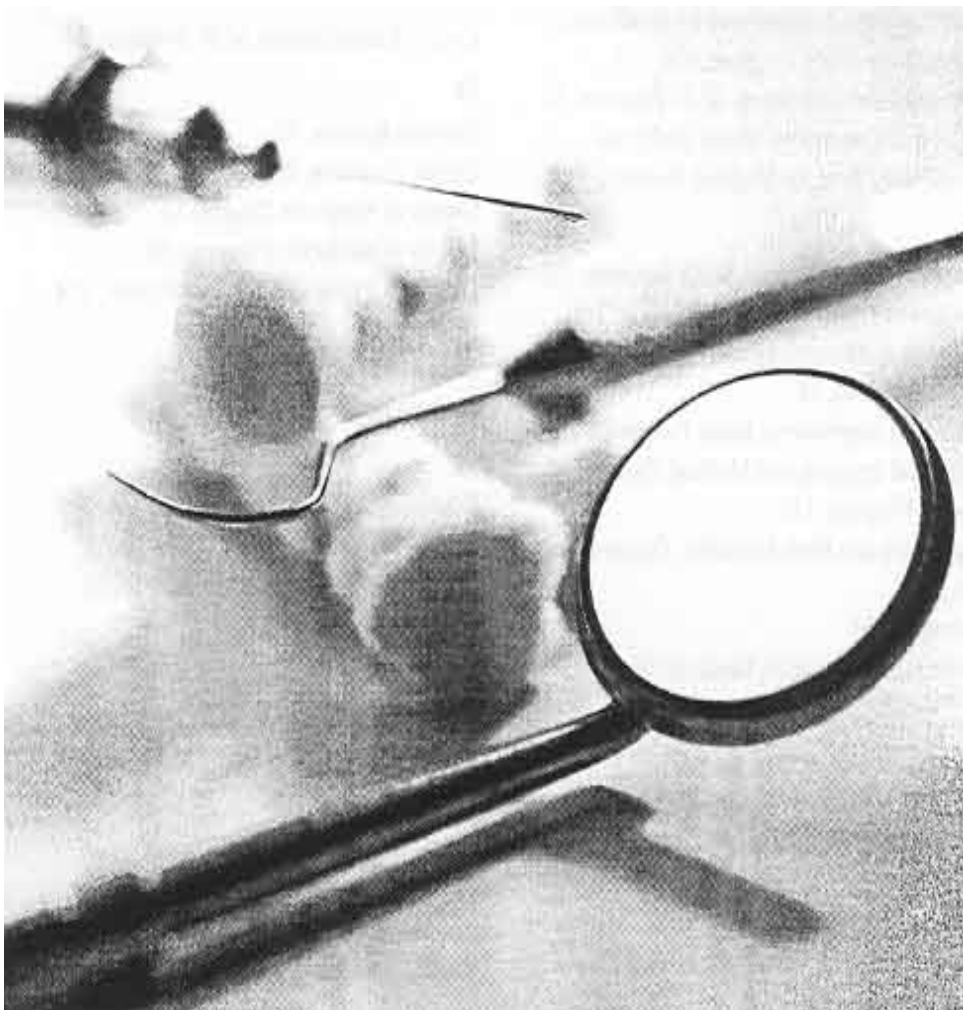
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Continuing Medical Education

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