
bulletin of
Duke University
2001-2002

Medical Center



The Mission of Duke University

The founding Indenture of Duke University directed the members of the university 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 foster health and well-being through medical research and patient care; and to promote a sincere spirit of tolerance, 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.

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Medical Center

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The information in this bulletin applies to the academic year 2001-2002 and is accurate and current, to the extent possible, as of May 2001. The university reserves the right to change programs of study, academic requirements, teaching staff, the calendar, and other matters described herein 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 e-mail accounts as well as access to e-mail services from public clusters if students do not have personal computers of their own. All students are expected to access their e-mail 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, Box 90563, Duke University, Durham, North Carolina 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 2001-2002

M.D. Program

YEAR 1 (FIRST YEAR) STUDENTS

Fall Term 2001

August		
8-10	Wednesday-Friday	– Begin orientation and 2001-2002 academic year
13	Monday, 8:00 a.m.	– Begin Block I
October		
5	Friday, 6:00 p.m.	– End Block I
9	Tuesday, 8:00 a.m.	– Begin Block II
November		
20	Tuesday, 6:00 p.m.	– Begin Thanksgiving holiday
26	Monday, 8:00 a.m.	– Classes Resume
December		
14	Friday, 6:00 p.m.	– End Block II and Fall 2001 Term

Spring Term 2002

January		
3	Thursday, 8 a.m.	– Begin Block III Spring 2002 Term
21	Monday	– Martin Luther King, Jr. holiday
25	Friday	– End Block III
28	Monday	– Intro to Physical Diagnosis (intensive learning period)
February		
8	Friday, 6:00 p.m.	– End Intro to Physical Diagnosis
11	Monday, 8:00 a.m.	– Begin Block IV
April		
17	Wednesday, 6:00 p.m.	– End Block IV and begin spring vacation
29	Monday, 8:00 a.m.	– Begin Block V
June		
27	Wednesday, 6:00 p.m.	– End Block V and 2001-2002 academic year

YEAR 2 (SECOND YEAR) STUDENTS

Fall Term 2001

July		
30	Monday, 8:00 a.m.	– Begin Orientation to the Clerkship Year (OCY)
August		
24	Friday, 6:00 p.m.	– End intensive learning period
27	Monday, 8:00 a.m.	– Begin classes in sections 81, 41
September		
19	Wednesday, 6:00 p.m.	– End classes in section 41
24	Monday, 8:00 a.m.	– Begin classes in section 42
October		
17	Wednesday, 6:00 p.m.	– End classes in regular sections 81, 42
22	Monday, 8:00 a.m.	– Begin classes in sections 82, 43
November		
14	Wednesday, 6:00 p.m.	– End classes in section 43
19	Monday, 8:00 a.m.	– Begin classes in section 44
21	Wednesday, 6:00 p.m.	– Begin Thanksgiving holiday
26	Monday, 8:00 a.m.	– Resume classes in section 82, 44
December		
15	Saturday, 6:00 p.m.	– End classes in regular sections 82, 44

Alternate Schedule for Psychiatry/Cost Effective Care

- 81 PSC August 27 – October 5
- 81 MPS October 8 – October 19
- 82 PSC October 22 – November 21
- 82 MPS November 26 – December 14

Spring Term 2002

- January**
- 2 Wednesday, 8:00 a.m. – Begin classes in sections 81, 41
- 21 Monday – Martin Luther King, Jr. holiday
- 25 Friday, 6:00 p.m. – End classes in section 41
- 28 Monday, 8:00 a.m. – Begin classes in section 42
- February**
- 20 Wednesday, 6:00 p.m. – End classes in regular sections 81, 42
- 25 Monday, 8:00 a.m. – Begin classes in sections 82, 43
- March**
- 20 Wednesday, 6:00 p.m. – End classes in section 43
- 25 Monday, 8:00 a.m., Begin classes in section 44
- April**
- 17 Wednesday, 6:00 p.m. – End classes in regular sections 82, 44 and begin spring vacation

Alternate Schedule for Psychiatry/Cost Effective Care

- 81 PSC January 2 – February 8
- 81 MPS February 11 – February 22
- 82 PSC February 25 – April 5
- 82 MPS April 8 – April 19

Summer Term 2002

- April**
- 29 Monday, 8:00 a.m. – Begin classes in sections 81, 41
- May**
- 22 Wednesday, 6:00 p.m. – End classes in section 41
- 27 Monday, 8:00 a.m. – Begin classes in section 42
- June**
- 19 Wednesday, 6:00 p.m. – End classes in regular sections 81, 42
- 24 Monday, 8:00 a.m. – Begin classes in sections 82, 43
- July**
- 4 Thursday – Independence Day holiday
- 17 Wednesday, 6:00 p.m. – End classes in section 43
- 22 Monday, 8:00 a.m. – Begin classes in section 44
- August**
- 14 Wednesday, 6:00 p.m. – End classes in regular sections 82, 44

Alternate Schedule for Psychiatry/Cost Effective Care

- 81 PSC April 29 – June 7
- 81 MPS June 10 – June 21
- 82 PSC June 24 – August 2
- 82 MPS August 5 – August 16

YEARS 3 and 4 (THIRD AND FOURTH YEAR) STUDENTS

Summer Term 2001

- April**
- 30 Monday, 8:00 a.m. – Begin classes in sections 16, 81, 41
- May**
- 26 Saturday, 12:00 noon – End classes in section 41
- 28 Monday, 8:00 a.m. – Begin classes in section 42
- June**
- 23 Saturday, 12:00 noon – End classes in sections 81, 42
- 25 Monday, 8:00 a.m. – Begin classes in sections 82, 43

July	
4	Wednesday – Independence Day holiday
21	Saturday, 12:00 noon – End classes in section 43
23	Monday, 8:00 a.m. – Begin classes in section 44
August	
18	Saturday, 12:00 noon – End classes in sections 16, 82, 44
Fall Term 2001	
August	
27	Monday, 8:00 a.m. – Begin classes in sections 16, 81, 41
September	
22	Saturday, 12:00 noon – End classes in section 41
24	Monday, 8:00 a.m. – Begin classes in section 42
October	
20	Saturday, 12:00 noon – End classes in sections 81, 42
22	Monday, 8:00 a.m. – Begin classes in sections 82, 43
November	
8	Thursday, Registration for Spring Term, 2002
17	Saturday, 12:00 p.m. – End classes in section 43
19	Monday, 8:00 a.m. – Begin classes in section 44
21	Wednesday, 6:00 p.m. – Begin Thanksgiving holiday
26	Monday, 8:00 a.m. – Classes resume in section 44
28	Wednesday, Late registration day for Spring Term, 2002
December	
19	Wednesday – 12:00 noon – End classes in sections 16, 82, 44
Spring Term 2002	
January	
7	Monday, 8:00 a.m. – Begin classes in sections 16, 81, 41
21	Monday – Martin Luther King, Jr. holiday
February	
2	Saturday, 12:00 noon – End classes in section 41
4	Monday, 8:00 a.m. – Begin classes in section 42
March	
2	Saturday, 12:00 noon – End classes in sections 81, 42.
4	Monday, 8:00 a.m. – Begin classes in sections 82, 43
13	Wednesday – Registration for Summer Term, 2002 – rising fourth year students
27	Wednesday- Registration for Fall Term, 2002 – rising third and fourth year students
30	Saturday, 12:00 noon – End classes in section 43
April	
1	Monday, 8:00 a.m. – Begin classes in section 44
27	Saturday, 12:00 noon – End classes in sections 16, 82, 44
May	
11-12	Saturday-Sunday – Graduation activities
Summer Term 2002	
April	
29	Monday, 8:00 a.m. – Begin classes in sections 16, 81, 41
May	
25	Saturday, 12:00 noon – End classes in section 41
27	Monday, 8:00 a.m. – Begin classes in section 42
June	
22	Saturday, 12:00 noon – End classes in sections 81, 42
24	Monday, 8:00 a.m. – Begin classes in sections 82, 43
July	
4	Thursday – Independence Day holiday
20	Saturday, 12:00 noon – End classes in section 43
22	Monday, 8:00 a.m. – Begin classes in section 44
August	
17	Saturday, 12:00 noon – End classes in sections 16, 82, 44

University Administration

GENERAL ADMINISTRATION

Nannerl Overholser Keohane, Ph.D., *President*
Peter Lange, Ph.D., *Provost*
Ralph Snyderman, M.D., *Chancellor for Health Affairs and Executive Dean, School of Medicine*
Tallman Trask III, M.B.A., Ph.D., *Executive Vice-President*
John F. Burness, A.B., *Senior Vice-President for Public Affairs and Government Relations*
John J. Piva, Jr., B.A., *Senior Vice-President for Alumni Affairs and Development*
R. James Clack, Ph.D., *Interim Vice-President for Student Affairs*
H. Clint Davidson, Jr., M.B.A., *Vice-President for Human Resources*
Sally M. Dickson, J.D., *Vice-President for Institutional Equity*
Thruston B. Morton III, B.A., *President of Duke Management Company*
Robert S. Shepard, Ph.D., *Vice-President for University Development*
N. Allison Haltom, A.B., *Vice-President and University Secretary*
David B. Adcock, J.D., *University Counsel*
R. Sanders Williams, M.D., *Vice-Chancellor for Medical Center Academic Affairs and Dean, School of Medicine and Allied Health*
William J. Donelan, M.S., *Vice-Chancellor for Health Affairs and Executive Vice-President, Duke University Health System*
Michael D. Israel, M.P.H., *Vice-Chancellor and Chief Executive Officer, Duke University Hospital*
Steven A. Rum, M.S., *Vice-Chancellor for Development and Alumni Affairs*
Jean Gaillard Spaulding, M.D., *Vice-Chancellor for Health Affairs*
Robert L. Taber, Ph.D., *Vice-Chancellor for Science and Technology Development*
R. C. "Bucky" Waters, M.A., *Vice-Chancellor for Special Projects*
Gordon D. Williams, B.A., *Vice-Chancellor for Medical Center Operations and Vice-Dean for Administration and Finance, School of Medicine*
Russel E. Kaufman, M.D., *Vice-Dean for Education and Academic Affairs, Associate Vice-Chancellor for Academic Affairs*
William H. Willimon, S.T.D., *Dean of the Chapel*
Joseph L. Alleva, M.B.A., *Director of Athletics*

Medical Center and Health System Administration

Ralph Snyderman, M.D., *Chancellor for Health Affairs, Executive Dean of the School of Medicine and Allied Health, and President and Chief Executive Officer, Duke University Health System*
R. Sanders Williams, M.D., *Vice-Chancellor for Medical Center Academic Affairs and Dean, School of Medicine and Allied Health*
Steven A. Rum, M.S., *Vice-Chancellor for Development and Alumni Affairs*
Vicki Y. Saito, B.F.A., *Assistant Vice-Chancellor for Health Affairs, Communications*
Jean G. Spaulding, M.D., *Vice-Chancellor for Health Affairs*

Medical Center Academic Affairs

R. Sanders Williams, M.D., *Vice-Chancellor for Medical Center Academic Affairs and Dean, School of Medicine and Allied Health*
Gordon D. Williams, B.A., *Vice-Dean for Administration & Finance, School of Medicine, Vice-Chancellor for Operations, DUMC, and Vice-President for Administration, DUHS*
Russel E. Kaufman, M.D., *Vice-Dean for Education and Academic Affairs, Associate Vice-Chancellor for Academic Affairs*
Joseph M. Corless, M.D., Ph.D., *Associate Vice-Dean for Faculty Affairs*
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Brenda E. Armstrong, M.D., *Associate Dean, Admissions*
Jeffrey R. Dawson, Ph.D., *Associate Dean, Basic Science Curriculum*
Robert P. Drucker, M.D., *Associate Dean for Medical Education*
Joseph Green, Ph.D., *Associate Dean for Continuing Medical Education*
Caroline Haynes, M.D., Ph.D., *Associate Dean for Medical Education and Director, Office of Student Affairs*
Andrew C. Puckett, Jr., Ph.D., *Associate Dean for Medical Education and Director, Center for Professionalism and Wellness*
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Mark W. Sebastian, M.D., *Associate Dean for Medical Education*
Patricia L. Thibodeau, *Associate Dean, Library Sciences*
John L. Weinerth, M.D., *Associate Dean and Director, Graduate Medical Education*
Delbert R. Wigfall, M.D., *Associate Dean for Medical Education and Faculty Director, Multicultural Resource Center*
Deborah A. Heineman, M.A., M.Ed., *Assistant Dean of Medical Education Administration*
Barbara L. Sheline, M.D., M.P.H., *Assistant Dean for Primary Care*

Jeff Taekman, M.D., *Assistant Dean for Education Technology*
Stacey R. McCorison, M.B.A., *Director of Financial Aid and Registrar*
Carol G. Reilly, B.S., *Administrative Director, Office of Curriculum*
Jan K. Richardson, Ph.D., PT, OCS, *Chair, Doctor of Physical Therapy Program*
Justine Strand, M.P.H., PA-C, *Division Chief and Director, Physician Assistant Education*
Mary T. Champagne, Ph.D., *Dean, School of Nursing*

Duke University Health System

William J. Donelan, M.S., *Executive Vice President/Chief Operating Officer, Duke University Health System, and Vice Chancellor, Health Affairs*
Michael D. Israel, M.P.H., *Vice-Chancellor and Chief Executive Officer, Duke University Hospital*
Gary L. Stiles, M.D., *Vice-President and Chief Medical Officer*
Kenneth C. Morris, M.P.A., *Vice-President and Chief Financial Officer*

Office of the School of Nursing

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Barbara S. Turner, R.N., D.N.Sc., *Associate Dean, Director of Nursing Research and Division Chief, Pediatrics and Acute Care*
Terris Kennedy, R.N., Ph.D., *Associate Dean for Academic Affairs*
C. Eileen Watts Welch, M.B.A., *Assistant Dean for Development*
W. C. Budzinski, M.B.A., *Assistant Dean for Finance*
Randi L. Davenport, Ph.D., *Special Assistant to the Dean*
Linda K. Goodwin, Ph.D., *Division Chief, Health Systems Leadership & Outcomes & Primary Care*
Donna Hewitt, R.N., M.N., *Director of Special Projects*
Nancy Short, R.N., M.B.A., *Robert Wood Johnson Distance Education Coordinator*
Susan Epstein, M.P.H., *Division Chief, Community Health*
Wayne T. Thompson, M.S.W., *Director, Office of Admissions and Student Services*
Izy Obi, B.A., *Clinical Site Placement Coordinator*

Standing Committees of the Medical Center Academic Administration

Admissions Medical School

Brenda Armstrong, M.D., *Chair*; Drs. Abou-Donia, Anderson, Andolsek, Augustine, Bradford, Butterly, Campbell, Chatterjee, Currie, Dawson, Drucker, Eck, Fuchs, George, Hanson, Harmel, Hardenbergh, Haynes, Herndon, Hershfield, Jackson, Kaprielian, Keifer, King, Kravitz, Krystal, Kudler, Michener, Montana, Moon, Olufolabi, Opara, Puckett, Reves, Rourk, Schanberg, Schmidt, Scott, Stafford-Smith, Stein, Stolp, Szczech, Waite, Wigfall, Winn, Young, Yowell; Ms. Cullins; Administrative Assistant: TBA; Student Representatives: Messrs. Cancel, Fields, Hsu, Jenkins, Lee, Lo, Olson, Serlin, Singh, Wood; Ms. Athar, Choy, Davel, Liao, Odunze, Scott, Sheppard-Sawyer, Sufka, Trinh, and Woo; Dr. Kaufman, *ex officio*.

Audit and Tissue

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

Basic Science Appointments, Promotion, and Tenure

K. V. Rajagopalan, Ph.D., *Chair*; Drs. Caron, Chikaraishi, Cullen, Fitzpatrick, Hsieh, McClay.

Basic Science Faculty Steering

B. Capel, Ph.D., *Chair*, Drs. Been, Cartmill, Cullen, Kelsoe, Linney, Reinhart, Slotkin, and Steenbergen.

Brain Death

Larry Goldstein, M.D., *Chair*; Drs. Alberts, Bedlack, Burke, Chilukuri, Ciafaloni, Graffagnino, Hurwitz, Husain, Kori, Laskowitz, McKeown, McNamara, E. W. Massey, J. Massey, Morgenlander, Radtke, Rich, Rozear, Sanders, Schmechel, Scott, Strittmatter, Vance, and Vanlandingham.

Clinical Cancer Education Program

Edward C. Halperin, M.D., *Chair and Director*.

Clinical Sciences Appointments, Promotions, and Tenure

J. G. Reves, M.D., *Chair*; Drs. Anderson, Buckley, Cohen, Coleman, Frank, and Telen; Dr. Corless, *ex officio*.

Clinical Science Faculty Council on Academic Affairs

Jonathan Mark, M.D., *Chair*; Drs. Bowie, Burton, Georgiade, Gottfried, Herbert, Jaffe, Mark, Moon, Moon, Paulson, Richtsmeier, Seaber, Shea, Swartz, Tanaka, Walmer, Wilkinson, and Wilson.

Continuing Medical Education

Joseph S. Green, Ph.D., *Associate Dean*; Four sub-committees of CME Governing Board Int'l, Nat'l, Regional - Robert Jones, M.D., *Chair*; Marketing & Finance - Kenneth W. Lyles, M.D., *Chair*; Internal CME/ AHEC/Affiliates - Marvin Schwartz, M.D., *Chair*; Education Process/Outcomes - Joe Kisslo, M.D., *Chair*.

Duke Comprehensive Cancer Center Clinical Cancer Committee

Drs. Bossen, Colvin, Clarke-Pearson, Friedman, George, Gilbert, Hurwitz, Kornguth, Price, Prosnitz, Richtsmeier, Rosoff, Schildkraut, and Seigler; Ms. Crouch, Kessenich, Robertson, Singletary, and Webb; Mr. Downey.

Financial Aid

Stacey R. McCorison, M.B.A., *Chair*; Drs. Armstrong and Kaufman; Ms. Heineman; Student Representatives: Ms. Karen Hoffman; and three OSR representatives.

Hospital Ethics

James L. Travis, Ph.D., *Chair*; Drs. Alexander, Jones, Ms. Burke, Ms. Taylor, *Co-chairs*; Drs. Falletta, Ford, Fortney, Goldstein, Kenan, Moylan, Puckett, and Rosoff; Ms. Alexander, Maher, Newsome, Radford, Tart, Wooley; Messrs. Borg, Crewes, Freck, and Rutherford.

Hospital Infection Control

Daniel J. Sexton, M.D., *Chair*; Drs. Christmas, Jackson, Kaye, Livengood, McKinney, Reller, Schulmann, Sebastian, Thomann, and Vaslef; Ms. Adams, Bronstein, Cheesborough, Dickerson, Finch, Fulmer, Kessenich, MacFarquhar, Martin, McLean, and Oden; Messrs. Borg, Bright, Dennis, Guerry, Haynes, Kessler, Nevin, and Riddick.

Hospital Transfusion Committee

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

Institutional Animal Care and Use Committee

E. Lee Tyrey, Ph.D., *Chair*; Warren Meck, Ph.D., *Vice-chair*; Drs. Amalfitano, Anderson, Augustine, Bonaventura, Cant, Cerutti, Collins, Crowder, Currie, Dennis, Gerard, Glander, Glower, Gustafson, Hawkins, Hedlund, Kirby-Smith, Klopfer, Koch, Krangel, Levin, Linney, Lyerly, McCaughan, McClay, McClellan-Green, McKay, Mills, Pickup, Rahija, Reimer, Reynolds, Richards, Rickman, Saling, Schanberg, Schomberg, Sigmon-Hendricks, Steenbergen, Sullivan, Terse, Vaslef, Vigna, Williams; Ms. deGuehery, Dillon, Lundberg, Milich.

Institutional Biosafety Committee

Jack Keene, Ph.D. and Wayne R. Thomann, Ph.D., *Co-chairs*; Drs. Drake, Gilboa, Hunt, Pickup, and Resnick; Ms. DeGuehery.

Institutional Committee for Graduate Medical Education

Thomas Anderson, Ph.D., *Chair*; Drs. Andolsek, Bradford, Buckley, Chatterjee, Clifford, Couchman, Davis, Dodd, Drucker, Eck, Fortney, Goldner, Gradison, Gray, Gutman, Hardaker, Kamran, Katz, Kaufman, Keitz, King, Kredich, Lineberger, Lyerly, Muir, Puckett, Robertson, Rourk, Scher, Sebastian, Shaddock, Thrall, Weinerth, Weintrob, and Yarger; Messrs. Ciompi and Gustafson; Ms. Campbell, Hendrix, and Tuck.

Institutional Review Board for Clinical Investigations

John M. Falletta, M.D., *Chair*; George Parkerson, M.D., *Vice-chair*; Drs. Adams, Alfred, Anderson, Bajwa, Bass, Bentley, Benveniste, Brizel, Carroll, Cheek, Dobbins, Drucker, Dunn, Ellison, Farmer, Freedman, Gan, Goldstein, Gustafson, Gwyer, Hahn, Hall, Herlong, Hertzberg, Howrey, Jackson, Kenan, Kessler, Lee, Ludeman, Lukes, MacFall, Mahaffey, Majure, Marsh, Matchar, McBride, McConkle-Rosell, McFetridge, Morse, Muhlbaier, Muir, Munley, Murray, Olsen, Patterson, Petros, Polloch, Proia, Rafferty, Scanga, Semans, Slaughter, Smith, Smolko, Sparrow, Sutton, Toffaletti, Travis, Turner, Walmer, Wolfe, and Womack; Ms. Coley, Hurwitz, Maney, McCaskill, Olsen, Panghorn, Rohn, and Stewart; Student Representatives: Messrs. Erickson, Leveque, and Sanchez; Mses. Kong and Sufka.

Library

Patricia L. Thibodeau, M.L.S., *Chair*; Drs. Alberts, Edwards, Gwyer, Madden, McCusker, Oas, Petrusa, Turner, and Walther; Ms. Carpenter and Ms. Odom; Mr. Albright, *ex officio*, Ms. Murphy, *ad hoc member*.

Medical Radiation Control and Radioactive Drug Research Committee

Kenneth W. Lyles, M.D., *Chair*; Drs. Harris, Lobaugh, Ludwig, Petry, Reiman, Samulski, Wong and Yoshizumi; Ms. Crouch; Mr. Tenney.

Medical Center Safety Committee

Wayne R. Thomann, Ph.D., *Chair*; Drs. Broda, Hunt, Jackson, Kaye, and Yoshizumi; Messrs. Bergen, Borg, Eroee, Garber, Good, Guerry, Poplin, Quinn, Stanley, Streater, and Whitfield; Mses. Finch, James, Muse, and Shulby.

Medical Student Research Scholarship

Nicholas M. Kredich, M.D., *Chair*; Drs. Alexander, Bradford, Dawson, Greenfield, Hamilton, Kane, Klintworth, Rockey, Rosse, Rozear, Shetzline, Wagner, Weinberg, and Woods.

Merit Awards

Russel E. Kaufman, M.D., *Chair*; Drs. Bollinger, N. Kredich, Armstrong, and J. Wilson; Administrative Assistant: Ms. Franklin; two student representatives.

Minority Affairs Committee for Undergraduate Medical Education

Delbert Wigfall, M.D., *Chair*; Drs. Franklin, Kaufman, Robinson, Sveteky, Wells, Winn; Mses. Hall, Newby and Student Representatives from SNMA and the Davison Council; Drs. Armstrong, Holmes, *ex officio*.

Misconduct in Research

Christian R. H. Raetz, M.D., *Chair*; Drs. Bollinger, Crawford, and Ward.

North Carolina Residence

Brenda Armstrong, M.D., *Chair*; Ms. Franklin, Ms. McCorison.

Operations Committee for Undergraduate Medical Education

Deborah Heineman, M.A., M.Ed., *Chair*; Drs. Anderson, Armstrong, Dawson, Drucker, Haynes, Kaufman, Petrusa, Puckett, Sebastian, Strand, Wigfall; Ms. Cullins, McCorison, Reilly and Sider.

Pharmacy and Therapeutics

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

Primary Care Committee for Undergraduate Medical Education

Barbara Sheline, M.D., *Chair*; Drs. Chatterjee, Copeland, Morris, and Nahum.

School of Medicine Education Steering Committee

Caroline Haynes, M.D., Ph.D., *Chair*; Drs. Anderson, Dawson, Kaufman, Petrusa, Puckett, Richardson, Strand, Weinerth, Wright; Messrs. Green and Hurtgen; Ms. Heineman, McCorison, Reilly, Sider, and Thibodeau.

Senior Scholarships

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

Study Away

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

Undergraduate Medical Education – Curriculum

The current Curriculum Committee consists of all medical school course directors. A new Curriculum Committee will be formed to both create the new curriculum and serve as the oversight group.

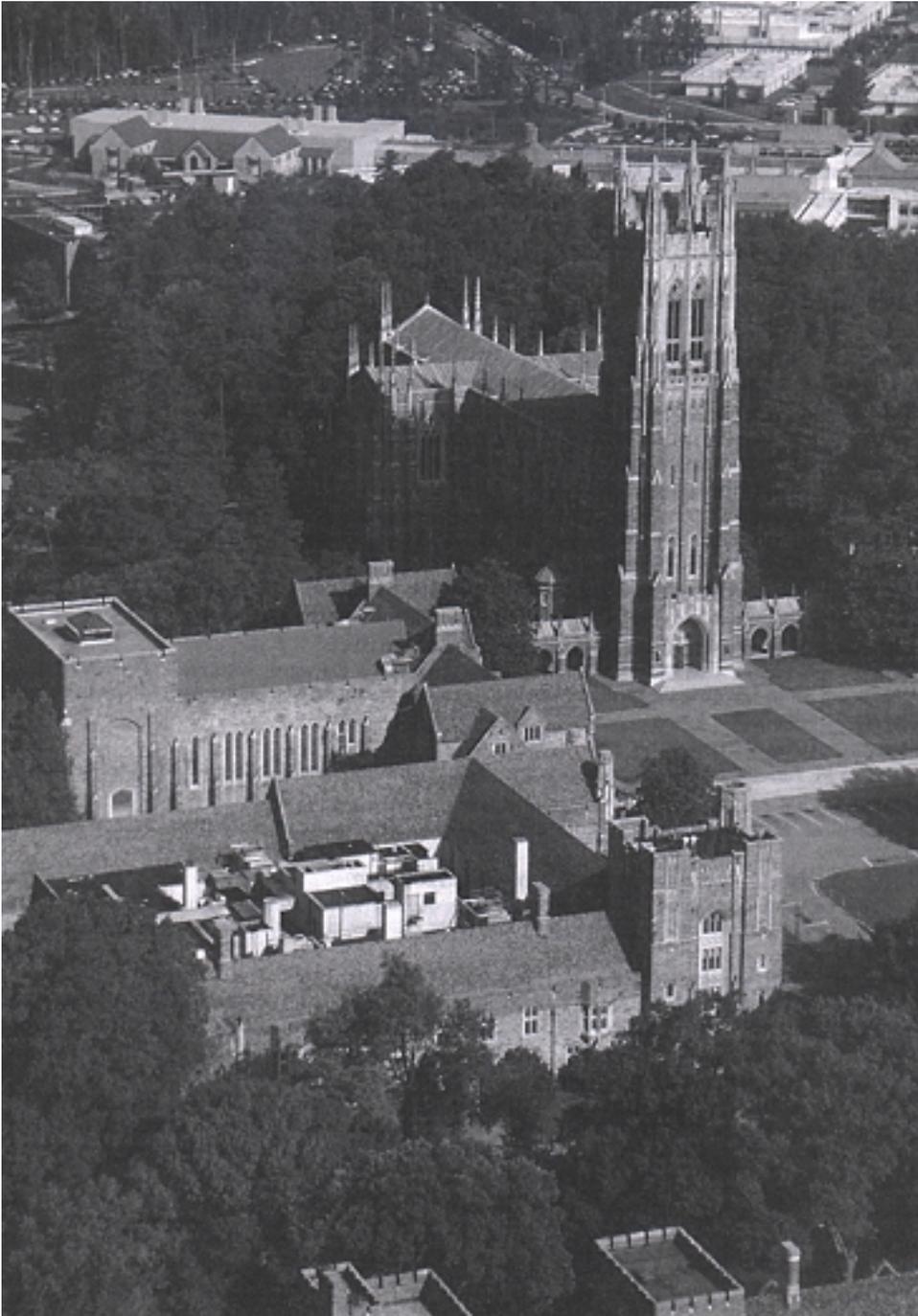
Veterans Administration Research and Development

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

Veterans Administration, Dean's

Ralph Snyderman, M.D., *Chair*; Barton Haynes, M.D., *Vice-chair*; Drs. Anderson, Cohen, Corless, Epstein, Halperin, Hoenig, Howell, Kaufman, Keitz, Krishnan, Mark, Oddone, Pappas, Pizzo, Ravin, Reves, Shelburne, Simel, Vandemark, Weinberg, Weiner, Yarger; Messrs. Phaup and Williams; Ms. Huggins.

General Information



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 the 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.

Medical Center and Health System Buildings and Facilities

The eighty-seven 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, and Central Teaching facilities. *Baker House*— Department of Obstetrics and Gynecology administration, clinics, diagnostic, treatment and support services including: Speech and Hearing, Oral Surgery, Pastoral Care and Counseling, and departmental offices. *Barnes Woodhall Building*— Psychiatry inpatient care unit, diagnostic, treatment, and support services, outpatient pharmacy, pre-opscreening, 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, and Psychiatry, Medical Center Information Systems (MCIS), Gross Anatomy laboratories, and Brain Imaging and Analysis administration and research. *Marshall Pickens Building*— Clinics, Student Health Services, 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 Program, Community and Family Medicine administrative and departmental offices, and School of Nursing administrative and departmental offices, Hospital Education and teaching facilities. *Seeley G. Mudd Communications and Library*— Medical Center Library, Offices of Communications, Office of Grants and Contracts, Medical Center Commons, and the Searle Center for Continuing Education. *Parking Garage II*— House Staff and Student Exercise Facility, Traffic & Parking office and Pathology laboratories.

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, Pathology, Pediatrics, Radiology, Radiation Oncology and Surgery, research laboratories, offices and hospital clinic laboratories. *Vivarium*— Division of Laboratory Animal Resources and laboratory animal care facilities. *Cancer Center Isolation Facility*— Special containment facility for cancer 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, Procurement Services, Hospital Emergency Services, Occupational and Environmental Safety, Medical Center Engineering and Operations, and the Academic Medical Center Consortium.

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 301,584 volumes are available, including the Trent Collection in the History of Medicine. Approximately 2,361 journal subscriptions are currently received and the library has extensive back files of older volumes. The collection contains over 1,369 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, as well as an area focusing on multimedia programs. The Frank Engel Memorial Collection consists of a small group of books on consumer health and nonmedical 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 online card 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 - midnight; Friday, 8:00 am - 8:00 pm; Saturday, 10:00 am - 6:00 pm; Sunday, 12:00 noon - midnight. Summer and holiday hours are announced.

Associate Dean for Library Services and Director: Patricia L. Thibodeau, M.L.S., M.B.A. (Rhode Island, 1976) (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 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, banquet, 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 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 (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 684-2244.

Office of Medical Education Research and Development. The Office of Medical Education Research and Development offers expertise to the Medical School community in the areas of curriculum and course development, research and evaluation studies, standardized patients, and faculty development. A few of the projects with which OMERD is involved include the following.

Clinical Performance Examination. In collaboration with the three other medical schools in North Carolina, OMERD has developed and implemented the Clinical Performance Examination (CPX). The CPX is a multi-case, standardized patient-based examination that assesses student skills in the doctor-patient relationship, communication, history-taking, physical examination, and assessment and plan. The CPX has provided useful information for students, for the curriculum, and for accreditation. The North Carolina medical schools have collaborated with the National Board of Medical Examiners to test the feasibility of the NBME protocol of standardized patients for use in the licensure examination process.

Standardized Patients. OMERD has trained more than 250 standardized patients and has developed over 125 standardized patient cases which are used to: (a) highlight and integrate learning issues from basic, clinical, and behavioral sciences; (b) evaluate physical examination skills; and (c) assess doctor-patient relationship and interviewing skills. Duke also has used SPs in residency programs for medical interviewing courses, educational diagnostic screening, department grand rounds, and many continuing medical education courses locally and nationally.

The Thomas D. Kinney Central Teaching Laboratory. The Thomas D. Kinney Central Teaching Laboratory is located on the fourth floor of the Davison Building where it provides laboratory, demonstration, and conference space for all courses taught in the basic sciences with the exception of gross anatomy. A full-time staff maintains a wide range of equipment and provides supplies and services necessary for the teaching programs in allied health as well as medical education. This enables the academic staff of each department to devote its efforts entirely toward the students.

Six unit laboratories, each accommodating sixteen to eighteen students, are devoted to instruction for the first year. All first year medical students are given space (which they maintain for the entire academic year) in one of these laboratories for their own work. Small laboratories are interspersed between the six unit laboratories and provide space for large pieces of equipment used in conjunction with exercises conducted in the unit laboratories. One large multipurpose laboratory that can accommodate forty or more students and one small room that accommodates twenty students provide space for a variety of teaching exercises. A computer cluster with electronic mail capability is available to students twenty-four hours a day; a twenty-four workstation electronic laboratory is adjacent for computer-assisted educational training for students, faculty, and employees. A new amphitheater and small group rooms in the clinic building complete space for medical student training.

Services provided by the Central Teaching Laboratory include in-house microscope cleaning and repair, exam grading, grade book maintenance, and course evaluation tabulation and reporting. Laptop imaging and help desk support for medical students and physical therapy students are handled through Central Teaching.

Administrative Director: Carol G. Reilly, B.S.

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 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 medical illustration produced by various computer graphics and manual art production methods and techniques. Web Development services include entire site design, information architecture, page design and graphics creation, and programming. Offerings include E-commerce, Lotus Notes, Access and Java Script programming, Internet indexing and search functionality; and hosting of secure web servers for on-line CME activities. Streaming video and audio on the internet and internet-based live broadcasts are also offered.

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 overhead prints and transparencies; graphics creation for slides, prints, and artwork; and graphic design and other creative services for PowerPoint presentations and desktop publishing.

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 promotional or informational 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. Audiotape services, projection services, and equipment rental are also offered.

The Curriculum Materials Development Project staff works with faculty to produce media materials such as on-line course materials, web sites, videotape productions, and computer-assisted instructional programs. These materials may be a regular part of course presentations or may serve as adjuncts to classroom activities.

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 1,124 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. More than 38,000+ patients are admitted annually. Surgical facilities include thirty-five inpatient operating rooms and eight ambulatory surgery rooms in which surgeons perform more than 27,000+ operative procedures annually. Approximately 3,000 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, the employee health service, and the emergency department, with annual total patient visits of more than approximately 1,200,000. 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 clinics.

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 with commendation by the Joint Commission on Accreditation of Healthcare Organizations.

Veterans Administration Medical Center. The Durham Veterans Administration Medical Center, with 435 beds, annually admits over 7,000 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. On July 1, 1998, Durham Regional Hospital became a part of the Duke University Health System through a lease agreement with the County to operate the facility. Durham Regional Hospital is a 451-bed, general, short-term care community facility serving the residents of Durham and surrounding counties. This institution participates in many of the medical and health-related professional training experiences.

Raleigh Community Hospital. Raleigh Community Hospital located in North Raleigh, is a 218-bed acute care facility which became a part of the Duke University Health System on September 5, 1998. Raleigh Community Hospital provides primary and specialty care, including a Sports Medicine Clinic; a Neuro-otolaryngology, Hearing Institute; and a Cardiac Rehabilitation Center.

In addition, Raleigh Community Hospital has a comprehensive childbirth center with a LDRP birthing service, adult and geriatric psychiatric services, and a same day surgery center.

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.

Student Life

THE UNIVERSITY

Duke University, located in Durham, North Carolina, has an enrollment of 11,611 students from all fifty states and from many foreign countries. Currently, Trinity College of Arts and Sciences, the Graduate School, and the Schools of Business Administration, Divinity, Engineering, Environment, Law, Medicine, and Nursing comprise the university.

Durham, with a population of 148,000, 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 twenty-five 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.

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. Floor plans and furnishing lists are sent out in the housing application packet or an application may be found on the Housing Management website at <http://www.housing.duke.edu>.

The Town House Apartments are located approximately 3 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 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. Telephone, cable and data jacks are provided in each apartment. 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 the Department of Housing Management 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. When students are informed of their acceptance to the Medical School, they also receive a postcard on which to indicate preference for university housing. This postcard may be returned to the Department of Housing Management and detailed information on the types of accommodations and application materials will be forwarded to the accepted student. Students may find it more convenient to review housing information and to apply for accommodations on-line through the Housing Management website: <http://www.housing.duke.edu/grad/>. 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. The Department of Housing Management maintains a listing of rental apartments, rooms, and houses provided by property owners or real estate agencies in Durham. These listings are available in the department only; during the summer an assistant is available to answer questions and to aid students in their attempts to obtain housing off campus. Information on commercial complexes in the Durham area may be obtained by indicating a preference for off-campus housing on the postcard which students receive with their acceptance notices. Except for assuring that owners sign a statement of nondiscrimination, off-campus property is in no way verified and neither the university nor its agents negotiate between owners and interested parties.

The search for accommodations should begin as soon as possible after acceptance to the Medical School. A visit of two or three days allows students the opportunity to make use of the off-campus service and to inspect personally the availabilities.

Additionally, Duke Community Housing is an off-campus rental housing resource for graduate and professional students and professional affiliates of Duke University. Duke Community Housing provides tools to help students find off-campus housing options, and information to help them make intelligent decisions about those options. Duke Community Housing is located at 402 Oregon Street, Room 102, telephone 660-1785, email communityhousing@duke.edu. Office hours are 8:30 a.m. to noon and 1:30 p.m. to 5:00 p.m. Monday-Friday.

Dining Facilities. 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>.

SERVICES AVAILABLE

Student Health Service. The Student Health Service is administered by the Department of Community and Family Medicine, Duke University Medical Center. Medical services are provided by board-certified faculty and by physician assistants, nurse practitioners, and resident physicians under faculty supervision.

Duke Family Medicine Center. The D.F.M.C. (684-3180), located on the corner of Erwin Road and Trent Drive in the Marshall Pickens Building, is the primary location for medical care. Students are seen by appointment (681-WELL) Monday-Friday, 8:00 a.m.-5:00 p.m. A wide variety of services are available: general medical care, health education, laboratory, pharmacy, travel and immunization, x-rays, cold/flu self-help table, allergy clinic, and nutrition counseling.

Students are encouraged to use the Duke Family Medicine 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.

For problems arising after hours and on weekends, students should call the Infirmary (684-3367). The nurse may advise the student to come to the Infirmary or to the Duke Emergency Department (684-2413) for further evaluation. In the event of an obvious life-threatening emergency, students should go directly to the Emergency Department. If necessary, Duke Public Safety (call 911 or 684-2444) provides on-campus transportation to the Emergency Department or the Infirmary.

The Infirmary. The 24 hour Infirmary (684-3367), located on the fourth floor of Duke University Hospital South Division, purple zone, provides inpatient treatment of illnesses too severe to manage in the residence hall or apartment, but not requiring hospitalization. Confidential HIV testing, flu shots, walk in assessments, and a cold, flu, allergy self help table and nurse assessments are also provided.

Health Education. This component of the Student Health Service is headquartered at the Healthy Devil Health Education Center in House 0 on West Campus. Health education staff are available to assist students in making informed decisions that promote their health. Topics of concern include alcohol and other drug usage, eating and nutrition, sexual activity and sexually transmitted diseases, stress management, and others. 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 2:00 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 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 written permission.

Student Accident and Hospitalization Insurance. Health insurance is essential to protect against the high cost of unexpected illnesses or injuries which would require hospitalization, surgery, or the services of specialists outside the Student Health Service. Therefore, all students are required to have such insurance. At the beginning of each fall semester, medical students must provide proof to the bursar's office of coverage under an accident and hospitalization insurance policy or purchase the Duke Student Accident and Hospitalization Insurance policy. This insurance policy provides protection twenty-four hours per day during the twelve-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 Associates (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 Service during each enrolled semester. An optional summer health fee for students not enrolled in summer sessions is also available through the bursar's office.

Services Covered by the Health Fee. The health fee covers most of the services at Duke Family Medicine 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 and most associated studies
- annual gynecological exam
- most routine laboratory and x-ray services
- allergy shots
- confidential pregnancy testing
- most medications required for short-term treatment of acute problems
- some immunizations excluding prematriculation immunizations

The health fee covers a variety of other services at D.F.M.C. and other locations:

- health education and health promotion, including nutrition consultation
- infirmary service, not including meals and not including diagnostic testing ordered by specialist consultants
- mental health and career counseling at C.A.P.S.

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 ser-

vice. 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, 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 personal travel
- medications not on the student health formulary and those required for long-term use; contraceptives

Student Health Service: William A. Christmas, M.D., Director, 357 Hanes Hall

Counseling and Psychological Services. Counseling and Psychological Services (C.A.P.S.) is located in Suite 214, Page Building on West Campus. C.A.P.S., 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, family relationships, academic performance, dating, intimacy, and sexual concerns. Ordinarily students are seen for counseling by appointment. If the concern requires immediate attention, a C.A.P.S. staff member assists with the emergency at the earliest possible time.

Each year C.A.P.S. offers a series of counseling, therapy, and support groups. These explore such interests as stress, relationships, awareness of diversity, and management of eating disorders. Support groups have been offered to graduate and professional school women and gay and lesbian students.

Another function of C.A.P.S. 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 C.A.P.S. at 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 three 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.

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 a skilled physician; and demonstrated their fitness to practice medicine by adherence to a high standard of ethical and moral behavior.

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 school.

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

In February, 1995, 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 and the Council on Medical Education of the American Medical Association.

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 two 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 200 - Gross Human Anatomy	4
BIOCHEM 200 - Biochemistry	4
CELLBIO 200 - Cell Biology	2
CELLBIO 201 - Microanatomy	2
CELLBIO 202 - Medical Physiology	4
GENETICS 200 - Genetics	2
INTERDIS 201 - Practice I	1
Total	19
Semester 2	Credit
IMMUNOL 201 - Immunology	2
INTERDIS 201 – Practice I	2
MICROBIO 200 - Microbiology	5
NEUROBIO 202 - Basic Neurobiology	4
PHARM 200 - Pharmacology	4
PATHOL 200 - Pathology	5
Total	22

A vacation takes place after the conclusion of the first year. In addition, every class has Thanksgiving and the day after, Christmas, Martin Luther King, Jr. holiday, and spring break with the exact dates depending upon rotation and class schedules.

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, Orientation to the Clerkship 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.

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. 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 fifteen 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 sixteen weeks each. In addition, the fourth year has an optional summer term, also of sixteen weeks. Successful completion of sixty-four elective credits (typically thirty-two basic science credits during the third year and thirty-two 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 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, or public policy. With rare exception, the elective experience should be taken as a block. During the third year, students are required to complete thirty-two basic science credits.

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 thirty-two clinical science credits during the fourth year. Four of these credits must be completed in an elective requiring direct patient care.

Education Records. 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 nondisclosure 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 nondisclosure 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. Some of this information will be made available as a student directory for use by fellow students, faculty, and School of Medicine staff. In addition, match results for residency placement will also be made available on the web.

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 has 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 at-

testing to high ethical standards in school performance. A detailed version of this is located on the School of Medicine website: <http://www2.mc.duke.edu/som>.

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. A grade of Satisfactory (*S*) or Unsatisfactory (*U*) is used to rate performance in a course for which the award of the grade of H is prohibited.

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 promotions committees composed of course directors (or their designees) from the appropriate departments. Recommendations by these committees are made to the vice-dean for medical education 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 for medical education within two weeks of notification.

The vice-dean for medical education, 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 committee, he or she must submit in writing to the vice-dean for medical education 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 for medical education appoints a Promo-

tions 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 DUMC 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 for medical education 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 is provided to that office. The dean's decision is binding.

Satisfactory Academic Progress. Satisfactory academic progress for students in the School of Medicine is construed 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 fourteen months.

Third to Fourth Year. Completion of thirty-two basic science credits within nine months.

Fourth Year to Graduation. Completion of thirty-two 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 medical education.

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.

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 sixteen week semester is two 8-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 sixteen credits with a maximum registration of eighteen 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 Elective 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.

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 sixty 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 for medical education 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 thirty 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 ninety 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 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 for medical education 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-admission 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-Chapel Hill 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 Federation of State Medical Boards (FSMB) and the National Board of Medical Examiners (NBME) have established a single, three-step examination for medical licensure in the United States. The United States Medical Licensing Examination (USMLE) provides a common evaluation system for applicants for medical licensure." (*USMLE 1997 Bulletin of Information*) Step 1 concentrates on basic science knowledge, Step 2 on fundamental clinical science knowledge, and Step 3 on advanced clinical science knowledge. Steps 1 and 2 can be taken in any order, but must be passed before applying to take Step 3. Of course, a full license requires also 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 Central Teaching Lab Office, 684-5967, for more information. The USMLE website, <http://www.usmle.org> has the actual application. Students typically take Steps 1 and 2 while in medical school. The Dean's Office assists students as they decide the most appropriate times during medical school to take these steps 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.

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 students 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 an application fee (currently \$50, subject to change), a registration fee of \$200, and a student health fee are required. For information write to: Coordinator, Visiting Students, Box 3878, Duke University Medical Center, Durham, North Carolina 27710, or access the Medical School's Registrar's Office at <http://www2.mc.duke.edu/som/romain.html>.

Admission Procedures

Good study habits, intelligence, character, and integrity are essential qualifications for admission. Beyond this, premedical students should strive for an education that develops abilities to observe critically, think analytically, and work independently. Though a knowledge of basic scientific principles should be secured, the competence with which premedical 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 be initiated through the electronic AMCAS application. The application may be accessed at the following website: <http://www.aamc.org/students/>.

Upon receipt of the application from AMCAS, a preliminary screen of the AMCAS application materials at Duke selects competitive candidates to complete the Duke web-based supplemental application. Applications are received after June 1 until November 1, which is 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 absolute deadline for the supplemental application is December 1st. Upon receipt of the supplemental application, two members of the Admissions Committee review all application materials and determine whether or not to invite prospective applicants for interview.

Requirements. Admission to the School of Medicine requires a minimum of ninety 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 during the senior year is encouraged. All science requirements must be completed 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 given in April and August of each year at numerous colleges throughout the United States. If possible, students 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 late February for students entering the following August. Data on each candidate are screened using a computer model of previously matriculated students. Those selected to complete supplemental applications are carefully evaluated by the Committee on Admissions. A personal interview is conducted at Duke for those students 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 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.

Advanced Placement. After acceptance to the School of Medicine, students 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.

Reapplication. Students who wish to apply for a second time 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, reapplicants must make 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 thirty 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 to the Director of Student Health Services, Box 2899 DUMC, Duke University, Durham, North Carolina 27710.

Summary. Three years of college work, a seventy-five dollar (\$75) nonrefundable application fee, a signed agreement within three weeks of notification of acceptance,

and the Medical College Admission Test are required. The estimated, first year class size for 2001-2002 is 100.

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 career 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 \$16,300. 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, biochemistry, cell biology, genetics, immunology, microbiology, 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 Clerkship 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 description 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, Microbiology, Immunology, Neurobiology, Pathology, Pharmacology, Biomedical Engineering, Chemistry, Zoology, Molecular Cancer Biology, and Genetics 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 emailing paoburks@acpub.duke.edu.

The Medicine and Clinical Research Program. 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 Study Program during the third year. This study program requires 12 of the 24 credits of graded course work required for the M.H.S. degree. In the spring of the third year, while completing the requirements of the study program, students may apply as degree candidates for the M.H.S. degree. During the fourth year, students complete the remaining 12 credits of graded course work and the 12-credit research project which serves to demonstrate the student's competence in the use of quantitative methods in clinical research. The fifth and final year is spent completing the elective clinical science work that is tailored to the student's specialized needs.

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 should contact the Program Director, William E. Wilkinson, Ph.D., at 681-4560 or email: crrtp@mc.duke.edu, to discuss their interests and to obtain instructions regarding the application procedure.

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. Though the third and fourth years remain elective years for all medical students, Prima-

ry 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 of clinical electives, students are encouraged to take the basic neurology clerkship, 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 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 dean for medical education 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 are 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@acpub.duke.edu.

The Medicine and Business Administration Program. The Duke School of Medicine and the Fuqua School of Business jointly sponsor a program of combined medical and business administration education. The program provides an opportunity to acquire a full basic study of the two fields within five years. 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 curriculum is the same as that of other M.B.A. students. After the completion of two semesters, the student returns (commonly in the month of May) to the School of Medicine to begin the first half of an eight month scholarly experience through, typically, the Epidemiology and Public Health Study Program or the Clinical Research Study Program. In the fall of that year (the beginning of the fourth year), the student continues enrollment in the School of Medicine but returns to the School of Business to complete course work. During the

spring of the fourth year, the student completes the second four months of the scholarly activity period. The fifth and final year is spent at completing 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. Application forms for the Fuqua School of Business may be obtained by writing to the Office of Admissions, Duke University Fuqua School of Business, Box 90104, Duke University, Durham, NC 27706. Applications for the School of Medicine should be made by utilizing the MCATS 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 and Adele Spitz Roth, Ph.D., Fuqua School of Business, Box 90120, Duke University, Durham, NC 27706, roth@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 at which 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. A total of seventy-four credits must be earned in the Law School. The final time is spent in the Medical School completing elective basic science and elective clinical science work that is tailored to the student's specialized needs.

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. Neither school gives preference to joint degree candidates in the admissions process.

Application Procedure. Application forms for the School of Law may be obtained by writing to the Office of Admissions, Duke University School of Law, 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 take the new 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.

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. Upon receipt of the M.P.H. degree, students are awarded a full year of basic science credit toward the M.D. degree.

For additional information contact the Director of the M.D./M.P.H. Program, Laurence G. Branch, Ph.D., Box 3003, Duke University Medical Center, Durham, North Carolina 27710, (919) 660-7554, lgbranch@geri.duke.edu.

The Medicine and Public Policy Program. This program is offered to meet the growing demand for persons who combine medical skills and training 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. Such leadership might be provided as an elected or career public official, as a leader of medical professional organizations, or as a practicing physician or medical scholar active in public affairs.

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 have a twelve-week policy internship. During the fourth year, students complete their requirements in the School of Medicine and write a "master's memo" for the Institute. When they have completed all the requirements for the two programs, both the M.D. and Master of Public Policy (MPP) degrees are awarded.

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./MPP Program, Laurence G. Branch, Ph.D., Box 3003, Duke University Medical Center, Durham, North Carolina 27710, (919)660-7554, email: *lgbranch@geri.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 which 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 \$38,850 for a fourth year student to \$47,330 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.

2000-2001 Cost of Education

Tuition	27,600
Accident and Sickness Insurance* (subject to change)	847
Laptop computer rental fee	1,650
First Year Fee† (includes microscope rental, first year only)	275
Annual Cost of Books and Supplies: first year	2,340
Annual Cost of Books and Supplies: second year	1,590
Annual Cost of Books and Supplies: third and fourth years	710
Rent: first year	5,130
Rent: second year	5,550
Rent: third and fourth years	3,420
Board: first year	4,170
Board: second year	4,520
Board: third and fourth years	3,420
Student Health Service* (per semester)	230
Student Government* (Davison Society)	50

*Mandatory fees.

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

Continuation of Enrollment Fee* (per semester)	35
Graduate Student Fee*	19
Motor Vehicle Registration: car	120
Motor Vehicle Registration: motorcycle	45

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 satisfactory progress 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. 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.

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 Vice-Dean for Medical Education to receive a maximum of thirty-two elective, basic science credits to be applied to the third year M.D. curriculum. Students granted sixteen transfer credits are given allowance for one tuition payment. Those granted thirty-two 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.

Combined 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.

- *Master of Health Science in Clinical Research and Master of Public Health Programs*

Students register for these two programs at Duke for third year credit and are assessed the usual tuition and fees. The Medical School Registrar's Office reimburses UNC and the CRT Program for tuition and mandatory fees for participating students for a maximum period of one calendar year. Students who continue to enroll in courses in these master's programs after the expiration of one calendar year must request leaves of absence from the School of Medicine. During these periods, such students are billed

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

directly by the master's programs at those programs' regular tuition rates and are responsible for making payment.

- *Doctor of Philosophy and Master of Public Policy Programs*

Students take leaves of absence from the School of Medicine to enroll in Duke's Graduate School. Upon award of the MPP or Ph.D. 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 MPP or Ph.D., must pay the Medical School for four years of tuition and do not earn transfer credit for work completed in the alternate program.

- *Juris Doctor and Master of Business Administration Programs*

Students in these programs are required to complete the entire Medical School curriculum, but are permitted to arrange their schedules such that third year requirements may not 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 5 credits of third year work in the Medical School.

Payment of Accounts. Monthly invoices for tuition, fees, and other charges are sent by the bursar's office and are payable upon receipt but no later than the invoice due date. As a part of the agreement of admission to Duke University, a student is required to pay all invoices as presented. If full payment is not received by the invoice due date, a late payment charge as described below is assessed on the next invoice and certain restrictions as stated below will be applied. Failure to receive an invoice does not warrant exemption from the payment of tuition and fees nor from the penalties and restrictions. Nonregistered students will be required to make payment at the time of registration for tuition and fees and any past due balance on the account.

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. The participation fee can be paid by Visa or MasterCard. 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 twelve months. The monthly payments can be increased or decreased without additional cost.

Late Payment Charge. If the "Total Amount Due" on an invoice is not received by the invoice due date, the next invoice 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 Duke University Human Resources Office.

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 Enrollment 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.

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

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. After graduation from the School of Medicine, transcripts of deans letters may also be obtained from the Office of the Registrar. There is no charge for either service.

LIVING ACCOMMODATIONS

Housing Costs. For the 2001-2002 academic year, rental rates and occupancy dates for the first-year medical student are available on the Housing Management website: www.housing.duke.edu. Utility charges, except telephone, are included in these rates. Rates are per person per academic year.

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. Dining and FLEX are two prepaid accounts which allow students to make purchases with their DukeCard at 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://auxweb.duke.edu/DukeCard>.

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 \$120 for each four-wheeled motor vehicle and \$45 for each motorbike or motor scooter registered. Bicycles are registered free of charge at the Public Safety Department, 2010 Campus Drive.

To register a vehicle, the student must present a valid state registration for each vehicle registered and a valid state operator's license.

Parking, traffic, and safety regulations are given each student at the time of registration of the vehicle(s). Students are expected to abide by these regulations.

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 criteria for selection; however, applicants who feel their financial need is greater than the merit award may apply for financial aid.

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. Eight 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 thirty-two 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 twelve months is required for the research experience. These scholarships are coordinated through the Student Research Scholarship Committee.

Eugene A. Stead Student Research Scholarships

The Eugene A. Stead Scholarship is sponsored by the Duke Department of Medicine 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.

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 twelve-month program which is conducted away from 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>.

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 nonprofit 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 Third Year Scholarship Committee chairperson.

Hughes Medical Research Training Fellowships

This program is in its tenth year and selects sixty 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 early December. 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 web site: <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>.

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 2000 it was \$1,250/month. 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, phone 919-681-6774, email: reyno010@mc.duke.edu.

NIH Clinical Research Training Program

The NIH offers fellowships for training at NIH in clinically related areas. 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/crtp>.

There are many other foundations such as the Pew Program, Arthritis Foundation, the Pharmaceutical Manufacturers Foundation, and Fight for Sight, that support student research scholarship programs and are approved for Duke University School of Medicine credit.

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 1st. 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. Upperclassmen seeking financial assistance for the first time may consult with the director of financial aid.

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) was formerly known as US Health Professions Student Loan (HPSL). 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.

North Carolina Board of Governors Medical Scholarships. Board of Governors Medical Scholarships (BGMS) are awarded annually to twenty 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.

Loans

University loans are available under the specific restrictions of the loan funds and are awarded on the basis of financial need. Some of them are: W. K. Kellogg Foundation Loan Fund, Seaborn L. Hardman Loan Fund, Medical Freshman Tuition Loan, Scott Loan Fund, Charles W. Banner Loan Fund, Carl Perkins Student Loans, Radiological Science Medical Student Loan Fund, U. S. Health Professions Student Loans, and Primary Care Loans.

The Francis and Elizabeth Swett Loan Fund is an emergency loan available in small amounts to any medical student on a no-interest basis for a short period of time.

Loans from Outside the University

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. For current medical students, the total maximum unsubsidized loan is \$38,500. The aggregate maximum is \$189,125, a combination of subsidized and unsubsidized loans. 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 which 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 F.A.F.S.A.

Additional information may be obtained by writing to Office of Financial Aid, Box 3067 DUMC, Durham, North Carolina 27710.

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 thirty 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 criteria 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.
External Affairs: Patrick Lee

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, treasurer, and intramural sports chairman) 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 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 the pertinent faculty and administration. The Davison Council also coordinates medical student projects with community service groups such as Habitat for Humanity, Share Your Christmas, AIDS Volunteer Network, Durham Community Kitchen, 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 American Medical Student Association, the North Carolina Student Rural Health Coalition, the North Carolina Medical Society Student Chapter, the Student National Medical Association, *Shifting Dullness* (the medical student newspaper), the Christian Medical and Dental Society, the Asian-American Medical Student Association, the Duke Jewish Medical Student Association; Student Curriculum Committee, Duke Comprehensive Cancer Center Volunteer Network, AIDS Education Roadshow, Lennox Baker Children's Hospital Program, Duke Medical Gleaning Program, Homeless Shelter Clinic, Children's Miracle Network Fair, Family Medicine Interest Group, the *Aesculapian* (yearbook), American Medical Women's Association, the Mind-Body Interest Group, OB-GYN Interest Group, Neurology Interest Group, Emergency Medicine Interest Group, and the N.C. Wilderness Club.

Meetings of the council occur every two weeks. 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, the Davison Ball, is held in the fall.

President: Bill Wood
Social Chairman-Vice-President: Ali Raja
Service Chairman-Vice-President: Sara Pasquali
Secretary: Ryan Hick
Treasurer: Patrick Hu
IM Chairman: Brent Townsend

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 5,000 Duke School of Medicine graduates and 5,800 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; the "History of Duke Medicine", a program during Medical Alumni Weekend that focuses attention on the Medical Center's unique history; 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; and distribution of the publications, *Perspectives and Medical Alumni News*.

President: William D. Bradford, M.D., H.S. 1965-66, Durham, North Carolina
President-Elect: L. Thompson Bowles, T '53, M.D. '57, Chevy Chase, Maryland
Ellen R. Luken, Executive Director, Medical Alumni Affairs

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, medallion, 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 stu-

dents 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.

Courses of Instruction

ANESTHESIOLOGY

Professor Joseph G. Reves, M.D. (Med. Univ. of South Carolina, 1969), M.S. (Alabama at Birmingham, 1973), Chairman.

Professors: Peter B. Bennett, Ph.D., D.Sc. (Univ. of Southampton, 1984); D. Ryan Cook, M.D. (Univ. of Pittsburgh, 1966); Frank H. Kern, M.D. (Pennsylvania, 1987); Richard E. Moon, M.D., C.M. (McGill, 1973); William J. Murray, Ph.D. (Wisconsin, 1955); M.D. (North Carolina at Chapel Hill, 1962); Mark F. Newman, M.D. (Louisville, 1985); 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. (Univ. of Groningen, 1976).

Associate Professors: Helene Benveniste, M.D., Ph.D. (Univ. of Copenhagen, 1986, 1991); 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. (Univ. of Witwatersrand, 1975); Madan M. Kwatra, Ph.D. (Univ. of Montreal, 1977); Catherine K. Lineberger, M.D. (North Carolina at Chapel Hill, 1987); David A. Lubarsky, M.D. (Washington, 1984); Jonathan B. Mark, M.D. (Stanford, 1978); Joseph P. Mathew, M.D. (Southwestern Med. School, 1986); Jon N. Meliones, M.D. (Tufts, 1984); Robert L. Reed, M.D. (Virginia, 1976); Scott R. Schulman, M.D. (George Washington Univ., 1982); Sidney A. Simon, Ph.D. (Northwestern, 1973); Mark Stafford Smith, M.D., C.M. (McGill Univ., 1983); John Sum-Ping, F.R.C.A., M.B. (Univ. of Manchester, 1978), Ch.B. (Royal College of Anesthetists, 1984).

Associate Clinical Professors: Guy de Lisle Dear, M.B., F.R.C.A. (St. George's Hospital, 1979); Roy A. Greengrass, M.D., F.R.C.P.(C) (Univ. of Manitoba, 1973); Peter C. Huttemeier, M.D., Ph.D. (Univ. of Copenhagen, 1977, 1989); John C. Keifer, M.D. (North Carolina at Chapel Hill, 1979); Kerri M. Robertson, M.D., F.R.C.P.(C) (Univ. of British Columbia, 1980); Dianne L. Scott, M.D. (North Carolina at Chapel Hill, 1978); Susan Steele, M.D. (Illinois, 1983).

Assistant Professors: Elizabeth A. Bell, M.D. (North Carolina at Chapel Hill, 1990); John V. Booth (N/A); Terrance W. Breen, M.D. (University of British Columbia, 1985); John B. Eck, M.D. (Duke, 1992); Joel S. Goldberg, M.D. (Duke, 1977); Katherine P. Grichnik, M.D. (Tufts, 1987); Hilary Grocott, M.D. (Univ. of Saskatchewan, 1991); Lewis R. Hodgins, M.D. (New York, Downstate, 1985); Stephen M. Klein, M.D. (New Jersey Med. Sch., 1992); Holly A. Muir, M.D., F.R.C.P.(C) (Dalhousie Univ., 1983); Laura Niklason, M.D. (Univ. of Chicago, 1988), Ph.D. (Univ. of Michigan, 1991); Claude Piantadosi, M.D. (Johns Hopkins, 1975); James D. Reynolds, Ph.D. (Queen's Univ., 1994); Allison L. Ross, M.D. (Marshall, 1988); Thomas F. Slaughter, M.D. (Duke, 1987); Jacques Somma, M.D. (Universite de Montreal, 1991); Bryant W. Stolp, M.D. (North Carolina at Chapel Hill, 1988); Jeffrey M. Taekman, M.D. (Wake Forest, 1991); Barbara E. Tardiff, M.D. (Yale, 1983); Christopher C. Young, M.D. (New York Med. Coll., 1987).

Assistant Clinical Professors: Francine D'Ercole, M.D. (Med Coll. of Penn., 1989); Peter D. Dwane, M.D., C.M. (McGill Univ., 1967); Jennifer T. Fortney, M.D. (Maryland, 1978); H. David Hardman, M.D. (Minnesota, 1981); Steven Hill, M.D. (Vanderbilt, 1986); Katherine P. King, M.D. (North Carolina at Chapel Hill, 1988); Nancy W. Knudsen, M.D. (Univ. of Missouri, 1991); Andrew F. Meyer, M.D. (New York, Downstate, 1969); Adeyemi J. Olufolabi, M.B., B.S., F.R.C.A. (Coll. of Med. Univ. of Ibadan, 1986); Stephen Parrillo, M.D. (Univ. of Bologna, 1982); Mark L. Phillips, M.D. (Bowman Gray, 1980); Ziaur Rahman, M.B., B.S. (Prince of Wales Medical Center, 1968); Dana N. Wiener, M.D. (Duke, 1989).

Assistant Research Professors: Nadia M. Agopyan, Ph.D. (McGill Univ., 1990); Barry W. Allen, Ph.D. (Duke, 1984); Lieju Liu, M.D., M.B., M.S. (Tongji Med. Univ., 1978, 1981); Gregory A. Michelotti, Ph.D. (Univ. of South Carolina, 1992); Richard Vann, Ph.D. (Duke, 1976); Jantje Margaretha Oortgiesen, Ph.D. (Utrecht Univ., 1989); 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, Khartoum, Sudan, 1980).

Associates: Alexis Carmer, M.D. (Univ. of North Dakota, 1993); Anne Marie Fras, M.D. (Univ. of Michigan, 1993); Carolyn M. Garduno, M.D. (Georgetown, 1993); Veeraindar Goli, M.B., B.S. (Osmania Med. Coll., 1978); James D. Gould, M.D. (State Univ. of New York, 1994); Billy K. Huh, M.D. (Univ. of Alabama, 1993), Ph.D. (Georgia Institute of Technology, 1985); Richard L. Jacobs, II, M.D. (Univ. of Michigan, 1985); Stephen P. Kantrow, M.D. (Louisiana State Univ., 1988); David R. Lindsay, M.D. (Univ. of Maryland, 1994); Ellen M. Lockhart, M.D. (Univ. of Texas-Southwestern, 1993); David B. MacLeod, M.B., B.S., F.R.C.A. (Univ. of London, 1987); Eugene W. Moretti, M.D. (Temple Univ., 1993); Karen Nielsen, M.D. (Univ. Federal Do Parana, 1995); Iain Sanderson, M.A., M.Sc., F.R.C.A. Anaes. (Oxford Univ., 1985); Timothy O. Stanley, M.D. (FUHS/The Chicago Med. Sch., 1995); John R. Schultz, M.D. (Loma Linda Univ., 1991); Allan B. Shang, M.D. (Univ. of Vermont, 1993); Gautam Sreeram, M.D. (Emory, 1993); Ian James Welsby, M.B.B.S., BSc., F.R.C.A. (Middlesex Hosp. Med. Sch., 1990); Bo Wu, M.D. (China Med. Univ., 1985).

Clinical Associate: Thomas E. Buchheit, M.D. (Emory Univ., 1994).

Visiting Associates: Mark J. Bennett, M.B., Ch.B., F.R.C.A., M.A. (Univ. of Liverpool, 1990); Daniel T. Bainbridge, M.D. (Univ. of Saskatchewan, 1995); George N. Djaiani, M.D. (Med. Academy of Latvia, 1986); John G. Ellingham, M.B.B.S., F.A.N.Z.C.A. (Monash Univ., 1989); Ashraf S. Habib, M.B., B.Ch., M.Sc. Anaesth., F.R.C.A. (Ain Shams Univ., 1987); Richard Ing, M.B., Ch.B., F.A.(S.A.) (Univ. of Witwatersrand, 1988); Gavin Martin, M.B., Ch.B., F.R.C.A. (Univ. of Cape Town with Association Groote Schuur Hospital, 1989); Brian J. McCreath, M.B., Ch.B. (Univ. of Glasgow, 1995); James A.L. Pittman, M.B.B.S., B.Sc., F.R.C.A. (King's College, 1992); Madhav Swaminathan, M.D. (Univ. Coll. of Med. Science and Gru Teg Bahadur Hosp., 1988); David R. Wright, B.M., F.R.C.A. (Southampton Univ., 1990).

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

Adjunct Associate Professor: Randall L. Carpenter, M.D. (Univ. of Michigan, 1978).

Adjunct Assistant Professors: Wayne A. Gerth, Ph.D. (California at 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. (Texas at San Antonio, 1980), Ph.D. (Texas at San Antonio, N/A).

Assistant Consulting Professors: John D. Buckwalter, M.D. (North Carolina at Chapel Hill, 1982); Frederick J. Carpenter, M.D. (Wisconsin, 1982); John J. Freiberger, M.D. (Southwestern, 1979); Scott Thomas Howell, M.S., M.D. (Duke, 1986, 1990); James R. Jacobs, M.D. (Duke, 1985), Ph.D. (Univ. of Alabama, 1987); Moya E. Kileff, M.D. (Univ. of Birmingham, 1973); Gerald A. Maccioli, M.D., F.C.C.M., (Univ. of Nevada, 1984); Judith O. Margolis, M.D. (Colorado, 1984); Edward Burt McKenzie, Jr., M.D. (North Carolina at Chapel Hill, 1985); C.P. Reddy Parvata, M.D. (Inst. of Med. Sciences, 1966); Gary L. Pellom, M.D. (North Carolina at Chapel Hill, 1984); Edward G. Sanders, M.D. (North Carolina at Chapel Hill, 1985); Paul V. Stankus, M.D. (North Carolina at Chapel Hill, 1976); Thomas E. Stanley, III, M.D. (Duke, 1981); Cathy N. Thomas, M.D. (North Carolina at Chapel Hill, 1984); Rolf B. Wallin, M.D. (North Carolina at Chapel Hill, 1984).

Consulting Associates: David S. Bacon, M.D. (Duke, 1990); James L. Caruso, M.D. (Univ. of Illinois, 1988); James M. Chimlak, M.D. (North Carolina at Chapel Hill, 1986).

Research Associates: Mitsuo Aono, M.D. (Mie University, 1990); Ivan T. Demchenko, Ph.D. (Institute of Physiology, 1970), D.Sc. (Institute of Evolutionary Physiology, 1979); Petar J. Denoble, M.D. (Univ. of Zagreb, 1975); Yung-Wei Hsu, M.D. (Taipei Med. Coll., 1992); Yoshihide Miura, M.D. (Yamagata Univ., 1989); Barbara Phillips-Bute, Ph.D. (Duke Univ., 1988); Neal W. Pollock, Ph.D. (Florida State Univ., 1996); Mona A. Razik, Ph.D. (North Carolina at Chapel Hill, 1996); Yukie Sato, M.D. (Yamagata Univ., 1990); Benalata Sen, Ph.D. (Michigan Technological Univ., 1999); Kengo Warabi, M.D. (Juntendo Univ., 1993); Keisuke Yamaguchi, M.D. (Jutendo Univ., 1993).

Emeriti: Edmond C. Bloch, M.B., Ch.B. (Univ. of Cape Town, 1946); Elisabeth J. Fox, M.B., B.S. (London Univ., 1955); Merel H. Harmel, M.D. (Johns Hopkins, 1943); Joannes H. Karis, M.D. (State Univ. of Utrecht, 1952); Lloyd F. Redick, M.D. (Ohio State, 1958); Kenneth Sugioka, M.D. (Washington Univ., 1949); Stanley W. Weitzner, M.D. (New York Univ., 1953).

Visiting Scholar: Lynda Carroll, M.B.B.Ch. (Univ. of Witwatersrand, 1974).

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 anesthetic 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 to 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 an-

esthesia 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 offered September to December; January, February, March, and May. Credit: 4. Enrollment: max 6, min 2. *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 sub-interns in the Surgical Intensive Care Unit (SICU). Students are re-assigned 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*

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 operation of pressure vessels for human occupancy, life support equipment, and sham treatment of medical problems. Prerequisites: Human anatomy and physiology; diving techniques; equipment and procedures; diving physiology; dysbaric diseases; and treatments. Prerequisites may be met by previous training courses, or self-study with instructor permission. Permission of instructor is required. Credit: 3 without lab; 4 with lab. Enrollment: max 12, min 6. *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); Perry Blackshear, M.D., Ph.D. (Ph.D. Oxford 1974; M.D., Harvard, 1977); Patrick Casey, Ph.D. (Brandeis, 1986); Arno Greenleaf, Ph.D. (Harvard, 1974); Gordon Hammes, Ph.D. (Wisconsin, 1959); James B. Duke Professor Robert L. Hill, Ph.D. (Kansas, 1954); Tao Hsieh, Ph.D. (California at

Berkeley, 1976); 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. (MIT, 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); Russel E. Kaufman, M.D. (Ohio State, 1973); Kenneth Kreuzer, Ph.D. (Univ. Chicago, 1978); Terrence Oas, Ph.D. (Oregon, 1986); Eric Toone, Ph.D. (Toronto, 1988).

Assistant Professors: Daniel Gewirth, Ph.D. (Yale, 1988); Michael Hershfield, M.D. (Pennsylvania, 1967); Meta Kuehn, Ph.D. (Washington U., 1993); Johannes Rudolph, Ph.D. (MIT, 1993); John D. York, M.D. (Washington U., 1993).

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

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

Research Assistants: Dwayne Allen, Ph.D.; Ines Batinic-Haberle, Ph.D.; David Benson, Ph.D.; Keith Bljornson, Ph.D.; Leonard Blackwell, Ph.D.; Steven Breazeale, Ph.D.; Vickers Burdett, Ph.D.; Sherry Carty, Ph.D.; Sihong Chen, Ph.D.; Wen Chen, Ph.D.; Shean-Tai Chiou, Ph.D.; Kent Christiansen, Ph.D.; David Conrad, Ph.D.; Robert De Lorimier, Ph.D.; William Doerrier, Ph.D.; Jochen Genschel, Ph.D.; Kendra Hightower, Ph.D.; Margaret Kanipes, Ph.D.; Snehalatha Karnam, Ph.D.; Silke Leimkuhler, Ph.D.; Stefan Liotchev, Ph.D.; Dan Liu, Ph.D.; Ayako Matsumoto, Ph.D.; Donald Mika, Ph.D.; Jeffrey Myers, Ph.D.; Chad Paavola, Ph.D.; Juan Perez-Vilar, Ph.D.; Nanette Que, Ph.D.; Anthony Ribeiro, Ph.D.; I-Hung Shih, Ph.D.; Claudia Spampinato, Ph.D.; Ivan Spasojevic, Ph.D.; Hope Taylor, Ph.D.; Jeffrey Taylor, Ph.D.; Tasado-Acevedo, Ph.D.; Stephen Trent, Ph.D.; Ronald Venters, Ph.D.; Shuntai Wang, 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.; Bernard Kaufman, Ph.D.; Kenneth S. McCarty, Sr., Ph.D.; Yashiko Nozaki, Ph.D.; Robert W. Wheat, Ph.D.

Required Course

BIOCHEM-200B. Biochemistry. The core course given to all freshman medical students during a period of seven weeks in the first term 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. Credit: 4. *Raetz*

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*

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).

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 Univ., 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*

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. (UNC-Chapel Hill, 1968), Interim Chair.

Professor: Stephen L. George, Ph.D. (Southern Methodist, 1969).

Associate Professors: Elizabeth R. DeLong, Ph.D. (UNC-Chapel Hill, 1979); James E. Herndon, II, Ph.D. (UNC-Chapel Hill, 1988); Kerry L. Lee, Ph.D. (UNC-Chapel Hill, 1974); Gary L. Rosner, Sc.D. (Harvard, 1985); Gregory Samsa, Ph.D. (UNC-Chapel Hill, 1988).

Associate Research Professor: Victor Hasselblad, Ph.D. (UCLA, 1967).

Assistant Professors: Terry Cox, M.D. (Univ. of Kansas, 1999), Ph.D. (UNC-Chapel Hill, 1995);

David M. DeLong, Ph.D. (UNC-Chapel Hill, 1977); Susan Halabi, Ph.D. (Texas, 1994); Carl F. Pieper, Dr.P.H. (Columbia, 1990); Daohai Yu, Ph.D. (Univ. of Michigan, 2000).

Assistant Research Professors: Laura P. Coombs, Ph.D. (Oklahoma State Univ., 1999); Habib El-Moalem, Ph.D. (UNC-Chapel Hill, 1995); Alaattin Erkanli, Ph.D. (Carnegie Mellon Univ., 1991); Steven C. Grambow, Ph.D. (Univ. of Kentucky, 1998); Cynthia L. Green, Ph.D. (NC State, 1999); Edwin S. Iversen, Ph.D. (Yale Univ., 1995); Maragatha Kuchibhatla, Ph.D. (Texas AandM, 1992); Lauren M. McIntyre, Ph.D. (NC State Univ., 1995); Lawrence H. Muhlbaier, Ph.D. (UNC-Chapel Hill, 1981); Donna Niedzwiecki, Ph.D. (Yale, 1984); Maren K. Olsen, Ph.D. (Pennsylvania State Univ., 1999); Bercedis L. Peterson, Ph.D. (UNC-Chapel Hill, 1986); Jennifer Shoemaker, Ph.D. (NC State Univ., 1998); Sandra Stinnett, Dr.P.H. (UNC-Chapel Hill, 1993).

Research Associate: Cynthia J. Coffman, Ph.D. (NC State Univ., 1997).

Adjunct Professors: Barbara S. Hulka, M.D. (Columbia, 1995), M.P.H. (Columbia, 1961); Anastasios A. Tsiatis, Ph.D. (California at Berkeley, 1974).

Adjunct Associate Professors: Mark R. Conaway, Ph.D. (Minnesota, 1985); Frank E. Harrell, Jr., Ph.D. (North Carolina, 1979).

Adjunct Assistant Professor: Gina R. Petroni, Ph.D. (Michigan, 1990).

Assistant Consulting Professor: Lawrence Myers, Ph.D. (California at Berkeley, 1972), Research Triangle Park, NC.

Electives

CRP-230B. Fundamental Concepts of Clinical Research. The goals for this course are to provide future clinician-investigators a basic understanding of the methodological considerations necessary for clinical research. The topic areas include: issues related to research design; diagnostic test use; clinical trials with an emphasis on experimental methodology and therapeutic efficacy; cohort studies with a focus on the proper structure of natural history studies; issues relating to disease causation, contrasting case-control and cohort methodologies; issues concerning patient selection and other biases in analytic research. Credit: 2. *Staff*

CRP-240B. Fundamental Concepts of Biostatistics. This course is an introduction to the fundamental concepts in biostatistics and their use in medical research. Through directed readings and discussion of representative research reports from peer-reviewed journals, students will be 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. The goal of the course is for students to develop an understanding of these basic concepts that will enable them to discuss statistical issues related to their research and to acquire some facility in critically evaluating the medical literature. Credit: 2. *Staff*

CRP-241B. Introduction to Statistical Methods. An introduction to the concepts of statistical estimation and hypothesis testing as applied in clinical research. Topics include probability distributions, descriptive statistics, graphical displays, parametric and non-parametric tests for differences in central tendency, paired comparisons and correlation, simple linear regression, one-way analysis of variance, and logistic regression. Types of study designs and epidemiological concepts are woven into the statistical presentation. Several medical articles are critiqued to foster evaluation of the literature and to demonstrate proper application of statistical techniques. In addition, basic concepts and procedures of SAS are presented for computation of the statistical measures presented in the course. Credit: 4. *Staff*

CRP-242B. Principles of Clinical Research. General principles and issues in clinical research design. Formulating the research objective and the research hypothesis; specifying the study population, the experimental unit and the response variable(s). Classification of studies as experimental or observational, prospective or retrospective, case-control, cross-sectional, or cohort; their relative advantages and limitations and the statistical methods used in their analysis. 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. Prerequisites: CRP-241B. Credit: 4. *Staff*

CELL BIOLOGY

James B. Duke Professor Harold P. Erickson, Ph.D. (Johns Hopkins, 1969), Chairman.

Associate Professor Jo Rae Wright, Ph.D. (West Virginia, 1981), Chief, Division of Physiology and Cellular Biophysics.

Professors: G. Vann Bennett, M.D. (Johns Hopkins, 1976); Celia Bonaventura, Ph.D. (Texas at Austin, 1968); Joseph Bonaventura, Ph.D. (Texas at Austin, 1968); James B. Duke Professor Marc G. Caron, Ph.D. (Miami, 1973); Diane L. Hatchell, Ph.D. (Marquette, 1968); Daniel P. Kiehart, Ph.D. (Pennsylvania, 1979); Thomas J. McIntosh, Ph.D. (Carnegie Mellon, 1973); R. Bruce Nicklas, Ph.D. (Columbia, 1958); Michael K. Reedy, M.D. (Washington, 1962).

Associate Professors: Onyekwere E. Akwari, M.D. (Southern California, 1970); Nels C. Anderson, Ph.D. (Purdue, 1964); Blanche Capel, Ph.D. (Pennsylvania, 1989); Frederick R. Cobb, M.D. (Mississippi, 1964); Jonathan Cohn, M.D. (Rockefeller, 1978); Joseph M. Corless, M.D., Ph.D. (Duke, 1972); 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).

Assistant Professors: Page A. W. Anderson, M.D. (Duke, 1963); Lawrence Barak, M.D., Ph.D. (Michigan, 1982); Marc K. Drezner, M.D. (Pittsburgh, 1970); Richard G. Fehon, Ph.D. (Washington, 1986); James M. Grichnik, M.D., Ph.D. (Harvard, 1990); John A. Klingensmith, Ph.D. (Harvard, 1993); William E. Kraus, M.D. (Duke, 1982); Haifan Lin, Ph.D. (Cornell, 1990); Brian S. McKay, Ph.D. (Medical College, Wisconsin, 1995); Erik Meyers, M.D. (California at San Diego, 1990); Patricia M. Saling, Ph.D. (Pennsylvania, 1979); Sean P. Scully, M.D. (Rochester, 1986); Jonathan S. Stamler, M.D. (Mt. Sinai, 1985); Bryant W. Stolp, M.D. (North Carolina, 1988), Ph.D. (Duke, 1985); William E. Yarger, M.D. (Baylor, 1971).

Associate Research Professor: E. Ann LeFurgey, Ph.D. (North Carolina, 1976).

Assistant Research Professors: Rodney Folz, M.D. (Washington, 1989); Bruce M. Klitzman, Ph.D. (Virginia, 1979); Bruce Lobaugh, Ph.D. (Pennsylvania State, 1981); Emmanuel C. Opara, Ph.D. (London, 1984); Katherine I. Swenson, Ph.D. (Washington, 1983).

Adjunct Assistant Professors: Leslie A. Lobaugh, Ph.D. (Duke, 1986); Elizabeth Murphy, Ph.D. (Pennsylvania, 1980); R. Neal Shepherd, Ph.D. (Duke, 1975).

Emeriti: 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.; Knut Schmidt-Nielsen, Dr.Phil.; George Somjen, M.D.

Required Courses

CELLBIO-200B. Cell and Tissue Biology. Lectures on 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. Credit: 2. *McIntosh and staff*

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. *N. Anderson and staff*

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. Credit: 3. Spring. 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. Credit: 4. *Erickson 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 involv-

ing signaling pathways. Credit: 3. Enrollment: 50. *Caron, Casey, Pendergast, York, Van-Dongen, Heitman, McDonnell, Means, Shenolikar, and Kornbluth*

COMMUNITY AND FAMILY MEDICINE

Clinical Professor: James L. Michener, M.D. (Harvard, 1978), *Chairman*.

Professor: Truls Ostbye, M.D. (Univ. of Bergen, Norway, 1979), M.P.H. (Harvard Univ., 1983); George R. Parkerson, Jr., M.D. (Duke Univ., 1953), M.P.H. (UNC-Chapel Hill, 1977).

DIVISION OF COMMUNITY HEALTH

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

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

Assistant Consulting Professor: Gwendolyn C. Murphy, Ph.D. (UNC-Chapel Hill, 1993).

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

DIVISION OF CLINICAL INFORMATICS

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

Professor: William E. Hammond, Ph.D. (Duke, 1967)

FAMILY MEDICINE PROGRAM

Clinical Professors: Lloyd Michener, M.D. (Harvard, 1978), *Division Chief and Chair*; Kathryn A. Andolsek, M.D. (Northwestern, 1975).

Associate Professors: Robert J. Sullivan, Jr., M.D. (Cornell, 1966), M.P.H. (UNC-Chapel Hill, 1973).

Associate Clinical Professors: William Christmas, M.D. (Boston, 1965); Joseph Green, Ph.D. (Univ. of Illinois, 1975); Victoria Kaprielian, M.D. (Calif. at LA, 1985); Kimberly S. Yarnall, M.D. (Florida, 1985).

Assistant Clinical Professors: Andrew A. Bonin, M.D. (Duke, 1975); Joyce A. Copeland, M.D. (North Carolina, 1975); Margaret Gradison, M.D. (Univ. of Cincinnati, 1981); Janet H. Keating, M.D. (Missouri, 1987); Ronald P. Olson, M.D. (Univ. of Calgary, 1986); William Purdy, M.D. (Case Western Univ., 1977); Sarah Ro, M.D. (Loma Linda Univ., 1991); Barbara L. Sheline, M.D., M.P.H. (UNC-Chapel Hill, 1984); Lawrence R. Wu, M.D. (Duke, 1982).

Clinical Associates: Chika Akera, M.D. (Univ. of Minnesota, 1995); Franca Alphin, M.P.H. (UNC-Chapel Hill, 1989); Warren A. Blackburn, M.D. (Uniformed Svcs., Univ. of Hlth. Sciences, 1982); Katie B. Dore, PA-C (Duke, 1991); Richard T. Ferro, M.D. (Robert Wood Johnson Med. School, 1994); Janet Lehr, M.D. (Florida, 1982); James A. Mergy, M.D. (Univ. of CA-San Francisco, 1987); Almaz Smith, M.D. (Univ. of TX-San Antonio, 1992); Anthony Smith, Ph.D. (Southern Illinois Univ.-Carbondale, 1996); Robert M. Smith, M.D. (Univ. of Pittsburgh, 1997); Philip E. Stover, M.D. (Eastern Virginia Med. School, 1980); William T. Vaughan, R.Ph., R.P.A. (UNC-Chapel Hill, 1972).

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

DIVISION OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE

Assistant Clinical Professor: Samuel D. Moon, M.D. (Virginia, 1975), M.P.H. (UNC-Chapel Hill, 1991), *Division Chief*.

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

Associate Consulting Professors: John Dement, Ph.D. (UNC-Chapel Hill, 1980); Jerry J. Tulis, Ph.D. (Catholic Univ., 1965).

Assistant Professor: Hester J. Lipscomb, Ph.D. (UNC-Chapel Hill, 1995).

Assistant Clinical Professors: Dennis Darcey, M.D., M.S.P.H. (UNC-Chapel Hill, 1986, 1988); Carol Epling, M.D. (Virginia, 1989), M.S.P.H. (Colorado, 1994); Gary N. Greenberg, M.D. (Northwestern, 1978), M.P.H. (UNC-Chapel Hill, 1983); Debra Hunt, Dr.P.H. (UNC-Chapel Hill, 1984); Craig R. Stenberg, Ph.D. (Denver, 1982); Woodhall Stopford, M.D. (Harvard, 1969), M.S.P.H. (UNC-Chapel Hill, 1980); Edward D. Thalmann, M.D. (Georgetown, 1970); Wayne R. Thomann, Dr.P.H. (UNC-Chapel Hill, 1983).

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 Univ., 1990); Andrew S. Silberman, M.S.W. (UNC-Chapel Hill, 1982).

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

DIVISION OF PHYSICAL THERAPY

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

Associate Professor: Elia E. Villanueva, P.T., A.M. (Duke Univ., 1959, 1969).

Associate Clinical Professors: Daniel E. Erb, P.T., Ph.D., *Director of Graduate Studies*; Janet L. Gwyer, Ph.D., P.T. (UNC-Chapel Hill, 1984, 1977).

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

Assistant Clinical Professors: Daniel V. Dore, P.T. (Univ. of Pennsylvania, 1979), M.P.A. (Univ. of Maine, 1985); Carol Figuers, P.T. (Duke Univ., 1981); Ed.D. (North Carolina State Univ., 1995); Linda M. Lawrence, P.T., (State Univ. of New York at Buffalo, 1976), M.S. (UNC-Chapel Hill, 1994); Corrie J.

Odom, P.T. (Florida State Univ., 1979), M.P.T. (Slippery Rock Univ., 1995), D.P.T. (Slippery Rock Univ., 1998); Mary Ellen Riordan, P.T. (Univ. of Wisconsin-Madison, 1969), M.S. (Univ. of Wisconsin-Madison, 1975).

Clinical Associates: Laura E. Case, M.S., P.T. (UNC-Chapel Hill, 1992); Rebecca H. Crouch, M.S. (UNC-Chapel Hill, 1986); Elizabeth F. Ross, M.M.S., P.T. (Emory University, 1982).

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

DIVISION OF PHYSICIAN ASSISTANT EDUCATION

Assistant Clinical Professor: Justine Strand, M.P.H., PA-C (Duke, 1981), *Division Chief and Program Director*. Joyce A. Copeland, M.D. (UNC-Chapel Hill, 1975), *Medical Director*.

Associate Clinical Professor: Reginald D. Carter, Ph.D. (Bowman Gray, 1970).

Assistant Clinical Professors: Lovest T. Alexander, M.H.S. (Duke, 1991); Patricia A. Dieter, M.P.A. (Pennsylvania State, 1983); Phillip Price, M.H.S. (Duke, 1991); Margaret Schmidt, Ed.D. (Duke, 1988); Jan Victoria Scott, M.H.S. (Duke, 1991).

Clinical Associates: Robert Giggey, PA-C (Maine Medical Center, 1991); Paul C. Hendrix, M.H.S. (Duke, 1991); Gloria Jordan, PA-C (Duke, 1988); John C. Lord, PA-C (Duke, 1981); Peggy R. Robinson, M.H.S., PA-C (Duke, 1992).

DIVISION OF PREVENTION AND HEALTH PROMOTION RESEARCH

Associate Professor: Colleen McBride, Ph.D. (Minnesota, 1990), *Division Chief*. Professor: Barbara K. Rimer, Dr. P.H. (Johns Hopkins, 1981).

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

Assistant Professor: Patricia Moorman, Ph.D. (UNC-Chapel Hill, 1993).

Assistant Research Professors: Kathryn I. Pollack, Ph.D. (Univ. of Houston, 1996).

Research Associates: Marilyn F. Vine, M.P.H. (Yale, 1983) Ph.D. (UNC-CH, 1988).

DUKE DIET AND FITNESS CENTER

Assistant Clinical Professor: Howard Eisenson, M.D. (Duke Univ., 1979); *Division Chief*. Jarol Knowles, M.D. (Univ. of Saskatchewan, 1981).

ADJUNCT FACULTY

Adjunct Associate Professor: James F. Gifford, Jr., Ph.D. (Duke, 1969);

Adjunct Assistant Professors: James D. Bernstein, M.H.A. (Michigan, 1968); Brian A. Boehlecke, M.D. (SUNY at Buffalo, 1970), M.P.H. (UNC-Chapel Hill, 1981); Patricia M. Eiff, M.D. (Med. Coll. Wisconsin, 1983); Joseph W. Hales, Ph.D. (Utah, 1991); Lars C. Larsen, M.D. (SUNY at Syracuse, 1973); Gretchen Purcell, M.D., Ph.D. (Stanford Univ., 1996, 1997); Benjamin Reese, Ph.D. (Rutgers the State Univ., 1978); Clare J. Snachez, M.D. (Colorado School of Med., 1975); Katherine M. Shea, M.D. (Oregon Health Sciences, 1978), M.P.H. (North Carolina, 1995); Bonnie Yankaskas, Ph.D. (UNC-Chapel Hill, 1982), M.P.H. (Yale, 1973).

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

COMMUNITY FACULTY

Assistant Clinical Professors: L. Allen Dobson, Jr., M.D. (Bowman Gray, 1980), Mt. Pleasant, NC; James M. Wetter, M.D. (SUNY at Buffalo, 1974), Fayetteville, NC.

Clinical Associates: James A. Mergy, M.D. (California, 1987), Fayetteville, NC; Lenard Salzberg, M.D. (Albany, 1988) Fayetteville, NC.

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: Kathryn Magruder-Habib, Ph.D. (North Carolina, 1987), Washington, D.C.; Albert A. Meyer, M.D. (SUNY at Brooklyn, 1975), Cary, NC; 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. (Med. Coll. 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. (Med. Coll. 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; 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; 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 Med. Coll., 1974); Raleigh, NC; Mary Lee Lobach, M.D. (Vanderbilt, 1984); 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; 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 (USUHS, 1996), Fayetteville, NC; Clarence H. Beavers, M.D. (West Virginia, 1982), Eden, NC; Mary Jo Bondy, Pa-C, MHS (Duke Univ., 1993), Wilmington, NC; Peter K. Brady, M.D. (Mississippi, 1989), Durham, NC; Charles Brown, MD (Univ. of Louisville, 1995), Fayetteville, NC; Toby Brown, MHS, PA-C (Duke Univ. 1992), Asheville, NC; Peter A. Cardinal, M.D. (Uniformed Services Univ. of the Hlth. Sciences, 1984), Fayetteville, NC; Sandra Carr, M.D. (Univ. of TX-Houston, 1996), Fayetteville, NC; Karol Cheek, M.D. (South Carolina, 1987), Concord, NC; Mary Ann Chiodo, MD (West Virginia Univ., 1989), Dunn, NC; Vincent Chiodo, MD (West Virginia Univ., 1989), Dunn, NC; Young S. Choi, M.D. (Oklahoma, 1985), Fort Bragg, NC; David L. Christopherson, M.D. (Michigan, 1974), Concord, NC; Bruce A. Cohen, M.D. (St. George's Hosp., 1981), M.P.H. (North Carolina, 1997), Durham, NC; Kiara S. Eily Cofield, M.D. (Bowman Gray, 1991) Durham, NC; James F. Cummings, M.D. (Georgetown Univ., 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, MD (USUHS, 1993), Fayetteville, NC; Mars F. Davis, M.P.H. (Univ. of Oklahoma, 1989); Douglas Degler, M.D. (Georgetown Univ., 1995), Fort Bragg, NC; Victor Dewyea, MD (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. (Univ. of 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. (Med. Coll. Virginia, 1989), Atlanta, GA; Lakshmi Gordon, M.D. (New York Medical College, 1993); 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; Richard Juberger, M.D. (East Carolina, 1982), Erwin, NC; Brenda L. Kaminski, PA-C (Univ. of Wisconsin at Madison, 1988), Rocky Mount, NC; Edward N. LaMay, M.D. (Bowman Gray, 1988), Durham, NC; Glen R. Liesegang, M.D. (Kentucky, 1983), Blowing Rock, NC; Christopher Manasseh, M.D. (Kilpauk Medical College Univ. of Madras, 1992), Fayetteville, NC; Matthew M. McCambridge, M.D. (Georgetown Univ., 1992), Fort Bragg, NC; Ronald K. McLearn, M.D. (Ohio State, 1975), Durham, NC; Ofelia N. Melley, M.D. (Guadalajara, 1984), Southern Pines, 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. (Med. Coll. Virginia, 1986), Charlotte, NC; Gwendolyn Powell; M.D. (Miami, 1981), M.P.H. (North Carolina, 1986), Durham, NC; Michael A. Rave, M.D. (USUHS, 1989), Fort Bragg, NC; Charles W. Rhodes, M.D. (Bowman Gray, 1980) Mt. Pleasant, NC; Rebecca S. Rich, M.D. (Brow, 1983), Durham, NC; Mark D. Robinson, M.D. (Pennsylvania, 1983), Concord, NC; Paul W. Sasser, M.D. (California at Los Angeles, 1984), Eden NC; Lori J. Seymour, PA-C (Duke, 1992), Mt. Pleasant, NC; David Siebens, M.D. (Washington Univ., 1983); Deborah Smith, M.S.W. (UNC-Chapel Hill, 1979). 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. (Med. Coll. Virginia, 1982) Elkin, NC; Edward Taylor, M.D. (Hahnemann Univ., 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. (Univ. of 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 Univ., 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).

Clinical Associate: John Michael Aquino, M.D. (Toronto, 1991).

Consulting Associates: John B. Anderson, M.D. (Cincinnati 1980); Ginetta Archinal, M.D. (Univ. of New South Wales, 1982); Gillian A. Aylward, M.D. (Canada, 1983); Katherine Bliss, M.D. (UNC-Chapel Hill, 1989); Anita Blosser, M.D. (Kentucky, 1991); William Borgos, M.D. (Johns Hopkins Univ., 1995); W. Kevin Broyles, M.D. (Univ. of Florida, 1986); Isa Cheran, M.D. (Bowman Gray, 1988); Daniel Crummett, M.D. (Wayne State, 1982); Kathleen de la Cruz, M.D. (Johns Hopkins Univ., 1996); Jenny Franczak, M.D. (West Virginia, 1988); Joanne Fruth, M.D. (Med. Coll. Ohio, 1987); Michael Gagliardi, M.D. (Univ. of Pittsburgh, 1992); Allison K. Gard, M.D. (Univ. of Illinois-Chicago, 1990); Parul Harsora, M.D. (Univ. of Western Ontario, 1992); Jon Paul Heiderscheidt, M.D. (UNC-Chapel Hill, 1995); Craig A. Hoffmeier, M.D. (Louisiana State, 1986); Kamla T. Jain, M.D. (Bowman Gray, 1994); Robert Juer, M.D. (Tennessee, 1979); Joel R. Kann, M.D. (Eastern Virginia, 1989); Patrick Kavanaugh, M.D. (East Carolina Univ., 1995); Richard Kennedy, M.D. (Illinois, 1983); David Klein, M.D. (UNC-Chapel Hill, 1986); Thomas Koinis, M.D. (Case Western Reserve, 1980); Soon Kwark, M.D. (Louisiana State Univ., 1984); Janet McKeown, M.D. (Univ. of Toronto, 1990); John Mills, M.D. (Bowman Gray, 1982); George H.

Moore, M.D. (East Carolina, 1981); Mary Sherwyn Mouw, M.D. (Univ. of Michigan, 1996); Jane Murray, M.D. (UNC-Chapel Hill, 1984); Julia Nelson, M.D. (UNC-Chapel Hill, 1997); T. Andrew O'Donnell, M.D. (Med. Coll. of Ohio, 1993); Coin Page, M.D. (UNC-Chapel Hill, 1983); Enas Pruitt, M.D. (Univ. of Iowa, 1997); Sarah Cornwell Ringel, M.D. (Duke, 1985); Jane Satter, M.D. (Rochester, 1977); Todd Shapley-Quinn, MD (Wayne State Univ., 1984); Carols Sotolongo, M.D. (Univ. Autonoma De Guadajajara, 1981); Tamra H. Stall, M.D. (Case Western Reserve, 1987); Margaret Stetson, M.D. (Rochester, 1977); Amy Walsh, M.D. (Georgetown Univ., 1997); Kelvin E. Wynn, M.D. (Howard, 1988).

Emeriti: Robert Charles Bartlett; E. Harvey Estes, Jr., M.D.; Michael A. Hamilton, M.D. Siegfried H. Heyden, M.D.; David G. Warren, J.D.

Required Courses

During the second year non-primary care students may select either COMMFAM-205 or a combination of COMMFAM-207 and MEDICINE-207, 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 eight 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 eight weeks prior to the start of the rotation. Credit: 4. *Copeland*

Basic Science Electives

COMMFAM-238B. Tutorial in Community and Family Medicine. An individual-ly arranged experience in which the student participates in the research program of a faculty member. The subject matter, course credit, and meeting time is arranged with the faculty member. Each student meets regularly with his 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*

COMMFAM-246B. Historical Studies in a Medical Specialty. This elective is offered primarily to those who have made the choice of their probable career specialty. It is intended to provide an appreciation of the developments in that specialty and thereby depends an understanding of it. While the choice of elective topic is made on an individual basis and depends on the interests of each student, emphasis generally is placed on specific theoretical, practical, and organizational developments since the second half of the nineteenth century. The format comprises selected readings, tutorials, and a student project. Credit: 1-2. *English and Gifford*

COMMFAM-248B. The Development of and Perspectives on Modern Medicine. Comprised of lectures, discussion, and readings, this course outlines the general history of medicine with particular attention given to recent developments. The course includes such topics as the contributions of William Harvey, medical systems, aspects of clinical diagnosis, and the evolution of key concepts in modern medicine such as cell theory, the germ theory, antiseptics, and theories of immunity. Full use is made of the excellent resources of the Trent Collections. Additional units of credit may be earned through independent study. Credit: 1. *Gifford*

Clinical Science Electives

COMMFAM-250C. Clinical Nutrition. This course provides an overview and opportunity to develop skills in the assessment and management of common nutritional problems in primary care. Topics include nutritional assessment; nutrition during pregnancy and lactation, infancy and childhood, as well as senescence; nutritional management of chronic diseases (diabetes, obesity, cardiovascular disease); health promotion/disease prevention. If permitted by the instructor, this clinical science course can be audited. Credit: 1. Enrollment: min 3, max 8. *Staff*

COMMFAM-251C. Integrative Medicine: Research and Clinical Perspectives. This 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-254C. Community Medicine. This elective combines patient care with study of community health issues and a population-based approach to treatment. Students develop an intervention plan for a problem they perceive and that is perceived by the community. Students also practice study design and implementation via a quality assurance project. This elective may be taken in Madison County in western North Carolina, or in Durham through the Division of Community Health. Students are advised to contact the department as early as possible for course approval. Credit: 3. Enrollment: max: 1. *Sheline and staff*

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. Prerequisites: permission of instructor. Credit: 4. Enrollment: min 2, max 6. *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 primary care practitioners. It includes both historical and systematic philosophical analyses of these questions. Among topics for consideration are ethical methods (e.g., clinical ethics, philosophical ethics, and public policy), as well as selected practice-related issues (e.g., truth-telling, confidentiality, informed consent). Credit: 1. Enrollment: min 6, max 12. *Keating*

COMMFAM-257C. Philosophic Problems for Physicians. This seminar is designed to help the fourth year medical student prepare for becoming an intern/resident in the areas of dealing with patients: taking on that level of responsibility, telling the family/patient about serious illness or about the patient's terminal condition, working with a family at the time of death, and dealing personally and professionally with the kinds of pressures placed on the intern/resident (how to do more than survive the next three to five years, keeping marriage together, being a parent, etc.) Prerequisite: permission of the instructor. If permitted by the instructor, this clinical science course can be audited. Credit: 2 or 4. Enrollment: min 3, max 8. *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 sixty days of the first day of the rotation. Prerequisites: 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 sixty days of the first day of the rotation. Prerequisites: 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). Prerequisites: 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, and Harrell*

COMMFAM-273C. The Ideal Physician. What is the role of the physician in relating with patients? How do you communicate with patients and families? How well do you do this? What is your "bedside manner"? How do you learn about this other than through models and self-reflection? This seminar provides a small group atmosphere for learning more about such skills and for receiving direct feedback on your own communication style and skills. If allowed by instructor, this clinical science course can be audited. Prerequisite: permission of instructor. Credit: 1-2. Enrollment: min 3, max 8. *Staff*

COMMFAM-274C. The Ideal Patient. Who is the "ideal" patient? What about those who are not so ideal? This seminar combines theory and practice. Information about "difficult" personality types and effective interpersonal skills for dealing with these individuals are integrated into actual practice. Members of the seminar are asked to draw upon past and current experiences with difficult persons and situations as well as to focus on case presentations provided by the instructor. If permitted by the instructor, this clinical science course can be audited. Prerequisite: permission of instructor. Credit: 1-2. Enrollment: min 3, max 8. *Staff*

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 are 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.
Community Health	Kathryn Andolsek, M.D., M.P.H. Victoria Kaprielian M.D.
Sports Medicine	Rich Ferro, M.D. Andrew Bonin, M.D.
Obesity Treatment	Howard Eisenson, M.D.
Geriatrics	Amrit Singh, M.D.
Managed Care	Victoria Kaprielian, M.D. Lloyd Michener, M.D.

All interested students should contact the coordinator of Medical Student Programs at 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 3 months prior to the desired rotation. Drops are not accepted. Prerequisites: permission of instructor. Credit: 4. *Copeland and staff*

DIVISION OF CLINICAL INFORMATICS

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. Approval 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, ONCOCIN, PIP, CASNET, ILIAD, QMR, and DXPLAIN and selected EXPERT systems. Approval of the instructor required. C-L: BME-241 (Graduate School). Credit: 3. *Staff*

MEDINFO-235B. Microprocessors and Digital Instruments. Design of microcomputer-based devices including both hardware and software considerations of system design. Primary emphasis on hardware aspects including a progression through initial design, prototype construction in the laboratory, testing of prototypes to locate and correct faults, and final design evaluation. Evaluation includes examination of complexity, reliability, and cost. Design and construction is oriented toward biomedical devices or instruments that include dedicated microcomputers, usually operating in real time. C-L: BME-205 (Graduate School). Credit: 3. *Hammond*

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. *Hammond*

MEDINFO-399B. Preceptorship in Medical Informatics. An individualized research program under the direction and supervision of a member of the faculty of the Medical Information Sciences Program. Credit: 1-16. *Staff*

GENETICS

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

Professors: Bryan R. Cullen, Ph.D. (New Jersey Medical School, 1984); Y.-T. Chen, M.D. (National Taiwan Univ., 1973), Ph.D. (Columbia, 1978); Margaret Pericak-Vance, Ph.D. (Indiana, 1978).

Associate Professors: Mariano Garcia-Blanco, M.D., Ph.D. (Yale, 1988); Joseph Heitman, Ph.D. (Rockefeller, 1989), M.D. (Cornell, 1992); Douglas A. Marchuk, Ph.D. (Chicago, 1985); Bruce Sullenger, Ph.D. (Cornell, 1990); Jeffery Vance, Ph.D. (Indiana, 1979), M.D. (Duke, 1984); Robin P. Wharton, Ph.D. (Harvard, 1986).

Assistant Professors: Hubert Amrein, Ph.D. (Univ. Zurich, 1988); Frederick Dietrich, Ph.D. (M.I.T., 1992); Daniel Lew, Ph.D. (Rockefeller, 1990); Andrew S. Peterson, Ph.D. (Harvard, 1988).

Required Course

GENETICS-200B. Molecular Genetics of Human Disease. A course designed for first year medical students that focuses on the principles of genetics as they apply to human disease. Material is presented in the context of five human diseases. In each case, the course emphasizes molecular aspects of gene structure and expression, experimental systems for genetic analysis, and various aspects of human genetics including population genetics and genetic epidemiology, the use of genetic analysis for the identification of disease causing genes, cytogenetics, and genetic diagnosis and counseling. Credit: 2. *Nevins*

Elective

GENETICS-252B. Genetic Analysis of Human Disease. This course introduces the student to quantitative and molecular aspects in the identification of human disease genes, implications for genetic counseling and risk assessment, and legal and social issues associated with the human genome initiative. The course draws extensively from the scientific literature to illustrate concepts of linkage analysis in Mendelian and complex disease, molecular approaches to disease gene cloning, molecular mechanisms of disease gene expression, gene therapy, and the utility of animal models for understanding human disease. C-L: Graduate School. Credit: 2. *Speer*

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 at Chapel Hill, 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 at Chapel Hill, 1960); Ralph Snyderman, M.D. (SUNY, 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); Phillip Hanna, Ph.D. (Pittsburgh, 1990); You-Wen He, Ph.D. (Miami, 1996); Maureen Hoffman, M.D., Ph.D. (Iowa, 1982); Herbert Kim Lyerly, M.D. (California at Los Angeles, 1983); Mary Louise Markert, M.D. (Duke, 1982), Ph.D. (Duke, 1981); Michael G. McHeyzer-Williams, Ph.D. (Melbourne, 1991); 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); Marcella Sarzotti-Kelsoe, Ph.D. (Torino, 1980); Joel R. Ross, Ph.D. (Texas-Southwestern, 1991); Douglas A. Steeber, Ph.D. (Wisconsin-Madison, 1995); Herman F. Staats, Ph.D. (South Alabama, 1992); 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.

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 enriched with patient oriented problem-solving sessions. Credit: 2. *Dawson*

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. Permission of the instructors is required. 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 recep-

tor. 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 instructor. Credit: 1-16. *Staff*

INTERDISCIPLINARY COURSES

Required Courses

INTERDIS-201B. Practice Year 1. The Practice courses are required in both years one and two. Practice emphasizes clinical skills development using lecture and small group teaching 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, Chatterjee, and Dell*

INTERDIS-204C. Practice: Orientation to Clerkship Year. Prior to beginning clerkships, students participate in the "Orientation to Clerkship 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, and end of life issues. Students develop skills in giving bad news and counseling around advance directives. The course devotes an entire block to personal professional development. *Fall, Credit: 1. Spring, Credit: 1. Sheline, Chatterjee, and Dell*

INTERDIS-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 healthcare 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, Branch, and staff*

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: 1/2. 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: 1/2. 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: 1/2. 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: 1/2. Enrollment: min 1. *English*

Clinical Science Electives

INTERDIS-300C. Interdisciplinary Seminar in Medical-Ethical Issues. The seminar is composed of students in approximately equal number from the Medical, Divinity, and Law Schools and explores important medical, legal, and ethical features of current issues, e.g., in-vitro fertilization and euthanasia. Faculty and resource persons from all three schools participate in the seminar. One introductory session in the fall semester for participating students and faculty is conducted with arrangement of interdisciplinary teams and topics. Student teams meet during December and January. All semester participants re-assemble for a series of weekly meetings beginning in February and ending in mid-March to present and discuss the topics researched. Any topics properly focused may be considered. The course covers fall section 82 and spring section 81. If permitted by the instructor, this clinical course can be audited. Credit: 2. Enrollment: max 6. *Gianturco (Medical), Shimm (Law), Smith (Divinity) and other faculty members from all three schools*

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 Honduras. The course content is designed to facilitate the understanding of art, history, literature, music, philosophy, and religion and the impact these factors have on medical care in a foreign country. The seminar is designed to facilitate understanding the meaning of medicine for the student and for different cultures. The course will highlight understanding the cultural aspects of medicine in Honduras and classes will be given by multidisciplinary faculty. A trip to Honduras is planned for spring break with a limited number of students invited. They will meet Honduran students and faculty as well as offer medical care to patients during the visit. 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. Credit: 2. Enrollment: Maximum 12. *Clements*

INTERDIS-304C. Medicine in the Third World: A Haitian Perspective. This course is divided into a didactic period conducted between September and December followed by one week in Haiti in early January. The didactic portion of the course will involve seven to ten two-hour sessions to discuss history, medicine, religion, culture, and travel in the third world. In addition, some rudimentary knowledge of the Kreyol language will be introduced. During the didactic portion each student will read a book on a topic relating to Haiti and lead a group discussion related to their reading. While in Haiti, the student will participate as a member of a mission team involving members of the medical and divinity schools. Each student will keep a journal while in Haiti. Four weeks after the trip, each student will turn in a short paper dealing with a topic of personal interest that incorporates all of their experience in the course. Goals of the course:

(a) exposing students to health care in the third world; (b) an appreciation for physical diagnosis skills developed by physicians trained without the use of Western technologies and; (c) an appreciation for the natural progression of disease in an environment where health care resources are limited to absent. Credit: 2. *Walmer*

MEDICINE

Barton F. Haynes, M.D., Frederic M. Hanes Professor of Medicine, (Baylor, 1973), Chair.

DIVISION OF CARDIOLOGY

Professor: Pascal J. Goldschmidt, M.D. (Universite Libre de Bruxelles, Belgium, 1980), Chief.

Professors: Thomas M. Bashore, M.D. (Ohio, 1972); Victor S. Behar, M.D. (Duke, 1961); Robert M. Califf, M.D., Donald F. Fortin, M.D. Professor of Cardiology, (Duke, 1978); Fred R. Cobb, M.D. (Mississippi, 1964); Augustus O. Grant, M.D. (Edinburgh, 1971); Joseph C. Greenfield, Jr., M.D., James B. Duke Professor of Medicine, (Emory, 1956); Joseph R. Kisslo, M.D. (Hahnemann, 1967); Robert J. Lefkowitz, M.D., James B. Duke Professor of Medicine, (Columbia, 1966); Daniel B. Mark, M.D. (Tufts, 1978); James J. Morris, M.D. (State Univ. of New York, 1959); Robert H. Peter, M.D. (Duke, 1961); Harry R. Phillips, M.D. (Duke, 1975); Edward L. C. Pritchett, M.D. (Ohio, 1971); Thomas J. Ryan, M.D. (Indiana, 1981); Richard S. Stack, M.D. (Wayne State, 1976); Gary L. Stiles, M.D., Ursula Geller Professor for Research in Cardiovascular Diseases, (Vanderbilt, 1975).

Associate Professors: Brian H. Annex, M.D. (Yale, 1985); Christopher B. Granger, M.D. (Connecticut, 1984); Robert A. Harrington, M.D. (Tufts, 1986); J. Kevin Harrison, M.D. (New York Univ., 1984); Michael B. Higginbotham, M.D. (Univ. of Melbourne, 1973); James G. Jollis, M.D. (Ohio, 1986); Mitchell W. Krucoff, M.D. (George Washington, 1980); Kenneth Morris, M.D. (Ohio, 1972); Christopher M. O'Connor, M.D. (Maryland, 1983); E. Magnus Ohman, M.D. (Royal Coll. of Surgeons, 1981); Eric D. Peterson, M.D. (Pittsburgh, 1988); Howard A. Rockman, M.D. (McGill, 1983); Robert A. Rosati, M.D. (Duke, 1967); Michael H. Sketch, M.D. (Creighton, 1984); James Tcheng, M.D. (Johns Hopkins, 1988); Galen S. Wagner, M.D. (Duke, 1965); Robert Waugh, M.D. (Pennsylvania, 1966); J. Marcus Wharton, M.D. (Vanderbilt, 1980); James P. Zidar, M.D. (Loyola, 1985).

Associate Research Professor: Judith C. Rembert, Ph.D. (North Carolina at Chapel Hill, 1972).

Assistant Professors: John H. Alexander, M.D. (Pennsylvania, 1993); Karen P. Alexander, M.D. (Duke, 1992); Tristram D. Bahson, M.D. (California at San Francisco, 1984); Michael A. Blazing, M.D. (California at San Francisco, 1987); Neil J. Freedman, M.D. (Harvard, 1985); Ruth Ann Greenfield, M.D. (Duke, 1985); M. Dee Gunn, M.D. (Southwestern, 1983); Christopher D. Kontos, M.D. (Medical College of Virginia, 1989); William E. Kraus, M.D. (Duke, 1982); Kenneth W. Mahaffey, M.D. (Univ. of Washington, 1989); L. Kristin Newby, M.D. (Indiana, 1987); Gail E. Peterson, M.D. (Michigan, 1991); Matthew T. Roe, M.D. (Duke, 1993); Stuart D. Russell, M.D. (Univ. of Washington, 1991); Robert A. Sorrentino, M.D. (Albany Med. Coll. 1985); Andrew Wang, M.D. (Duke, 1990).

Assistant Clinical Professor: Wendy A. Gattis, Pharm. D. (Campbell, 1995).

Assistant Research Professors: Patricia A. Cowper, Ph.D. (California at Davis, 1984); Chunming Dong, M.D. (Shandong Med Univ. 1984); Eric L. Eisenstein, D.B.A. (Cleveland State, 1995); Lan Mao, M.D. (Beijing Medical Univ., 1979); Karsten Pepdel, Ph.D. (SUNY at Albany, 1990); Doris A. Taylor, Ph.D. (Texas, Southwestern, 1987); Tao Wang, M.D., Ph.D. (Tongji Med Univ., 1986).

Associates: Sana M. Al-Khatib, M.D. (Beirut, 1993); Judy K. Battle, M.D. (Louisiana State University, 1993); Michael S. Cuffe, M.D. (Duke, 1991); John J. Warner, M.D. (Vanderbilt, 1992).

DIVISION OF DERMATOLOGY

Professor: Russell P. Hall, M.D. (Missouri, 1975), Chief.

Professors: Elise A. Olsen, M.D. (Baylor, 1978); Sheldon R. Pinnell, M.D., J. Lamar Callaway Professor of Dermatology, (Yale, 1963).

Associate Professors: Claude S. Burton, M.D. (Duke, 1979); James M. Grichnik, 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 Univ., 1975).

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

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

DIVISION OF ENDOCRINOLOGY, METABOLISM, AND NUTRITION

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

Associate Professors: Warner M. Burch, M.D. (Wake Forest, 1971); George J. Ellis, M.D. (Harvard, 1963); John R. Guyton, M.D. (Harvard, 1973); Francis A. Neelon, M.D. (Harvard, 1962).

Associate Research Professor: Bruce Lobaugh, Ph.D. (Pennsylvania State, 1981).

Assistant Professors: Ann J. Brown, M.D. (Stanford, 1988); Louis Luttrell, M.D. (University of Virginia, 1989).

Assistant Clinical Professor: Leslie J. Domalik, M.D. (Pittsburgh, 1986).

Associates: Jennifer B. Green, M.D. (Virginia, 1993); Thomas J. Weber, M.D. (Pritzker, 1989).

DIVISION OF GASTROENTEROLOGY

Professor: Rodger A. Liddle, M.D. (Vanderbilt, 1978), Chief.

Professors: John Baillie, M.B. (Glasgow Univ., 1977); Paul G. Killenberg, M.D. (Pennsylvania, 1963); Joanne A. P. Wilson, M.D. (Duke, 1973).

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

Associate Professors: M. Stanley Branch, M.D. (Med. Coll. of Georgia, 1984); Scott R. Brazer, M.D. (Case Western Reserve, 1981); Jonathan A. Cohn, M.D. (Rockefeller, 1978); Paul S. Jowell, M.D. (Univ. of Capetown, 1983); Thomas T. Long, M.D. (Wake Forest, 1966); Dawn Provenzale, M.D. (Albany, 1984); Don C. Rockey, M.D. (Med. Coll. of Virginia, 1984).

Assistant Professors: Wendy Z. Davis, M.D. (Duke, 1989); Kevin McGrath, M.D. (Jefferson, 1992); John F. O'Connor, M.D. (National Univ. of Ireland, 1983); Jane E. Onken, M.D. (George Washington, 1987); Michael A. Shetzline, M.D. (Ohio State, 1991).

Assistant Clinical Professors: Frank Pancotto, M.D. (Chicago, 1975); David A. Tendler, M.D. (Yale, 1993).

Assistant Research Professor: Richard T. Premont, Ph.D. (CUNY, 1992).

Associates: Jeffrey D. Bornstein, M.D. (McGill, 1994); Michael Heneghan, M.D. (Univ. Coll. Dublin, 1992); James K. Howden, M.D. (Uniformed Services, 1998); Andrew J. Muir, M.D. (Duke, 1993); Jorge V. Obando, M.D. (Cayetano Heredia Sch of Medicine, 1992).

DIVISION OF GENERAL INTERNAL MEDICINE

Associate Professor: Eugene Z. Oddone, M.D. (Colorado, 1985), Chief.

Professor: Jeremy Sugarman, M.D. (Duke, 1986).

Associate Professors: Kevin Schulman, M.D. (NY Univ., 1988); David L. Simel, M.D. (Duke, 1980); Martin J. Sullivan, M.D. (Ohio State, 1980); James A. Tulskey, M.D. (Illinois, 1987).

Associate Clinical Professor: Lynn E. Keplinger, M.D. (West Virginia, 1990).

Assistant Professors: Lori A. Bastian, M.D. (Emory, 1987); David E. Edelman, M.D. (Baylor, 1991); Linda H. Harpole, M.D. (Duke, 1992); Sheri A. Keitz, M.D. (Mount Sinai, 1991); Douglas C. McCrory, M.D. (Miami, 1986); Eric C. Westman, M.D. (Wisconsin, 1986); John D. Whited, M.D. (West Virginia, 1990).

Assistant Clinical Professors: Charles O. Beauchamp, M.D. (Duke, 1975); Lawrence H. Greenblatt, M.D. (Northwestern, 1990); Faith H. Holcombe, M.D. (Washington Univ., 1980); Scott V. Joy, M.D. (Pittsburgh, 1992); Judith M. Kramer, M.D. (North Carolina at Chapel Hill, 1977); Evangeline R. Lausier, M.D. (University of Vermont, 1979); Richard S. Liebowitz, M.D. (Rutgers, 1980); Michael W. Meredith, M.D. (North Carolina at Chapel Hill, 1994); Robert W. Paterson, M.D. (Duke, 1979); Amy W. Shaheen, M.D. (Washington Univ., 1989); Kathleen A. Waite, M.D. (Duke, 1990).

Assistant Research Professors: Hayden B. Bosworth, Ph.D. (Pennsylvania State, 1996); Carol Smith Hammond, Ph.D. (Univ. of Florida, 1993); Shelby D. Reed, Ph.D. (Univ. of Maryland, 1998); Karen Steinhauer, Ph.D. (Duke, 1996).

Associates: Cheryl A. Baker, M.D. (Albany 1995); Cedric M. Bright, M.D. (North Carolina at Chapel Hill, 1990); S. Tublu Chatterjee, M.D. (Boston Univ., 1990); Steven D. Crowley, M.D. (Duke University, 1996); Tamara Ann Doehner, M.D. (Nebraska, 1997); Rowena J. Dolor, M.D. (Duke, 1991); Marisa R. D'Silva, M.D. (North Carolina at Chapel Hill, 1992); Lisa A. Giannetto, M.D. (Loyola, 1986); Kenneth C. Goldberg, M.D. (Med. Coll. Wisconsin, 1994); Michael N. Hayden, M.D. (Duke, 1995); Nicole E. Jelesoff, M.D. (Georgetown, 1991); Kimberly S. Johnson, M.D. (Hopkins, 1997); Sabina M. Lee, M.D. (Alabama at Birmingham, 1989); Thomas A. Owens, M.D. (SUNY at Buffalo, 1995); Delia Roddy, M.D. (Georgetown, 1995); Amy J. Rosenthal, M.D. (Med. Coll. of Virginia, 1987); Vernice Royal, M.D. (Duke, 1992); Jeannette F. Stein, M.D. (North Carolina at Chapel Hill, 1981); Ralph L. Wall, Jr., M.D. (North Carolina at Chapel Hill, 1978); Kevin B. Waters, M.D. (Univ. of New Mexico, 1984).

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); Kenneth E. Schmader, M.D. (Wake Forest, 1980).

Associate Clinical Professors: Toni Cutson, M.D. (Med. Coll. of Virginia, 1980); Byron B. Hamilton, M.D. (SUNY, Syracuse, 1959).

Associate Research Professors: Connie Bales, Ph.D. (Tennessee, 1981); Elizabeth Clipp, Ph.D. (Cornell, 1984).

Assistant Professors: Helen Hoenig, M.D. (Arizona, 1985); Heidi K. White, M.D. (Washington Univ., 1989).

Assistant Clinical Professor: Jack I. Twersky, M.D. (Hahnemann, 1982).

Assistant Research Professors: Pao-Hwo Lin, Ph.D. (Texas, Austin, 1990); Miriam Morey, Ph.D. (North Carolina at Chapel Hill, 1997); Christine Ruby, Pharm.D. (Univ. of Pittsburgh, 1994); Gregory A. Taylor, Ph.D. (Duke, 1995).

Associates: Cathleen Colon-Emeric, M.D. (Johns Hopkins, 1994); Mitchell T. Heflin, M.D. (Univ. of Virginia, 1994).

DIVISION OF HEMATOLOGY

Professor: 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 Univ., 1982); Thomas L. Ortel, M.D. (Indiana, 1985).

Assistant Professor: Murat O. Arcasoy, M.D. (Aegean Univ., 1987).
Assistant Research Professors: Dipak K. Ghosh, Ph.D. (Univ. of Calcutta, 1984); Thung Lai, Ph.D. (Kent State, 1990); Qin Zen, Ph.D. (Ohio State, 1996).
Associate: Laura M. De Castro, M.D. (Univ. of Autonoma de Santo Domingo, 1986).

DIVISION OF INFECTIOUS DISEASES

Professor: John D. Hamilton, M.D. (Colorado, 1964), Chief.
Professors: 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 at Chapel Hill, 1974).
Associate Professor: John A. Bartlett, M.D. (Virginia, 1981).
Associate Clinical Professor: Charles B. Hicks, M.D. (George Washington, 1979).
Assistant Professors: J. Andrew Alspaugh, M.D. (Duke, 1991); Gary M. Cox, M.D. (Univ. of Virginia, 1989); Vance G. Fowler, Jr., M.D. (North Carolina, 1993); Richard Frothingham, M.D. (Duke, 1981); Carol Dukes Hamilton, M.D. (Utah, 1985); Nathan M. Thielman, M.D. (Duke, 1990).
Assistant Research Professor: Dena L. Toffaletti, Ph.D. (North Carolina at Chapel Hill, 1977).
Associates: Barbara D. Alexander, M.D. (East Carolina, 1993); Keith S. Kaye, M.D. (Univ. of Pennsylvania, 1994).

DIVISION OF MEDICAL ONCOLOGY

Professor: Keith M. Sullivan, M.D., James B. Wyngaarden Professor of Medicine, (Indiana, 1971), Chief.
Professors: Nelson J. Chao, M.D. (Yale, 1981); O. Michael Colvin, M.D., William W. Shingleton Professor of Cancer Research, (Washington Univ., 1961); Jeffrey Crawford, M.D. (Ohio State, 1974); Jon P. Gockerman, M.D. (Chicago, 1967); Andrew T. Huang, M.D. (Taiwan, 1965); Russel Kaufman, M.D. (Ohio, 1973); Joseph O. Moore, M.D. (Johns Hopkins, 1971).
Associate Professors: Frank R. Dunphy, II (Louisiana at Shreveport, 1979); Matthew J.C. Ellis, M.D. (Royal Postgraduate Medical School, 1991); 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: Gerard C. Blobe, M.D. (Duke, 1995); Carlos de Castro, M.D. (Southwestern, 1985); Jennifer L. Garst, M.D. (Med. Coll. of Georgia, 1990); Herbert I. Hurwitz, M.D. (Jefferson, 1988); Michael Kelley, M.D. (Michigan, 1985); Susan J. Littman, M.D. (Albany, 1989); Michael Morse, M.D. (Yale, 1990); David Rizzieri, M.D. (Rochester, 1991); Victoria L. Seewaldt, M.D. (California at Davis, 1989); Linda M. Sutton, M.D. (Massachusetts, 1987).
Assistant Clinical Professor: William P. Petros, Pharm.D. (Philadelphia Coll. of Pharm., 1987).
Assistant Research Professors: Adrianus G.W. Domen, Ph.D. (Univ. of Amsterdam, 1993); Michael P. Gamcsik, Ph.D. (Univ. of Edinburgh, 1983); Robert W. Storms, Ph.D. (Texas, Austin, 1991); Ying-Fu Su, Ph.D. (Colorado, 1979).
Associates: Kimberly L. Blackwell, M.D. (Mayo, 1994); Cristina Gasparetto, M.D. (Univ. of Rome, 1986); Robert R. Koch, Jr., M.D. (Case Western, 1976); Weei-Chin Lin, M.D. (National Taiwan Univ., 1986); P. Kelly Marcom, M.D. (Baylor, 1989); Heather S. Shaw, M.D. (Duke, 1993).
Clinical Associate: Ashley K. Morris, Pharm. D. (North Carolina at Chapel Hill, 1993).

DIVISION OF NEPHROLOGY

Professor: Thomas M. Coffman, M.D. (Ohio, 1980), Chief.
Professors: James R. Clapp, M.D. (North Carolina at Chapel Hill, 1957); 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 Univ., 1975).
Associate Professors: Michael S. Berkoben, M.D. (Pennsylvania, 1986); Mary H. Foster, M.D. (North Carolina at Chapel Hill, 1982); Eugene C. Kovalik, M.D. (McGill, 1987); William F. Owen, Jr., (Tufts, 1980); L. Darryl Quarles, M.D. (Alabama, 1979); Stephen R. Smith, M.D. (Duke, 1985); Robert F. Spurney, M.D. (Ohio, 1983).
Assistant Research Professor: Dennis Thomas, Ph.D. (Univ. of Cincinnati, 1995).
Assistant Professors: Krairerk Athirakul, M.D. (Univ. Prince of Sojgkla, 1986); David W. Butterly, M.D. (Duke, 1987); Michael I. Oliverio, M.D. (West Virginia, 1990); Lynda A. Szczech, M.D. (Jefferson Med., 1991); Michelle P. Winn, M.D. (East Carolina, 1992).
Associate: Thu H. Le, M.D. (Georgetown, 1993).

DIVISION OF NEUROLOGY

Professor: Warren J. Strittmatter, M.D. (Duke, 1973), Chief.
Professors: Janice M. Massey, M.D. (Georgetown, 1978); James O. McNamara, M.D., Carl R. Deane Professor of Neuroscience, (Michigan, 1968); Rodney A. Radtke, M.D. (Northwestern, 1980); Donald B. Sanders, M.D. (Harvard, 1964).
Research Professor: Carol A. Colton, Ph.D. (Rutgers, 1973).
Associate Professors: Mark J. Alberts, M.D. (Tufts, 1982); Larry B. Goldstein, M.D. (Mt. Sinai, 1981); Barrie H. Hurwitz, M.D. (Witwatersrand Univ., 1968); Shashidhar H. Kori, M.B.B.S (Kasturba Medical College, 1970); Joel C. Morgenlander, M.D. (Pittsburgh, 1986); Marvin Rozear, M.D. (Duke, 1966); Donald Schmechel, M.D. (Harvard, 1974); Jeffery M. Vance, M.D. (Duke, 1984).

Associate Research Professors: Michael P. Vitek, Ph.D. (Dartmouth, 1983).

Assistant Professors: James R. Burke, M.D. (New York at Brooklyn, 1985); Carmelo Graffagnino, M.D. (West-Ontario, 1985); Aatif M. Husain, M.D. (Rawalpindi, 1989); Daniel T. Laskowitz, M.D. (Duke, 1991); Martin J. McKeown, M.D. (Toronto, 1990); Jeremy N. Rich, M.D. (Duke, 1993).

Assistant Clinical Professors: J. Thaddeus Coin, M.D. (Duke, 1984); E. Wayne Massey, M.D. (Texas at Galveston, 1970); Kevan VanLandingham, M.D. (Virginia, 1985).

Assistant Research Professors: Hana N. Dawson, Ph.D. (Univ. of South Florida, 1996); Xiao-Ping He, Ph.D. (Shanghai Medical Univ., 1987); Ram S. Puranam, Ph.D. (Indian Institute, 1986); Ann Saunders, Ph.D. (Duke, 1987); Ruggero Serafini, Ph.D. (Mario Negri Institute, 1990); Patrick M. Sullivan, Ph.D. (North Carolina at Chapel Hill, 1993).

Associates: Richard S. Bedlack, M.D. (Connecticut, 1995); Vani R. Chilukuri, M.D. (Andhra Med. 1982); Emma Ciafaloni, M.D. (Milan, 1989); Jennifer A. Quinn, M.D. (East Carolina, 1994); Burton L. Scott, M.D. (Miami, 1990).

DIVISION OF PULMONARY AND CRITICAL CARE MEDICINE

Professor: David A. Schwartz, M.D. (California at San Diego, 1979), Chief.

Professors: William J. Fulkerson, M.D. (North Carolina at Chapel Hill, 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 at San Francisco, 1968).

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

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

Associate Clinical Professor: Peter S. Kussin, M.D. (Mount Sinai, 1985).

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

Assistant Clinical Professor of Medicine: Michael L. Russell, M.D. (North Carolina at Chapel Hill, 1985); Mark P. Steele, M.D. (Illinois, 1982).

Assistant Research Professors: Barbara Buckley, Ph.D. (Johns Hopkins, 1985); Donald N. Cook, Ph.D. (McGill, 1990); Andrew J. Gow, Ph.D. (Temple, 1995); Alfred Hausladen, Ph.D. (Virginia Polytechnic, 1992); Qiang Liu, M.D. (Xuzhou Med Coll, 1982); Eva Lorenz, Ph.D. (Univ of Iowa, 1995); Julia Walker, Ph.D. (Queen's Univ., 1996); Yun Zhao, Ph.D. (Shanghai Med. Univ., 1990).

Associates in Medicine: Jerry Eu, M.D. (Chicago, 1992); Harvey E. Marshall, M.D. (Wake Forest, 1991); Scott M. Palmer, M.D. (Duke University, 1993); Ernst-Gilbert Schreiber, M.D. (Cologne, 1987).

DIVISION OF RHEUMATOLOGY, ALLERGY AND CLINICAL IMMUNOLOGY

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

Professors: Nancy B. Allen, M.D. (Tufts, 1978); Barton F. Haynes, M.D., Frederic M. Hanes Professor (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).

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

Associate Professors: David S. Caldwell, M.D. (Wake Forest, 1967); Dhavalkumar Patel, M.D. (Duke, 1989); John R. Rice, M.D. (Miami, 1968); E. William St. Clair, M.D. (West Virginia, 1980).

Associate Research Professors: Haribabu Bodduluri, Ph.D. (Indian Inst., 1984); Kay H. Singer, Ph.D. (Duke, 1977); Margrith W. Verghese, Ph.D. (Iowa State, 1964).

Assistant Professors: Virginia B. Kraus, M.D. (Duke, 1982); Marc C. Levesque, M.D. (Yale, 1989); John S. Sundry, M.D. (Hahnemann, 1991).

Assistant Research Professors: S. Munir Alam, Ph.D. (Univ. of Glasgow, 1992); Alastair J. Barr, D.Phil. (Glasgow, 1994); Alan Fong, Ph.D., (California at San Diego, 1990); Hua-Xin Liao, Ph.D. (North Carolina at Chapel Hill, 1991); M. Richardo Richardson, Ph.D. (Univ. of Barcelona, 1988); Gregory D. Sempowski, Ph.D. (Rochester, 1997); Herman F. Staats, Ph.D. (Univ. of Southern Alabama, 1992); John F. Whitesides, Ph.D. (Auburn, 1990).

SECTION OF MEDICAL GENETICS

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

Associate Research Professors: John R. Gilbert, Ph.D. (North Carolina at Chapel Hill, 1982); Marcy Speer, Ph.D. (Duke, 1993).

Assistant Research Professors: Allison Ashley-Koch, Ph.D. (Emory, 1997); Elizabeth Hauser, Ph.D. (University of Michigan, 1998); Michael A. Hauser, Ph.D. (Johns Hopkins, 1990); Eden R. Martin, Ph.D. (North Carolina, Raleigh, 1997); William K. Scott, Ph.D. (Univ. of South Carolina, 1996); Judith Stenger, Ph.D. (SUNY at Stony Brook, 1994).

ADJUNCT FACULTY

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

Adjunct Professors of Medicine: Richard D. Bukoski, Ph.D. (Baylor, 1982); Edmund G. Lowrie, M.D. (Wayne State, 1963).

Adjunct Associate Professors of Medicine: Scott D. Berkowitz, M.D. (Jefferson, 1979); Edward

Breitschwerdt, D.V.M. (University of Georgia, 1974); David A. Hosford, M.D. (Emory, 1983); Tony Huang, M.D. (National Taiwan University, 1983); John S. Penta, Ph.D. (Purdue, 1967); Walter J. Rogan, M.D. (California at San Francisco, 1975); Sandra L. White, Ph.D. (Univ. of Michigan, 1974).

Adjunct Assistant Professors of Medicine: Linda A. Charles, M.D. (North Carolina at Chapel Hill, 1991); Gary D. Dunham, Pharm.D. (North Carolina at Chapel Hill, 1998); Richard Kent, M.D. (California at San Diego, 1975); Michael E. McCullough, Ph.D. (Virginia Commonwealth, 1995); Jack A. Taylor, M.D. (Univ. of Wisconsin, 1984).

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

CONSULTING FACULTY

Consulting Professors: Perry J. Blackshear, M.D. (Harvard, 1977); James D. Crapo, M.D. (Rochester, 1971); David T. Durack, M.B. (West Australia, 1969); Robert A. Gutman, M.D. (Florida, 1962); Robert J. Jacobson, M.D. (Univ. of Witwatersrand, 1966); Eric N. Prystowsky, M.D. (Mount Sinai, 1973); Barry W. Ramo, M.D. (Colorado, 1964); Allen D. Roses, M.D. (Pennsylvania, 1967); Eric J. Topol, M.D. (Rochester, 1979).

Associate Consulting Professors: Peter Bressler, M.D. (Duke, 1981); Richard V. Clark, M.D. (Washington, 1977); Kevin G. Peters, M.D. (Iowa, 1983); David B. Pryor, M.D. (Michigan, 1976); Joseph A. Puma, D.O. (New York Coll. of Osteopathy, 1985).

Assistant Consulting Professors: Syed Ahmed, M.D. (Dow Med. Coll., 1967); June Almenoff, M.D. (Mt. Sinai, 1985); Franc A. Barada, M.D. (Virginia, 1971); Robert P. Bauman, M.D. (Wayne State, 1977); Camille L. Bedrosian, M.D. (Harvard, 1983); Robert N. Belkin, M.D. (Cornell, 1980); Charles F. Bethea, M.D. (Oklahoma, 1971); Frederic Blum, M.D. (New York Univ., 1985); Dean A. Bramlett, M.D. (Illinois, 1976); J. Trig Brown, M.D. (Washington Univ., 1977); Cho-Yen Chiou, M.D. (Taipei Medical College, 1984); A. Alan Chu, M.D. (Duke, 1980); Gary J. Collins, M.D. (Uniformed Services, 1982); Peter J. Conlon, M.D. (Royal Coll. of Surgery, 1986); Edwin Cox, M.D. (Duke, 1971); Stephen C. Culp, M.D. (Vermont, 1986); Philip H. Dunn, M.D. (Duke, 1976); Nancy L. Earl, M.D. (North Carolina at Chapel Hill, 1982); Maha Elkordy, M.D. (North Carolina at Chapel Hill, 1988); Lewis D. Elliston, M.D. (Baylor, 1969); Donald F. Fortin, M.D. (Massachusetts, 1984); John W. Froggatt, III, M.D. (Miami, 1983); Andrew J. Ghio, M.D. (Boston Univ., 1981); F. Roosevelt Gilliam, M.D. (Duke, 1981); William Gough, M.D. (Rochester, 1976); Rochelle M. Hanley, M.D. (Michigan, 1978); Robert A. Harrell, M.D. (Johns Hopkins, 1980); M. Alycia Hassett, M.D. (Duke, 1978); John W. Hiemenz, M.D. (Virginia, 1978); Elizabeth H. Holt, M.D. (Wake Forest, 1986); Christine M. Hunt, M.D. (Boston, 1982); Susan F. Isbey, M.D. (North Carolina at Chapel Hill, 1987); Eric M. Janis, M.D. (Johns Hopkins, 1989); Souha Kanj, M.D. (St. Joseph, 1987); Elizabeth Kanof, M.D. (New York Univ., 1960); Vincent L.M. Keipper, M.D. (Vanderbilt, 1973); G. Wallace Kernodle, M.D. (North Carolina at Chapel Hill, 1981); Joel S. Kovarsky, M.D. (Iowa, 1972); Allan R. Krusell, M.D. (Tufts, 1986); Gunther Lallinger, M.D. (Ludwig, 1972); Carolyn K. Landolfo, M.D. (Texas, Southwestern, 1988); Andrew J. Laster, M.D. (Johns Hopkins, 1979); Virginia A. Lightner, M.D. (Duke, 1982); S. Spence McCachren, M.D. (Duke, 1978); Frank A. McGrew, M.D. (Case Western Reserve, 1970); J. Frederick McNeer, M.D. (Duke, 1972); Roderick B. Meese, M.D. (Cincinnati, 1981); Gwenesta B. Melton, M.D. (Tulane, 1979); Jeffrey Michel, M.D. (Southwestern, 1990); Lefkos T. Middleton, M.D. (University of Louis Pasteur, 1976); G. Diego Miralles, M.D. (Univ. of Buenos Aires, 1986); Robert D. Mitchell, M.D. (Michigan, 1982); Brant S. Mittler, M.D. (Duke, 1972); G. Radford Moeller, M.D. (Duke, 1977); Eva L. Morgenstern, M.D. (Connecticut, 1976); Rebecca L. Moroose, M.D. (Connecticut, 1980); John J. Murphy, M.D. (Northwestern, 1982); Robert B. Reynolds, M.D. (Royal College of Surgeons, 1984); Stephen H. Royal, M.D. (New York, Downstate, 1981); John H. Russell, M.D. (Virginia, 1963); Iqbal K. Savani, M.D. (Dow Medical, 1985); Ricky M. Schneider, M.D. (Yale, 1977); Ala Sharara, M.D. (Beirut, 1987); William J. Shergy, M.D. (Hahnemann, 1982); John B. Simpson, M.D. (Duke, 1973); David K. Smith, M.D. (Case Western Reserve, 1974); Adam F. Spitz, M.D. (SUNY at Brooklyn, 1988); James G. Wall, M.D. (North Carolina at Chapel Hill, 1982); Abe Walston, M.D. (Duke, 1963); Franklin C. Wefald, M.D. (Johns Hopkins, 1985); James O. Wynn, M.D. (Cornell, 1951); Lee H. Zehngbot, M.D. (Pennsylvania, 1976); Darryl C. Zeldin, M.D. (Indiana, 1986).

Consulting Associates: David J. Ahr, M.D. (Georgetown, 1969); Fred H. Allen, M.D. (Columbia, 1959); 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. (Univ. of Pennsylvania, 1989); Polly A. Beere, M.D. (Chicago, 1986); Alfonso E. Bello, M.D. (Univ. of 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. (Mount Sinai, 1983); Robert A. Buchanan, M.D. (Wake Forest, 1969); A. Gray Bullard, M.D. (North Carolina at Chapel Hill, 1985); Dwayne D. Callwood, M.D. (Medical Coll. of Virginia, 1989); Paul Campbell, M.D. (Temple, 1985); Stefani L. Capone, M.D. (Tulane, 1991); John F. Carr, M.D. (Univ. Tenn., 1968); Raul G. Castillo, M.D. (Ponce Sch. of Medicine, 1985); Charles J. Cattano, M.D. (SUNY at Syracuse, 1982); Geoffrey S. Chapman, M.D. (California at San Francisco, 1975); Ajit S. Chauhan, M.B.B.S. (BJ Medical School, 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 at Baltimore, 1987); James D. Daniels, M.D. (Med. Coll. of Virginia, 1966); Manuel H. Enriquez, M.D. (East-Ramon Magsaysay, 1979); Richard B. Everson, M.D. (Rochester, 1972); Kenneth A. Fath, M.D. (Ohio State, 1986); 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. Kabasan, M.D. (Univ. of Graz, 1977); Roger Karam, M.D. (Univ. of Los Andes, 1980); Shaukat A. Khan, M.D. (King Edward Med. Coll., 1986); Gerrit A. Kimmey, M.D. (Medical Univ. of SC, 1979); Joseph M. Kmonicek, M.D. (Jefferson, 1980); Fred M. Krainin, M.D. (Boston University, 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 at Chapel Hill, 1984); Linda F. Lukman, M.D. (St. George, 1990); Martin D. Mark, M.B.,ChB. (Cape Town Univ., 1979); Elisabeth A. McKeen, M.D. (Albany, 1974); Gary P. Miller, M.D. (Virginia, 1976); David C. Molthrop, Jr., M.D. (Louisiana State, 1987); Alexander Paraschos, M.D. (Med. Coll. of Virginia, 1986); Robert E. Pryor, M.D. (Baylor, 1986); Michael A. Rave, M.D. (Uniformed Services Univ., 1989); Veronica J. F. Ray, M.D. (North Carolina at Chapel Hill, 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. (UM.D.NJ, 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 Univ., 1982); Willie J. Sessions, M.D. (Tufts, 1985); 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. (Univ. of Montreal, 1987); Thomas F. Trahey, M.D. (Wake Forest, 1984); Janet K. Vasey, M.D. (Indiana, 1983); Robert A. Warner, M.D. (SUNY at Syracuse, 1969); Diane M. Williams, M.D. (Minnesota, 1987); Boshra George Zakhary, M.D. (Ain Shams Univ., 1981); William J. Zimmer, M.D. (Wisconsin, 1986).

Consulting Associates: **Duke University Affiliated Physicians (DUAP)**: Lori C. Abel-Meyerhoffer, M.D. (Univ. of South Florida, 1994); Martha B. Adams, M.D. (Univ. of Virginia, 1976); Nurum Erdem, M.D. (Univ. of Michigan, 1996); Ron D. Fleming, M.D. (Vanderbilt, 1984); Daniel C. Hu, M.D. (East Carolina, 1997); Carlton David Miller, M.D. (North Carolina at Chapel Hill, 1987); A. Dean Morgan, M.D. (Duke, 1975); Colleen P. Ramsey, M.D. (New Jersey Medical School, 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); John W. Whelan, M.D. (Jefferson, 1990).

Consulting Associates: **Community PDC Physicians (CPDC)**: Russell Anderson, M.D. (Duke, 1984); Timothy A. Collins, M.D. (Wayne State, 1988); Kimberly E. Edwards, M.D. (Miami, 1996); 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); Sydney G. Short, M.D. (West Virginia, 1983); Sharon L. Taylor, M.D. (New York University, 1982); Brian C. Torgerson, M.D. (Minnesota, 1978).

Emeriti: C. Edward Buckley, M.D.; Jerome M. Feldman, M.D.; Walter L. Floyd, M.D.; John T. Garbutt, M.D.; J. Caulie Gunnells, M.D.; Albert Heyman, M.D.; Jacqueline C. Hijmans, M.D.; Charles Johnson, M.D.; Yi-Hong Kong, M.D.; Johannes A. Kylstra, M.D.; Michael McLeod, M.D.; Harry T. McPherson, M.D.; Barbara Newborg, M.D.; Thomas F. Newcomb, M.D.; Richard M. Portwood, M.D.; Wendell F. Rosse, M.D.; Florence McAlister Professor of Medicine; Herbert A. Saltzman, M.D.; Herbert O. Sieker, M.D.; Harold R. Silberman, 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). The second year clerkship in medicine provides students with the basic humanistic and clinical skills as well as 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 careers. 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 plans(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 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 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 lines) 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 the Chair's Conferences, sign-out rounds with the Chief Medical Resident, 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. 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 his 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 his patients to faculty within twenty-four 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-205 or a combination of COMMFAM-207 and MEDICINE 207. Primary care students may complete the neurology clerkship during their fourth year. Weight: 4. *Chilukuri*

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. 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 the students are supervised by internal medicine residents. Alternative services include the MICU, CCU, Cardiology, and Hematology/Oncology. Supervision on these services is provided by internal medical residents and subspecialty fellows. 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. 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 see patients regularly in the Medical PDC. 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 sub-specialities. (3) Methods of Evaluation: The preceptor observes the student's interaction with patients and the quality of the student's evaluation, including assessments, plans, and follow-up on a daily basis. Prerequisites: Students must prearrange their elective with an individual preceptor and communicate the preceptor's approval to Dr. Waugh (681-6745). Credit: 2 (10 hrs/wk for 8 weeks), 4 (full time for 4 weeks or 20 hrs/wk for 8 weeks or 10 hrs/wk for 16 weeks), or 8 (full time for 8 weeks). *Waugh and staff*

MEDICINE-214C. Introduction to Outpatient Primary Care Internal Medicine. 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. 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). A highly diverse mix of patients is seen and might include persons with diabetes, heart disease, orthopedic conditions, skin disease, common men-

tal 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. Larry Greenblatt at least three weeks before the rotation begins. 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). *Greenblatt and general internal medicine staff.*

MEDICINE-220C. Emergency Medicine. (1) Course Goals: Primary - To provide a broad exposure to emergent clinical problems, emphasizing acute internal medicine in such a way that students can see patients before any other physician contact, permitting the learner to make initial diagnoses and plan short-term "workups". Secondary - To develop students' ability to rapidly obtain history and shorten the amount of time required to do a focused physical examination, to enhance dexterity when performing minimally invasive procedures, to gain experience and confidence by evaluating undifferentiated patient complaints, and to teach the concepts of triage and prehospital care. (2) How Goals Are Achieved: Each student works with attending physicians and residents (not interns) approximately twenty twelve-hour shifts, and in general does not spend the night. In collaboration with residents or senior staff, students are involved in diagnostic evaluations and therapeutic interventions. Didactic sessions cover clinical topics related to emergency medicine. (3) Methods of Evaluation: Residents and senior staff evaluate the student. Each student presents one case and leads a conference discussion on the diagnosis and emergency management of a patient they have seen during the rotation. Prerequisites: none mandatory, prior experience in other electives is beneficial. Credit: 4 or 8. Enrollment: min 1, max 4. *Minogue*

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. 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 re-

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 syllabus 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. Information may be obtained by telephoning Dr. Gilbert Schreiber at 286-6946 (Staff Assistant: Mrs. Sharon Waddell) or via email at schre002@mc.duke.edu. Credit: 5. Enrollment max 3. *Schreiber 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 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 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, 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, 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. *Wharton, Grant, Greenfield, Sorrentino, Bahnsen, 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. *Mediratta and Sharma*

MEDICINE-244C. In-Patient Cardiology Subinternship. (1) Course Goals: Primary - To provide an in-depth experience in the evaluation and care of in-patients 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 VA CCU, or a cardiology in-patient service at Duke, and, in concert with the housestaff, 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. Credit: 5. Enrollment: max 5. *Waugh and cardiology staff*

MEDICINE-245C. Consultative Cardiology. (1) Course Goals: 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; to develop the skills necessary to quickly and accurately interpret ECGs. (2) How Goals Are Achieved: Students are assigned to the consult service at either the VA Hospital or Duke, where, in concert with the resident, fellow and senior staff attending, they evaluate the operative risk for non-cardiac surgery as well as make decisions concerning evaluation and treatment of patients with ischemic and other types of heart disease. 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 questionnaire 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. 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 ap-

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 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 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 684-5146. Credit: 4. Enrollment: max 4. *Prose*

MEDICINE-255C. Pharmacotherapy of Common Problems in Internal Medicine.

The purpose of this course is to integrate basic pharmacology with rigorous clinical science in order to understand how drugs should be used to treat common medical problems. Topics covered include heart failure, stroke, arthritis, hypertension, asthma, diabetes, infectious disease, and cancer. Two lectures per week during the spring term. This course is offered to fourth year students for clinical credit. Third year students may take the course for basic science credit by registering for PHARM-255B. CL: PHARM-255B. Credit: 2. Enrollment: min 2. *Pritchett and Nadler*

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 primary care practitioners and their patients. It includes both historical and systematic philosophical analysis of these questions. Among topics addressed in this course are methods (e.g., clinical ethics, philosophical ethics, and public policy) as well as selected practice-related issues (e.g., truth-telling, confidentiality, informed consent). CL: COMMFAM-265C. 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 VA Hospital under the guidance of the resident, fellow, and faculty members assigned either to the 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 photodynamics 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 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. *Liddle 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-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, sixteen 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, 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, the student is 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 referred 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 hematology 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 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 oversubscribed, drops are not accepted within thirty days of the first day of classes unless the student finds 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 5. *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 apply 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, Ellis, Feinglos, Guyton, Green, Luttrell, 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 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. *McNeill 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 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 neurosurgical 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 responsi-

bility 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 twenty-four 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 to 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 are 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. 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 compliment the clinical experience. Attendance at Neurology Grand Rounds and various Neurologic Subspecialty Conferences are required. Experience on an inpatient neurology service such as MEDICINE-207C or MEDICINE-307C are prerequisites 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 Hospitals' 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, 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, 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 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/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. *Allen 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 15-20 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 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 and Clinic (VA), Geriatric Consultation Services (VA, Duke), extended care and rehabilitation center (VA) and other nursing home facilities, interactions with community services, home assessment and other. Principles to be stressed are biology and pathophysiology of aging, multiple clinical problems in the elderly, interdisciplinary team approach to evaluation, planning and treatment, 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 including the Duke Center for the Study of Aging. (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. Prerequisites: approval of course director. Credit: 4. Enrollment: max 2. *Cohen and staff*

MEDICINE-450B or C. Pathophysiology and Therapeutics of Human Disease. (1)

Course Goals: Primary: This course is designed to familiarize advanced students of medicine (years 3 and 4 of medical school) with a current understanding of the pathophysiological basis of common human diseases that is needed to understand therapeutic principles of those diseases. The course will build on that understanding to examine currently recommended treatments of the diseases in question, emphasizing how those treatments impact the disordered physiology. Secondary: The course will review many medical disorders commonly encountered in 21st century USA. It will familiarize students with these conditions and thus prepare them for their impending careers as house officers and for their eventual entry into medical practice. (2) How Goals Are Achieved: The course has a lecture format. Each lecture is delivered by a member of the Department of Medicine faculty who is a content expert in the topic being discussed. Lectures take advantage of computer-assisted facilities available in the Medical School. A portion of each lecture is reserved for interactive questioning of the audience using the computerized Audience Response System that gives instantaneous summaries of audience responses to questions. Those responses permit further discussion with the audience, allowing the instructor to emphasize the relevance of the questions to a full understanding of the lecture topic. (3) Methods of Evaluation: Grades are assigned on the basis of lecture attendance and student responses to the questions posed during the lecture. A written final examination covering the lectures is an option that may be implemented at the discretion of the course directors. Credit: 1.5. Enrollment: max 200. *Haynes, Neelon, and staff*

MICROBIOLOGY

Professor Jack D. Keene, Ph.D. (Washington, 1974), Chairman.

Professors: Deepak Bastia, Ph.D. (Chicago, 1971); Bryan R. Cullen, Ph.D. (New Jersey, 1984); Sharyn A. Endow, Ph.D. (Yale, 1975); Elwood Linney, Ph.D. (California at San Diego, 1973); Joseph R. Nevins, Ph.D. (Duke, 1976).

Adjunct Professors: Ken R. Harwood, Ph.D. (City University of NY, 1970); William Phelps, Ph.D. (Minnesota, 1985); Norman F. Weatherly, Ph.D. (Kansas, 1962).

Associate Professors: Soman Abraham, Ph.D. (Newcastle Upon Tyne, UK, 1981); Mariano A. Garcia-Blanco, M.D., Ph.D. (Yale, 1984); John D. Hamilton, M.D. (Colorado, 1964); Joseph Heitman, M.D., Ph.D. (Cornell, 1989; Rockefeller, 1992); Dolph Klein, Ph.D. (Rutgers, 1961); Kenneth N. Kreuzer, Ph.D. (Chicago, 1978); Thomas G. Mitchell, Ph.D. (Tulane, 1971); John R. Perfect, M.D. (Med. Coll. Ohio, 1974); David J. Pickup, Ph.D. (Natl. Inst. For Med. Research, London, 1979); Rytas Vilgalys, Ph.D. (Virginia Tech., 1985); Kenneth H. Wilson, M.D. (North Carolina, 1974); Peter Zwadyk, Jr., Ph.D. (Iowa, 1971).

Associate Research Professors: Lizzie J. Harrell, Ph.D. (North Carolina State, 1978); Sara E. Miller, Ph.D. (Georgia, 1972).

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

Assistant Professors: Kenneth Alexander, M.D., Ph.D. (Washington-Seattle, 1989); Gary M. Cox, M.D. (University of Virginia, 1989); Jonathan Freedman, Ph.D. (Albert Einstein, 1986); Richard Frothingham, M.D. (Duke, 1981); Matthias Gromeier, M.D., Ph.D. (Univ. Hamburg - Germany, 1992); Meta Kuehn, Ph.D. (Washington Univ., 1993); John H. McCusker, Ph.D. (Brandeis, 1986); Ross E. McKinney, Jr., M.D. (Rochester, 1979); Daniel J. Sexton, M.D. (Northwestern, 1971); Robin P. Wharton, Ph.D. (Harvard, 1986).

Assistant Research Professor: Barry S. Henderson, Ph.D. (Purdue, 1992).

Visiting Associate Professor: David J. Kroll, Ph.D. (University of Florida, 1989).

Research Associates: Ulus Atasoy, M.D.; Michael Burdick, Ph.D.; Craig Carson, Ph.D.; Arabinda Das, Ph.D.; Elena Dobrikova, Ph.D.; Kathleen Dudas, Ph.D.; Alan Goldstein, Ph.D.; Sayoko Harashima, Ph.D.; Joanne Kingsbury, Ph.D.; Bidyut K. Mohanty, Ph.D.; Sashidhar Mulugu, Ph.D.; Margaret S.

Neece, Ph.D.; Bradley Nicholson, Ph.D.; Eva Nilsson, Ph.D.; Erin O'Reilly, Ph.D.; James Pearson, Ph.D.; Luiz Penalva, Ph.D.; S. Shamsuzzaman, Ph.D.; Rahul Sharma, Ph.D.; Himanshu Sinha, Ph.D.; Hedi Sutterluety, Ph.D.; Scott Tenenbaum, Ph.D.; Fernando Tenjo, Ph.D.; Jianhong Wu, Ph.D.; Zhonghui Yang, Ph.D.; Xiaohua Zhang, 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

MICROBIO-200B. Microbiology. The 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*

Electives

MICROBIO-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: 4. Enrollment: min 5. *Keene, Alexander, Cullen, Nevins, and Pickup*

MICROBIO-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. Prerequisites: Permission of instructor. Credit: 3. Enrollment: max 10. *Krangel and staff*

MICROBIO-308B. Clinical Microbiology-Immunology. A bench-training course in methods used in clinical microbiology stressing isolation and characterization of clinically significant microorganisms. Course conducted at the VA hospital microbiology laboratory. Prerequisites: Permission of instructor. Credit: 8. Enrollment: max 4. *Zwadyk*

MICROBIO-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

George Barth Geller Professor for Research in Neurobiology Dale Purves, M.D. (Harvard, 1964), 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); Owen Flanagan, Ph.D. (Boston, 1977); David Fitzpatrick, Ph.D. (Duke, 1982); Warren G. Hall, Ph.D. (Johns Hopkins, 1975); William C. Hall, Ph.D. (Duke, 1967); Lawrence C. Katz, Ph.D. (California Instit. of Tech., 1984); Gregory McCarthy, Ph.D. (Illinois, 1980); David R. McClay, Ph.D. (North Carolina, 1971); James O. McNamara, M.D. (Michigan, 1968); J. Victor Nadler, Ph.D. (Yale, 1972); 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: Helene Benveniste, M.D. (Copenhagen, 1986), Ph.D. (Copenhagen, 1991);

Rose-Mary Boustany, M.D. (Amer. Univ. Beirut, 1979); Nell B. Cant, Ph.D. (Michigan, 1973); Joseph M. Corless, M.D. (Duke, 1972), Ph.D. (Duke, 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); Miguel A.L. Nicolelis, M.D. (Sao Paulo, 1984), Ph.D. (Sao Paulo, 1988); Stephen Nowicki, Ph.D. (Cornell, 1985); Peter H. Reinhart, Ph.D. (Australian National Univ., 1985); Donald E. Schmechel, M.D. (Harvard, 1974); Rochelle D. Schwartz-Bloom, Ph.D. (Georgetown, 1983); J. H. Pate Skene, Ph.D. (Washington Univ., 1980); Antonius Vandongen, Ph.D. (Univ. of Leiden, 1988); Fulton Wong, Ph.D. (Rockefeller, 1977).

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); Richard D. Mooney, Ph.D. (California Inst. Tech., 1991); Michael Platt, Ph.D. (Pennsylvania, 1994); Leonard White, Ph.D. (Washington Univ., 1992).

Associate Research Professors: William D. Matthew, Ph.D. (California-San Francisco, 1981); You-Wei Peng, M.D. (Zhongshan Med. College, 1982), Ph.D. (Baylor College of Med., 1989).

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 mammalian nervous system designed specifically for first-year medical students. Lectures, laboratory exercises, clinical presentations and problem-solving conferences. Credit: 4. *Cant and staff*

Electives

NEUROBIO-315B. Molecular Neurobiology. The macromolecules responsible for the specialized functions of neurons and glia. Topics stress the biochemical, molecular, cellular, and genetic processes involved in the development and function of the mammalian nervous system. Introductory biochemistry is recommended. Prerequisite: consent of instructors. Offered fall semester. C-L: Graduate School. Credit: 3. Enrollment: max 5. *Chikaraishi, Skene, and Reinhart*

NEUROBIO-317B. Neuronal Signaling: Ion Channels and Synapses. Basic principles of neural electrical signaling. Areas of emphasis include action potential generation, ion channel structure/function relationships, modulation of channel activity, neurotransmitter secretion, transmitter receptors, and mechanisms of synaptic plasticity. Prerequisite: consent of instructors. Offered fall semester. C-L: Graduate School. Credit: 3. Enrollment: max 5. *Augustine, Lo, and Reinhart*

NEUROBIO-321B. Systems Neurobiology. Structure and function of the mammalian sensory and motor systems, including their cognitive aspects. Prerequisite: consent of instructors. Offered spring semester. C-L: Graduate School. Credit: 3. Enrollment: max 5. *Nicolelis, Cant, Fitzpatrick, Purves, Simon, and Hall.*

NEUROBIO-322B. Developmental Neurobiology. The development of the nervous system covering both the history and present status of the major issues in the field. Prerequisite: consent of instructors. Offered spring semester. C-L: Graduate School. Credit: 3. Enrollment: max 5. *Mooney, Katz, and Lo*

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 Charles B. Hammond, M.D., E.C. Hamblen Chair of Reproductive Biology and Family Planning, (Duke, 1961), Chairman.

Professors: Walter L. Thomas Professor W. Allen Addison, M.D. (Duke, 1960); 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); 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); Charles H. Livengood, III, M.D. (Duke, 1976); Elizabeth G. Livingston, M.D. (Duke, 1984); Gustavo C. Rodriguez, M.D. (Illinois, 1985); Patricia M. Saling, Ph.D. (Pennsylvania, 1979); J. Brice Weinberg, M.D. (Arkansas, 1969).

Associate Clinical Professors: Stanley J. Filip, M.D. (Mt. Sinai, 1979); Stephen C. Gooding, M.D. (Bowman Gray, 1965); 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).

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); Grace M. Couchman, M.D. (Colorado, 1985); Andra H. James, M.D. (Virginia, 1993); Diana B. McNeill, M.D. (Duke, 1982); Amy P. Murtha, M.D. (Med. Col. of Pennsylvania, 1992); Evan R. Myers, M.D. (Pennsylvania, 1988); Donald H. Penning, M.D. (Queens, 1983); Alison C. Weidner, M.D. (Duke, 1992).

Assistant Clinical Professors: Cindy L. Amundsen, M.D. (Tennessee, 1991); Jeffrey C. Andrews, M.D. (Toronto, 1983); Paul S. Andrews, M.D. (North Carolina, 1981); Avis A. Artis, M.D. (Duke, 1984); Rudy W. Barker, M.D. (North Carolina, 1967); Diana Dell, M.D. (Louisiana State, 1982); Richard J. Dwane, M.D. (Georgetown, 1962); Anne C. Ford, M.D. (North Carolina, 1991); Joe W. Hardison, M.D. (North Carolina, 1965); Charles O. Harris, M.D. (North Carolina, 1979); William R. Lambeth, M.D. (Bowman Gray, 1974); Mary Lee Lobach, M.D. (Vanderbilt, 1984); William S. Meyer, M.S.W. (Illinois-Chicago, 1977); Gerard G. Nahum, M.D. (Stanford, 1984); Douglas J. Raburn, Ph.D. (Nebraska, 1990); David L. Richardson, Jr., M.D. (South Carolina, 1973); Ira Q. Smith, M.D. (Bowman Gray, 1979); 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, 1965); Michael D. Fried, M.D. (New York, 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. Virginia, 1979); Ronald E. Granger, M.D. (California-Irvine, 1977); William B. Gunter, Jr., M.D. (Emory, 1982); William D. Haithcock, M.D. (Med. Univ. 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. 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. Stegfried Smith, Jr., M.D. (Duke, 1961); Paul A. Vieta, M.D. (New Jersey, 1966); Bertram E. Walls, M.D. (Duke, 1972).

Research Associates: Weirong Shang, Ph.D. (Tennessee, 1994); Yulian Zhao, Ph.D. (Harbin, 1990).

Associates: David E. Abel, M.D. (SUNY-Syracuse, 1992); Angeles A. Alvarez, M.D. (Washington, 1994); Matthew D. Barber, M.D. (Jefferson, 1994); Elizabeth A. Bell, M.D. (North Carolina, 1990); Richard Blumrick, M.D. (SUNY, Stony Brook, 1992); Michael F. Carney, M.D. (Loyola, 1990); Martha L. Decker, M.D. (East Carolina, 1985); Peter D. Dwane, M.D. (McGill, 1967); Laura J. Havrilesky, M.D. (Duke, 1995); Johnathan M. Lancaster, M.D. (Univ. of Wales, 1992); Frederick W. Larsen, M.D. (Univ. of Virginia, 1994); Holly A. Muir, M.D. (Dalhousie, 1983); Jon A. Proctor, M.D. (Univ. of Colorado, 1985); Sharon L. Rupp, B.S., A.A.S.; Stuart D. Shelton, M.D. (Eastern Virginia, 1989); Ernest J. Zeringue, M.D. (Med. Univ. South Carolina, 1994).

Clinical Associates: Katrina H. Avery, M.D. (North Carolina, 1991); Elizabeth J. Burkett, B.S.N., M.S.N.; Susann L. Clifford, M.D. (Florida, 1993); MargEva M. Cole, M.D. (Harvard, 1993); Richard D. Duncan, III, M.D. (Tennessee, 1994); A. Dawan Gunter, M.D. (Michigan State, 1994); Jouko K. Halme, M.D., Ph.D. (Helsinki, 1968); Mary G. Hammond, M.D. (Florida, 1974); Janice L. Henderson, M.D. (Queens, 1983); Andréa S. Lukes, M.D. (Duke, 1994); Rebecca M. Ryder, M.D. (North Carolina, 1989); Kenneth D. Slack, M.D. (Albert Einstein, 1992); Shelley W. Wroth, M.D. (Columbia, 1992).

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); Mina N. Choi, M.D. (Duke, 1991); 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); 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).

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

Professor Emeriti: Arthur C. Christakos, 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

OBYN-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*

Electives

OBYN-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 an sub-intern. Outpatient, inpatient, and operative exposure to these patients is extensive. Credit: 4 or 8. Enrollment: max 1. *Clarke-Pearson, Soper, Berchuck, Rodriquez, and gynecologic oncology fellows*

OBYN-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*

OBYN-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. Permission of instructor required. Credit: 4. Enrollment: max 1. *Walmer, Couchman, Haney, Hammond, and reproductive endocrinology fellows*

OBYN-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 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. Inpatient care is not required, but participation in the operative care of gynecologic patients can be arranged if desired. Ample time for independent study is planned. The student is expected to utilize this time reviewing 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*

OBGYN-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 the 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 signing for the course. Credit: 4, 6, 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).

Associate Professors: R. Rand Allingham, M.D. (Cincinnati, 1979); Tereté Borrás, Ph.D. (Madrid, 1977); 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. Pennsylvania, 1983); Fulton Wong, Ph.D. (Rockefeller, 1977).

Assistant Professors: Catherine Bowes-Rickman, Ph.D. (Univ. of California, 1989); Pratap Challa, M.D., (Univ. of Florida, Gainesville, 1989), Joseph Corless, M.D., Ph.D. (Duke, 1972); Terry A. Cox, M.D. (Kansas, 1975); Sharon Fekrat, M.D. (Chicago, 1991); Leon W. Herndon, M.D. (North Carolina, 1991); Peter C. Huttmeier, M.D. (Copenhagen, 1977); Pedro Gonzalez, Ph.D., (Universidad de la Laguna, Canary Islands, Spain 1988); Terry Kim, M.D. (Duke, 1992); Brian McKay, Ph.D. (Wisconsin, 1995); Eric A. Postel, M.D. (Jefferson, 1991); Vasantha Rao, Ph.D., (Osmania University, Hyderabad, India 1989); Robin Vann, M.D. (Wake Forest, 1994); Julie Woodward, M.D., (Univ. of Texas at Houston, 1993).

Assistant Clinical Professors: David A. Chesnutt, M.D., (North Carolina, 1995); Laura B. Enyedi, M.D.; (North Carolina, 1993); Calvin H. Mitchell, M.D. (Duke, 1958); Ramin Mostafavi, M.D.; (Univ. of Medicine New Jersey, 1995); Laurie K. Pollock, M.D. (Johns Hopkins, 1986); William B. Rafferty, O.D. (Univ. of Alabama, 1977).

Assistant Research Professors: Wenjun Bao, Ph.D., (Oregon Graduate Institute, 1994); Margaret Pericak-Vance, Ph.D. (Indiana, 1978); You Wei Peng, Ph.D. (Johns Hopkins, 1992); Dennis Rickman, Ph.D. (Univ. of Los Angeles, 1993).

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

Associate Consulting Professor: Lawrence W. Moore, Jr., M.D. (Duke, 1963).

Assistant Consulting Professors: Andrew N. Antoszyk, M.D.(N/A); 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. Virginia, 1985); Anne Marie Hanneken, M.D. (Med. Coll. Wisconsin, 1984); Edward K. Isbey, III, M.D. (North Carolina, 1981); David Jones, M.D., Ph.D., (University of Miami); Phillip McKinley, M.D. (Tulane, 1972); Walter C. McLean, Jr., M.D. (Virginia, 1975); Charles F. Sydnor, M.D. (Virginia, 1969); 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. South Carolina, 1973); Robert E. Wiggins, M.D. (North Carolina, 1984).

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

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 housestaff 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. *Klintworth and Proia*

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. Students must devote at least three months to the elective. Credit: 4 or 8. Enrollment: max 2. *Klintworth, Wong, Proia, Jaffe, Epstein, and Borras*

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); Sandra H. Bigner, M.D. (Tennessee, 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); Keith A. Reimer, M.D. (Northwestern, 1972); Nancy Reinsmoen, Ph.D. (Minnesota, 1987); L. Barth Reller, M.D. (Virginia, 1966); Stanley J. Robboy, M.D. (California at

Los Angeles, 1965); Victor L. Roggli, M.D. (Baylor, 1976); John D. Shelburne, M.D., Ph.D. (Duke, 1972, 1971).

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

Associate Professors: Soman Abraham, Ph.D. (Newcastle Upon Tyne, U.K., 1981); 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. Huette, M.D., (Louisville, 1983); James G. Lewis, Ph.D. (Duke, 1982); Alan D. Proia, M.D. (Cornell, 1980), Ph.D. (Rockefeller, 1979); Christopher Shea, M.D. (Georgetown, 1983); 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); Uma Kant Misra, Ph.D. (Kansas State, 1958).

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

Assistant Professors: Rex Bentley, M.D. (Harvard, 1986); Scott Berkowitz, M.D. (Jefferson, 1979); Steven J. Bredehoeft, M.D. (Kansas, 1974); Mark W. Dewhirst, D.V.M., Ph.D. (Colorado State, 1975, 1979); Henry S. Friedman, M.D. (SUNY at Syracuse, 1977); Herbert Fuchs, M.D., Ph.D. (Duke, 1984); Jerry Gong, M.D. (Shanghai Medical Univ., 1986); Barbara K. Goodman, Ph.D. (Univ. of 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); 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. Medical College, Gujarat, 1980), Ph.D. (Univ. of Texas, 1989); James E. Lowe, M.D. (California at Los Angeles, 1973); Kim Lyerly, M.D. (California at Los Angeles, 1983); John F. Madden, M.D., Ph.D. (Duke, 1989); Roger C. McLendon, M.D. (Med. Coll. Georgia, 1982); Sara Miller, Ph.D. (Georgia, 1972); Thomas Ortel, M.D., Ph.D. (Indiana, 1985, 1983); L. Darryl Quarles, M.D. (Alabama, 1979); Greg Riggins, M.D., Ph.D. (Emory, 1994); Jonathan I. Scheinman, M.D. (Illinois, 1966); Angelica Selim, M.D. (Universidad de Buenos Aires of Medicine, 1990); Thomas Sporn, M.D. (Georgetown, 1986); Timothy T. Stenzel, M.D., Ph.D. (Duke, 1992); Pamela Sylvestre, M.D. (Univ. of Southern California, 1995); Marilyn Telen, M.D. (New York Univ., 1977); Philip J. Walther, M.D., Ph.D. (Duke, 1975, 1974); Michael R. Zalutsky, Ph.D. (Washington Univ., 1974).

Assistant Clinical Professors: John A. Bittikofer, Ph.D. (Purdue, 1971); Jane Gaede, M.D. (Duke, 1966); Claudia K. Jones, M.D. (Duke, 1985); Robert B. Kinney, M.D. (Duke, 1981); Richard J. Rahija, D.V.M. (Kansas, 1974), Ph.D. (North Carolina, 1989); Margaret C. Schmidt, M.A. (Louisville, 1969), Ed.D. (Duke, 1988); Frank A. Sedor, Ph.D. (Florida, 1971).

Assistant Research Professors: Mario Gonzalez-Gronow, D.Sc. (Chile, 1970); B. K. Ahmed Rasheed, Ph.D. (Indian Instit. 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. South Carolina, 1983); James D. Crapo, M.D. (Rochester, 1971); Lynn Crook, M.D. (Med. Univ. South Carolina, 1974), Ph.D. (Emory, 1966); Arthur Davis, M.D. (Minnesota, 1953); 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 at Los Angeles, 1972); Jerry E. Squires, M.D. (West Virginia, 1974), Ph.D. (Yale, 1971); Peter Wentz, Ph.D. (Florida, 1972).

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

Emeriti: Bernard F. Fetter, 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-200C. 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 empha-

sized. 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 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. Prerequisites: Permission of instructor. Credit: 4. Enrollment: max 2. *Stenzel*

PATHOL-241B. Pathologic Basis of Clinical Medicine. This is a lecture course stressing clinicopathologic correlation, morphologic diagnosis, pathophysiology, and laboratory medicine. It is required 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. *Dodd, Bigner, 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-353B. Neuropathology. A view of neuropathology that emphasizes clinicopathologic correlation. Credit: 3. *McLendon 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); James B. Sidbury Professor Rebecca H. Buckley, M.D. (North Carolina, 1958); Edward G. Buckley, M.D. (Duke, 1977); Y.T. Chen, M.D. (Taiwan Univ., 1973), Ph.D. (Columbia, 1978); 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. (University of 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); Joanne Kurtzberg, M.D. (New York Med. Coll., 1976); Darrell V. Lewis, Jr., M.D. (Minnesota, 1969); Jon N. Mellones, M.D. (Tufts, 1984); Stephen P. Sanders, M.D. (Louisville, 1975); William R. Treem, M.D. (Stanford, 1977); Martin H. Ullshen, 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); James A. Stockman III, M.D. (Jefferson, 1969); Norman S. Talner, M.D. (Michigan, 1949); W. Samuel Yancy, M.D. (Duke, 1965).

Associate Professors: Brenda E. Armstrong, M.D. (St. Louis, 1974); Roger C. Barr, Ph.D. (Duke, 1968); A. Resai Bengur, M.D. (Med. Univ. South Carolina, 1982); Rose-Mary Boustany, M.D. (Amer. Univ. Beirut, 1979); Philip Breitfeld, M.D. (Rochester, 1979); Dennis A. Clements, M.D. (Rochester, 1973), M.P.H., Ph.D. (North Carolina, 1988, 1990); Michael S. Freemark, M.D. (Duke, 1976); Sharon Freedman, M.D. (Harvard, 1985); Mary Min-Chin Lee, M.D. (SUNY-Buffalo, 1983); 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); Martin P. O'Laughlin, M.D. (Columbia, 1980); Neil Prose, M.D. (New York Univ., 1975); Philip M. Rosoff, M.D. (Western Reserve, 1978); 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: 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); David T.H. Tanaka, M.D. (Johns Hopkins, 1979); Gordon Worley, M.D. (Harvard, 1973).

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

Associate Research Professor: William D. Matthew, Ph.D. (University of California, San Francisco, 1981).

Assistant Professors: Kenneth A. Alexander, M.D. (Washington, 1989); Andrea Amalfitano, D.O., Ph.D. (Michigan State, 1990, 1989); Richard Auten, M.D. (North Carolina, 1981); William D. Bradford, M.D. (Western Reserve, 1958); Terrill D. Bravender, M.D., (Michigan, 1992), M.P.H. (Harvard, 1999); Ira M. Cheifetz, M.D. (Yale, 1989); Herbert E. Fuchs, M.D., Ph.D. (Duke, 1984); Timothy M. George, M.D. (New York University, 1986); Eva Nozik Grayck, M.D. (Colorado-Boulder, 1988); Sridharan Gururangan, M.B.B.S. (Madras Univ., 1981), M.R.C.P. (Royal College of Physicians, England, 1988); J. Rene Herlong, M.D. (Duke, 1989); Alicia M. Johnston, M.D. (SUNY, Syracuse, 1994); Howard A.I. Kader, M.D. (Nebraska, 1992); Priya Kishnani, M.D., B.S. (Bombay, 1985); Dwight D. Koeberl, M.D. (Mayo Medical School, 1990), Ph.D. (Mayo Graduate School, 1990); Richard M. Kravitz, M.D. (Temple, 1984); Jennifer Li, M.D. (Duke, 1987); Samuel M. Mahaffey, M.D. (West Virginia, 1979); Paul L. Martin, M.D., Ph.D. (Washington, 1987); Marie T. McDonald, M.D. (Trinity College, 1994); Erik N. Meyers, M.D. (Univ. of California, San Diego, 1990); Cindy Miller, M.D. (George Washington, 1985); Richard P. Morse, M.D. (Dartmouth, 1987); David A. Reardon, M.D. (Tufts, 1986); Joseph L. Roberts, M.D. (Emory, 1981), Ph.D. (Duke, 1992); Lisa A. Robinson, M.D. (Trinity College, Univ. of Toronto, 1991); M. Henderson Rourke, Jr., M.D. (Pennsylvania, 1963); Laura E. Schanberg, M.D. (Duke, 1984); Paul Szabolcs, M.D. (Sammelweis, 1985); Robert J. Thompson, Jr., Ph.D. (North Dakota, 1971); Judith A. Voynow, M.D. (Pennsylvania, 1982); John S. Wiener, M.D. (Tulane, 1988); Sherri A. Zimmerman, M.D. (UNC, 1991).

Assistant Clinical Professors: Jeffrey Baker, M.D. (Duke, 1984); Robert P. Drucker, M.D. (Duke, 1979); Nancy E. Friedman, M.D. (Med. Coll. Virginia, 1975); Karen H. Frush, M.D. (Duke, 1986); 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); J. Marc Majure, M.D. (Mississippi, 1981); Beatriz Morris, M.D. (Puerto Rico, 1988); John W. Moses, M.D. (Med. Univ. South Carolina, 1983); Christine Rudd, Pharm.D. (North Carolina, 1973); Gail Spiridigliozzi, Ph.D. (Kansas, 1988); Deborah Squire, M.D. (Northwestern, 1978); Karen S. St. Claire, M.D. (Texas-Galveston, 1982); Delbert Wigfall, M.D. (Emory, 1979).

Assistant Research Professors: Pasquale Chitano, Ph.D. (Milan, 1992); Michael D. Feezor, Ph.D. (North Carolina, 1969); Donald E. Fleenor, Ph.D. (Emory University, 1987); J. Francis Heidlage, Ph.D. (Missouri, 1978); Haixiang Jiang, M.D., Ph.D. (Shanghai Medical University, 1975, 1991); Stewart P. Johnson, Ph.D. (Case Western Reserve, 1983); Ailyn 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, New York, 1995); Gregory N. Barnes, M.D., Ph.D. (University of Kentucky, 1992, 1990); Michael P. Carboni, M.D. (Northeastern Ohio Univ. Coll. of Med., 1990); Kenji M. Cunnion, M.D. (Duke, 1993); Timothy A. Driscoll, M.D. (The Ohio State University, 1990); Richard P. Howrey, M.D. (Michigan, 1991); Rajiv K. Jain, M.D. (SUNY, Buffalo, 1996); Jennifer Lawson, M.D. (Vermont, 1990); L. Scott Levin, M.D. (Temple, 1982); Laurie A. Myers, M.D. (The Ohio State Univ., 1992); Thomas A. Owens, M.D. (SUNY-Buffalo, 1995); Alan M. Rice, M.D. (Miami, 1992); Roberts H.A. Smith, M.D. (Texas-Houston, 1990).

Clinical Associates: Joanne Barton, Dr.P.H. (North Carolina, 1990); Margarita Bidegain, M.D. (Facultad de Medicina, Universidad de la Republica, 1984); C. Michael Cotten, M.D. (Miami, 1986); Maria Luisa Escolar, M.D. (Colombian School of Medicine, 1986); Muki W. Fairchild, M.S.W. (North Carolina, 1976); Robert D. Fitch, M.D. (Duke, 1976); MaryLu Goldberg, Ph.D. (University of Miami, 1988); Kathryn E. Gustafson, Ph.D. (Ohio, 1988); Carmen M. Herrera, M.D. (University of Chile, 1990); Joy E. Kingston Hong, M.D. (Med. Coll. of Virginia, 1996); Myra McSwain Kamran, M.D. (Med. Coll. of Georgia, 1992); Edward F. Lueth, M.S.W. (UNC-Chapel Hill, 1982); Maria D. Martinez, M.D. (University of Navarra-Spain, 1994); Marcia Morgenlander, M.D. (Pittsburgh, 1988); Susan E. Owens, M.D. (SUNY, Buffalo, 1995); Alice M. Rothman, M.D. (Duke, 1997); William H. Schultz, P.A. (Duke, 1981); Yui-Lin Tang, M.D. (National Taiwan Univ., 1983); A. William Taub, M.S.W. (North Carolina, 1981); Diane C. Tenenbaum, M.D. (Tulane, 1992); Suzanne Trzcinski Woods, M.D. (Med. Coll. of Ohio, Toledo, 1994).

Research Associates: Yan An, Ph.D. (University of Ottawa, 1995); Ramamani Arumugam, Ph.D. (University of Madras, 1998); Ulus Atasoy, M.D. (Minnesota, 1984); Deeksha Sarihyani Bali, Ph.D. (Amritsar, 1987); Robert M. Beaty, Ph.D. (Tulane University, 1998); Shih-Fong Chao, Ph.D. (UNC, 1992); Sumeer Dhar, Ph.D. (Uppsala Universite, 1999); Enyu Ding, Ph.D. (Graduate School of Chinese Academy of Agricultural Sciences, 1993); Bernard M. Fischer, D.V.M., Ph.D. (NC State University, 1988, 1997); Bradley L. Hodges, Ph.D. (University of Illinois at Urbana-Champaign, 1997); Yang Sun Hou, M.D. (Harbin Medical University, 1982); Kitaro Kosaka, M.D. (Kyoto Prefectural Univ. of Med.); Qiang Li, M.D., Ph.D. (China Med. Univ., 1983); Univ. of Saskatchewan, 1996); Hui-Ming Liu, M.D. (Norman Bethune Univ., 1978); Alison J. McVie, Ph.D. (Univ. of Glasgow, 1997); Kyung-Duk Park, Ph.D. (Seoul National Univ., 1997); Svetlana N. Rylova, Ph.D. (Shemyakin and Ovchinnikov Institute, 1998); Wen-Ling Shaiu, Ph.D. (Iowa State University, 1993); Robert D. Stevens, Ph.D. (London, 1969); Sarah P. Young, Ph.D. (Institute of Child Health, 1997).

Associate in Research: Edward R. Darken, A.M. (Duke University, 1985); James H. Heller, M.A. (University of Minnesota, 1980), M.S. (Memorial Univ. of Nfld, 1983).

Consulting Professor: Thomas K. Oliver, Jr., M.D. (Harvard, 1949).

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

Associate Consulting Professors: Reese H. Clark, M.D. (UNC, 1982); Rosalind Coleman, M.D. (Case

Western Reserve, 1969); William L. London, M.D. (North Carolina, 1955); Howard H. Loughlin, M.D. (Pennsylvania, 1970); Evelyn 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); Thomas M. McCutchen, Jr., M.D. (Vanderbilt, 1963); Kathy A. Merritt, M.D. (Duke, 1985); Charles B. Neal, III, M.D. (Duke, 1955); 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. 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: 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. Virginia, 1960); Lisa Piglia Ferrari, M.D. (Duke, 1994); Jean M. Findlay, M.B., Ch.B. (Aberdeen, 1970); Gregory A. Fisher, M.D. (South Florida, 1976); 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. (Mount Sinai School of Medicine, 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); 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); Janice D. Stratton, M.D. (Tulane, 1961); Charles A. Trant, Jr., M.D. (East Carolina, 1989); Joseph W. Whatley, M.D. (Duke, 1958).

Emeriti: Edmond C. Bloch, M.B.; William Cleland, M.D.; Susan C. Dees, M.D.; 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.; 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 into 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*

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 noted on the registration card submitted to the Registrar's Office. 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	Karen Frush, M.D.	684-2246
Endocrinology	Michael S. Freemark, M.D.	684-3772
Gastroenterology	William R. Treem, M.D.	681-4841
Hematology/Oncology	Phillip Rosoff, M.D.	684-3401
Infectious Diseases	Ross McKinney, M.D.	684-6335
Medical Genetics	Y. T. Chen, M.D., Ph.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	Joanne Barton, Dr.P.H.	684-3172 [†]
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 2. *McKinney, Gutman, Katz, Drucker, Clements, Alexander, Johnston, and Cunnion.*

PEDS-215C. Endocrine Disorders in Children. Students attend in the Pediatric Endocrine, Diabetes, Neuroendocrine (Brain Tumor), 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. 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 act as sub-interns on the inpatients hematology-oncology service. They will not be required to take night or weekend call. Students may be asked to research a spe-

^{*}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 ED 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 is approximately two hours a day driving time, which allows for a one-on-one tutorial with the senior resident. The Special Topics course may vary from two to four weeks in length. Student may not drop within 60 days of the starting date without finding a replacement. Student must contact Dr. Barton three weeks before the course starting date.

cific topic and present a short presentation at the end of their rotation. Prerequisites: contact instructor. Credit: 4 or 8. Enrollment: max 1. *Rosoff, Ware, Adams, Zimmerman, Kreissman, Breiffeld, Nowrey, and Martin*

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

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 postoperative 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. Prerequisites: PEDS 205C. Credit: 4 (or 8 with special permission of the instructor). Enrollment: max 2. *Bengur, Sanders, Talner, and Armstrong*

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 Roberts*

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 and may take part in prenatal evaluations. May take with BIOCHEM-234B. 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. Prerequisites: PATHOL-362B suggested; 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 afternoons and Wednesday mornings. Optional clinic time may be arranged at Wake Teen Medical Services in Raleigh on Wednesday afternoons, or at the Sports Medicine Clinic on Thursday 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 2. *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 housestaff, 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 housestaff. Prerequisite: PEDS-205C. Credit: 5. Enrollment: max 2. *Cheifetz, Meliones, Kern, Schulman, and Grayck*

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 written permission of Dr. Robert Drucker or Dr. Deborah Kredich to register for or to drop this course on or after January 1, 2001. Credit: 5. Enrollment: max: 2. *Drucker, Kredich, 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. Prerequisites: contact Dr. Lewis. Credit: 4 or 8. Enrollment: max 2. *Lewis*

PHARMACOLOGY AND CANCER BIOLOGY

Professor Anthony R. Means, Ph.D. (Texas at Austin, 1966), Chairman.

Professors: Mohamed Abou-Donia, Ph.D. (California at Berkeley, 1966), Robert T. Abraham, Ph.D. (Pittsburgh, 1981), 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 Schwinn, M.D. (Stanford, 1983); Shirish Shenolikar, Ph.D. (Leeds, 1975); Theodore Slotkin, Ph.D. (Rochester, 1970); Gary Stiles, M.D. (Vanderbilt, 1975).

Associate Professors: Joseph Heitman, M.D. (Cornell, 1992), Ph.D. (Rockefeller, 1989); Homme Hellinga, Ph.D. (Cambridge, 1986); Madan Kwatra, Ph.D. (Montreal, 1977); Edward Levin, Ph.D. (Wisconsin, 1984); 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. (Los Angeles, 1986); A. Richard Whorton, Ph.D. (Vanderbilt, 1975).

Assistant Professors: Sheila Collins, Ph.D. (M.I.T., 1985); Christopher Counter, Ph.D. (McMaster, 1996); Yehia Daaka, Ph.D. (S. Florida, 1995); Walter Koch, Ph.D. (Cincinnati, 1990); Sally Kornbluth, Ph.D. (Rockefeller, 1989); Daniel Lew, Ph.D. (Rockefeller, 1990); Ponugoti Vasantha Rao, Ph.D. (Osmania, 1989); Tso-Pang Yao, Ph.D. (San Diego, 1994); John D. York, Ph.D. (Washington, 1993).

Research Professor: Wilkie A. Wilson, Jr., Ph.D. (Duke, 1971).

Assistant Research Professors: Ram Gupta, Ph.D. (West Virginia, 1971); Beth Harvat, Ph.D. (New Mexico, 1994); John David Norris, Ph.D. (Galway, 1998); Maxine Okazaki, Ph.D. (Toronto, 1984); 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 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).

Adjunct Associate Professors: Robert J. Kavlock, Ph.D. (Miami, 1977).

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 lec-

tures and one small-group, case-based discussion per week for eight weeks, May-June. Credit: 4. *Nadler and staff*

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. CL: Graduate School. Credit: 3. Enrollment: max 20. *Whorton and staff*

PHARM-255B. Pharmacotherapy of Common Problems in Internal Medicine. The purpose of this course is to integrate basic pharmacology with rigorous clinical science in order to understand how drugs should be used to treat common medical problems. Examples of topics to be covered are: heart failure, stroke, arthritis, hypertension, asthma, infectious disease, diabetes and cancer. Two lectures per week during the spring term. This course is offered to third year students for basic science credit. Fourth year students may take the course for clinical credit by registering for MEDICINE-255C. C-L: MEDICINE-255C. Credit: 2. *Nadler and Pritchett*

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 Medical College, 1978), Chairman.

DIVISION OF BEHAVIORAL MEDICINE

Redford B. Williams, Jr., M.D. (Yale, 1967), Division Head.

Professor: Roy J. Mathew, M.B. (Medical College of Trivandrum, 1970).

Associate Consulting Professor: Valerie F. Holmes, M.D. (Univ. of Louisville, 1980).

Assistant Clinical Professors: Lakshmi Kamaraju, M.D. (Andhra Univ., 1976); Indira M. Varia, M.D. (Shah Medical College, 1968); Michael R. Volow, M.D. (Seton Hall, 1964).

Clinical Associates: John G. Giragos, M.D. (Univ. Beirut); Katayoun Tabrizi, M.D. (Tehran Univ., 1984).

Research Associates: John Feaganes, Ph.D.; Michael J. Helms, B.S. (North Carolina at Chapel Hill, 1971).

DIVISION OF BIOLOGICAL PSYCHIATRY

P. Murali Doraiswamy, M.D. (Univ. Madras, 1987), Division Head.

Professors: Everett H. Ellinwood, Jr., M.D. (Univ. North Carolina at Chapel Hill, 1959); Saul M. Schanberg, M.D., Ph.D. (Yale, 1964); Theodore A. Slotkin, Ph.D. (Rochester, 1970); 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 Univ., 1975); Jeffrey Lieberman, M.D. (George Washington Univ., 1975).

Associate Professors: Edward D. Levin, Ph.D. (Wisconsin, 1984); Joseph P. McEvoy, M.D. (Vanderbilt, 1973); Rochelle Schwartz, Ph.D. (Georgetown, 1983); Bruno J. Urban, M.D. (Albertus-Magnus Univ., 1960).

Associate Clinical Professor: D. Larry Burk, M.D. (Univ. Pittsburgh, 1981).

Assistant Professors: Frederick Cassidy, M.D. (Vanderbilt, 1988); Scott D. Moore, M.D. (Univ. Virginia, 1986).

Assistant Clinical Professors: Marian Butterfield, M.D. (Univ. North Carolina at Greensboro, 1990); Lawrence A. Dunn, M.D. (Michigan, 1984); Manish A. Fozdar, M.D. (Gujarat Univ., India, 1982); Veeraindar Goli, M.D. (Osmania Medical College, 1978).

Assistant Consulting Professor: Stephen L. Oxley, M.D. (Kentucky, 1973).

Associate Research Professors: Sheila Collins, Ph.D. (Mass. Institute Technology, 1985); Tong H. Lee, M.D. (Stanford), Ph.D. (Duke, 1986); Jed E. Rose, Ph.D. (Univ. California at San Diego, 1978).

Assistant Research Professors: Colin Davidson, Ph.D. (Univ. London, 1996); Amir H. Rezvani, M.D. (Univ. Illinois, 1983).

Associate: Leann Nelson, M.D. (Texas, 1986).

Clinical Associates: Geoffrey M. Georgi; Kenneth R. Gersing, M.D. (Univ. Washington, 1993).

Consulting Associates: Christopher Byrum, M.D. (Univ. Virginia, 1988); Byron Cole, M.D.

(Cincinnati, 1960); Ugo Goetzl, M.D. (New York Medical College, 1968); Charlie Swanson, M.D. (Indiana Univ., 1991).

Adjunct Associate: Richard Weisler, M.D. (Univ. North Carolina at Chapel Hill, 1976).

Research Associate: Eiji Kirino, M.D., Ph.D. (Hokkaido Univ, Japan, 1989); Cindy Lazarus, Ph.D. (St. Andrews Univ., Scotland, 2000); Guiying Zhou, M.D. (China Medical Univ., 1988).

Associate in Research: Martha E. Payne, M.P.H. (Univ. North Carolina, Chapel Hill, 1996).

DIVISION OF CHILD AND ADOLESCENT PSYCHIATRY

Professors: John G. Looney, M.D. (Southwestern, 1969); John S. March, M.D. (Univ. California, Los Angeles, 1978).

Visiting Research Professor: Robert Coles, M.D. (Columbia, 1954).

Associate Professor: Adrian C. Angold, B.Sc. (London Hospital Med. School, 1976).

Associate Clinical Professors: Jean G. Spaulding, M.D. (Duke, 1972); W. Samuel Yancy, M.D. (Duke, 1961).

Assistant Professor: Lisa Amaya-Jackson, M.D. (Univ. North Carolina at Chapel Hill, 1986).

Assistant Clinical Professors: Allan Chrisman, M.D. (George Washington Univ., 1971); Karl Stevenson, M.D. (Bowman Gray, 1966).

Assistant Consulting Professors: Cesar Guajardo, M.D. (Univ. de Nuevo Leon, Mexico, 1961); James B. Payton, M.D. (Arkansas, 1971); Ingrid Pisetsky, M.D. (Albert Einstein, 1971).

Clinical Associates: Lucy T. Davis, Ed.D. (Columbia, 1955); Helen Egger, M.D. (Yale Univ., 1991); Ranota D.T. Hall, M.D. (East Tennessee State, 1987); Myra McSwain-Kamran, M.D. (Medical College of Georgia, 1992); Paul D. Nagy, M.S. (Florida State, 1984); Carol J. Vander-Zwaag, M.D. (Mount Sinai, 1986); Kendall Warden, M.D. (Univ. Missouri, 1992).

Consulting Associates: Peter F. Adland, M.D. (Georgetown, 1975); Linwood R. Aillsbrook, M.D. (Kentucky, 1981); Peter T. Daniolos, M.D. (Univ. N. Dakota, 1989); Bryon Herbel, M.D. (Univ. North Dakota, 1986); D. Randall Johnson, M.D. (Medical Univ. of South Carolina, 1983); Michael S. Lancaster, M.D. (Tulane Univ., 1975); Nancy J. Livingston, M.D. (Duke, 1972); Vladimir Maletic, M.D. (Univ. Belgrade, 1981); Karen M. Munstat, M.D. (Medical College of Ohio, 1990); Daphne Rosenblitt, M.D. (Duke, 1974); Donald L. Rosenblitt, M.D. (Duke, 1973); David A. Smith, M.D. (Alabama, 1980).

Research Associate: Tonya D. Armstrong, Ph.D. (Univ. North Carolina at Chapel Hill, 1998).

Instructor: Barbara J. Smith, M.Ed. (North Carolina Central, 1983).

Associate in Research: Aimee Nelson, M.Ed. (Temple Univ., 1994).

DIVISION OF GENERAL PSYCHIATRY

Clinical Professor: Steven Lipper, M.D. (Boston, 1972).

Associate Professor: Jean Hamilton, M.D. (Univ. Texas Health Science Center, 1977).

Associate Consulting Professor: Pedro J. Irigaray, M.D. (Univ. Nacional Autonoma de Mexico, 1955).

Adjunct Assistant Professor: Samuel B. Thielman, M.D., Ph.D. (Duke, 1980, 1986).

Assistant Clinical Professors: John L. Beyer, M.D. (Univ. Texas, 1989); Conrad C. Fulkerson, M.D. (Missouri, 1969); Michael Hertzberg, M.D. (Univ. North Carolina at Chapel Hill, 1985); Harold S. Kudler, M.D. (SUNY, 1979); 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 Univ., 1991); Philip Hillsman, M.D. (Univ. Tennessee at Memphis, 1987); Eric L. Kirchmann, M.D. (Washington Univ., 1995); Thomas M. Slaven, Ph.D. (Old Dominion Univ., 1983); Jonathan Weiner, M.D. (Univ. North Carolina at Chapel Hill, 1987).

Associate: Rosa F. Merino, M.D. (Case Western Reserve, 1985).

Instructor: Becky Hanusa, M.S. (Indiana Univ.)

DIVISION OF GERIATRIC PSYCHIATRY

Assistant Professor: David Steffens, M.D. (Univ. of Texas, 1988), Division Head.

J.P. Gibbons Professor: Dan G. Blazer, M.D. (Tennessee, 1969), Ph.D. (Univ. North Carolina at Chapel Hill, 1980).

Clinical Professor: Keith G. Meador, M.D. (Louisville, 1982).

Adjunct Professor: John C.S. Breitner, M.D., M.P.H. (Pennsylvania, 1970).

Associate Professor: Harold G. Koenig, M.D. (Univ. California, San Francisco, 1982).

Associate Research Professor: Judith C. Hays, R.N., Ph.D. (Yale, 1991).

Clinical Associates: Peter Barboriak, M.D., Ph.D. (Duke, 1989); Carol Saur, MSN (Univ. American School of Nursing, 1965); Sharon M. Wallsten, B.S.N., M.P.H. (Michigan, 1965).

Consulting Associates: Andree Allen, M.D. (Univ. Miami, 1982); Leslie Hocking, M.D. (Tufts Univ., 1983).

Research Associate: Bruce Burchett, Ph.D. (Carleton, 1983).

Instructor: Cornelia B. Service, M.P.H. (Univ. North Carolina at Chapel Hill, 1979).

Associate in Research: Ruth E. Eckles, B.A. (St. Andrews Presbyterian College, Laurinburg, 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 College, 1972); Robert Carson, Ph.D. (Northwestern, 1957); C. Keith Conners, Ph.D. (Harvard, 1960); Elizabeth J. Costello, Ph.D. (Univ. London, 1981); Herbert Crovitz, Ph.D. (Duke, 1970); Francis J. Keefe, Ph.D. (Ohio, 1975); Martin Lakin, Ph.D. (Chicago, 1955); Patrick Logue, Ph.D. (North Dakota, 1965); David Madden, Ph.D. (California at Davis, 1977); Susan Roth, Ph.D. (Northwestern Univ., 1973); Susan Schiffman, Ph.D. (Duke, 1970); Ilene C. Siegler, Ph.D. (Syracuse, 1973); Timothy J. Strauman, Ph.D. (New York Univ., 1987); Robert J. Thompson, Ph.D. (North Dakota, 1971).

Clinical Professor: Scott Swartzwelder, Ph.D. (American Univ., 1980).

Research Professors: John C. Barefoot, Ph.D. (Univ. North Carolina at Chapel Hill, 1968); Gerda Fillenbaum, Ph.D. (London, 1956); Jed E. Rose, Ph.D. (Univ. California, San Diego, 1978); William Wilson, Ph.D. (Vanderbilt, 1973).

Adjunct Professors: Bernard T. Engel, Ph.D. (Univ. of California, LA, 1956); Robert L. Hubbard, Ph.D. (Univ. Michigan, 1974); Florence Kaslow, Ph.D. (Bryn Mawr, 1969); John Lochman, Ph.D. (Connecticut, 1976); Martin T. Lowy, Ph.D. (Purdue Univ., 1982); Rune Simeonsson, Ph.D. (George Peabody College, 1971).

Associate Professors: Jean Beckham, Ph.D. (Florida State, 1988); John F. Curry, Ph.D. (Catholic, 1978); John A. Fairbank, Ph.D. (Auburn Univ., 1980); Mark Feinglos, M.D. (McGill, 1973); Richard S.E. Keefe, Ph.D. (New York Univ., 1990); Gail Marsh, Ph.D. (Iowa, 1968); Rochelle Schwartz-Bloom, Ph.D. (Georgetown Univ., 1983); Robert Shipley, Ph.D. (Michigan State, 1972); Andrew Sherwood, Ph.D. (Univ. Hull); Karen C. Wells, Ph.D. (Georgia, 1978); Kathleen A. Welsh-Bohmer, Ph.D. (Virginia, 1985).

Adjunct Associate Professors: Paul T. Costa, Jr., Ph.D. (Chicago, IL, 1970); Karen M. Gil, Ph.D. (West Virginia, 1985).

Associate Clinical Professors: James R. Clack, Ph.D. (Purdue Univ., 1970); Jack D. Edinger, Ph.D. (Virginia Commonwealth, 1971); Karen O'Donnell, Ph.D. (Univ. North Carolina at Chapel Hill, 1983); Rolffs S. Pinkerton, Ph.D. (Univ. 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 Consulting Professors: Lenore Behar, Ph.D. (Duke, 1973); Paul Brinich, Ph.D. (Univ. Chicago, 1974).

Associate Research Professors: Isaac M. Lipkus, Ph.D. (Univ. North Carolina at Chapel Hill, 1991); James Lane, Ph.D. (UCLA, 1979); Susan G. Silva, Ph.D. (North Carolina State Univ., 1991); William C. Wetsel, Ph.D. (Massachusetts Inst. Technology, 1983).

Assistant Professors: Jeffrey N. Epstein, Ph.D. (SUNY, Stony Brook, 1989); Kathryn Gustafson, Ph.D. (Ohio, 1988); Barbara R. Keith, Ph.D. (Univ. Alabama, 1992); Edward C. Suarez, Ph.D. (Miami, 1986).

Assistant Clinical Professors: Michael Babyak, Ph.D. (Univ. Kansas, 1995); Melanie J. Bonner, Ph.D. (Virginia Polytechnic Inst., 1995); John Barrow, Ph.D. (Houston, 1971); Robin A. Buhrke, Ph.D. (Southern Illinois Univ., 1982); Tracey Potts Carson, Ph.D. (Georgia, 1982); Jeanine M. Driscoll, Ph.D. (Univ. Maryland, 1996); Renee H. Dunn, Ph.D. (Univ. Southern Mississippi, 1996); Steve Herman, Ph.D. (Duke, 1977); Martin Ionescu-Pioggia, Ph.D. (Univ. North Carolina at Chapel Hill, 1985); Diane E. Johnson, Ph.D. (Univ. North Carolina at Greensboro, 1994); Scott H. Kollins, Ph.D. (Auburn Univ., 1997); Deborah C. Koltai, Ph.D. (California School-Professional Psychology, 1993); Albert D. Loro, Jr., Ph.D. (Washington, 1976); Thomas Lynch, Ph.D. (Kent State, 1996); Oliver Oyama, Ph.D. (Indiana, 1985); Rebecca Schein, Ph.D. (Fairleigh Dickinson Univ., 1992); Gail A. Spiridigliozzi, Ph.D. (Kansas, 1988); Craig R. Stenberg, Ph.D. (Denver, 1982); Barbara K. Walters, Ph.D. (Univ. Alabama, 1992); William K. Wohlegemuth, Ph.D. (Univ. Miami, 1995).

Adjunct Assistant Clinical Professor: Ronette L. Kolotkin, Ph.D. (University Minnesota, 1978).

Assistant Research Professors: Hayden B. Bosworth, Ph.D. (Penn State, 1996); Lisa Brauer, Ph.D. (Univ. Chicago, 1994); Beverly H. Brummett, Ph.D. (Univ. Kansas, 1996); Colin Davidson, Ph.D. (Univ. London, 1996); Brenda Plassman, Ph.D. (Univ. Arizona, 1986); Larry A. Tupler, Ph.D. (Emory, 1989); H. Ryan Wagner, Ph.D. (New Mexico, 1975); Lana Watkins, Ph.D. (Univ. North Carolina at Chapel Hill, 1991); Kevin P. Weinfurt, Ph.D. (Georgetown Univ., 1997).

Adjunct Assistant Professors: Randy Borum, Psy.D. (Melbourne Florida, 1992); Ralph Cooper, Ph.D. (Rutgers, 1973); William E. Schlenger, Ph.D. (North Carolina State Univ., Raleigh, 1974).

Assistant Consulting Professors: Teri Baldewicz, Ph.D. (Univ. Miami, 1997); William D. Barley, M.D. (Texas Tech., 1980); Lisa H. Brauer, Ph.D. (Univ. Chicago, 1994); William V. Burlingame, Ph.D. (Univ. Washington, 1967); Edward Landis, III, Ph.D. (Univ. Louisville, 1989); Richard L. Munger, Ph.D. (Univ. Michigan, 1979).

Clinical Associates: Linda Barnett, Ph.D. (Univ. Kentucky, 1981); Loretta E. Braxton, Ph.D. (Univ. North Carolina at Chapel Hill, 1989); Ernestine C. Briggs, Ph.D. (Univ. Illinois, Urbana, 1999); Anita Yvonne Bryant, Ph.D. (Univ. Maryland, 1991); Jill S. Compton, Ph.D. (Michigan State Univ., 1989); Scott N. Compton, Ph.D. (Univ. Nevada, 1998); Barbara Eldredge, Ph.D. (Southern Illinois, 1996); David Fitzgerald, Ph.D. (Univ. Notre Dame, 1995); Rebecca F. Frank, Ph.D. (Univ. North Carolina at Chapel Hill, 1994); Patricia J. Gammon, Ph.D. (Univ. North Carolina at Chapel Hill, 1990); Mary Gifford-Smith, Ph.D. (Univ. Pittsburgh, 1998); Marylu Goldberg, Ph.D. (Univ. Miami, 1988); Alisha B. Hart, Ph.D. (Univ. Colorado, 2000); Jill L. Hazlett, Ph.D. (Indiana State Univ., 1990); Pamela S. Hazlett, Ph.D. (Univ. North

Carolina at Chapel Hill, 1991); Judith Holder, Ph.D. (Southern Illinois Univ., 1995); Stephanie T. Jenal, Ph.D. (Univ. Southern California, 1996); Robert Mankoff, Ph.D. (Georgia State Univ., 1992); Douglas J. Mason, Ph.D. (Florida Inst. Of Psychology, 2000); Desiree W. Murray, Ph.D. (Univ. South Florida, 1977); Jennifer Norten, Ph.D. (Univ. North Carolina at Chapel Hill, 1995); Ruth E. Quillian, Ph.D. (Univ. Miami, 1994); Lisa Reiter-Lavery, Ph.D. (Catholic Univ., 1996); Victoria Reynolds, Ph.D. (Duke, 1999); Rashawn Roberts, Ph.D. (Case Western Reserve Univ., 2000); Anthony J. Smith, Ph.D. (Southern Illinois Univ., 1996); Elvia Y. Valencia, Ph.D. (Chicago School of Professional Psychology, 2000); Janet Whidby, Ph.D. (Duke 1987); Mark E. Wolever, Ph.D. (Univ. Toledo, 1997)

Consulting Associates: Steven J. Ashby, Ph.D. (Univ. Connecticut, 1976); Susanne E. Dunn, Ph.D. (Duke, 1989); Laura A. Gilliom, Ph.D. (Univ. North Carolina, Chapel Hill, 1997); Spencer Lylerly, Ph.D. (North Carolina State Univ., 1987); Robert J. McCarthy, Ph.D. (Univ. South Carolina, 1972); Michael Murray, Ph.D. (Univ. South Florida, 1993); Richard R. Rumer, Ph.D. (Univ. North Carolina at Chapel Hill, 1982); Laura J. Weisberg, Ph.D. (Univ. Maryland, 2000).

Adjunct Associates: Juesta M. Caddell, Ph.D. (VA Polytechnic Institute and State Univ., 1991); Anita P. Holmes, M.P.H., J.D. (Univ. North Carolina at Chapel Hill, 1972).

Instructors: Katherine L. Applegate, Ph.D. (Ohio State Univ., 2000); Christopher Edwards, Ph.D. (Univ. Kentucky, 1997); Kristina K. Hardy, M.A. (Duke, 1997); Pamela Maxson, Ph.D. (Penn State Univ., 1994); C. Toby McCoy, Ph.D. (Vanderbilt Univ., 1986); John T. Edwards, Ph.D. (Univ. Georgia, 1977); Elizabeth W. Jackson, Ph.D. (Univ. North Carolina at Chapel Hill, 1996); Lauren Levinson, Psy.D. (Illinois School of Professional Psychology, 1988).

Research Associates: Wenhong Cao, M.D. (Medicine Hunan Medical Univ., 1983); Anastasia Georgiades, Ph.D. (Uppsala Univ., 1998); Shirley X. Guo-Ross, Ph.D. (Univ. California, Irvine, 2000); Thomas Haney, M.S.P.H. (Univ. North Carolina at Chapel Hill, 1978); Celia F. Hybels, Ph.D. (Univ. North Carolina at Chapel Hill, 1997); Kari K. Lewis, Ph.D. (North Carolina State Univ., 1996); Margaret Maytan, M.D. (Univ. Umea); Alexander V. Medvedev, Ph.D. (Institute Cytology, 1991); Daniel A. Cordoba Montoya, Ph.D. (Universidad Nacional de Cordoba, 1998); Sandra M. Powers, Ph.D. (Univ. Connecticut, 1970); William S. Sampson, IV, Ph.D. (Univ. North Carolina at Chapel Hill, 1998); Srinivasan Sudha, Ph.D. (Indian Institute of Science, 1997); Miranda A.L. van Tilburg, Ph.D. (Tilburg Univ., 1997); Aaron White, Ph.D. (Univ. Miami, 1999); Jennifer Zervakis, Ph.D. (Duke, 1997).

Associates in Research: Dianna Gunnarsdottir, Ph.D. (Duke, 2000); Kristy S. Johnson, MA (Univ. North Carolina at Chapel Hill, 1999); Cynthia C. McCaskill, R.N., MSN (Univ. Michigan, 1967); Wendy Webster, MA (East Carolina Univ., Greenville, 1996); Nancy Zucker, Ph.D. (Louisiana State Univ., 2000).

DIVISION OF OUTPATIENT SERVICES

James B. Duke Professor: H. Keith H. Brodie, M.D. (Columbia, 1965).

Professor: Jonathan R.T. Davidson, M.D. (Univ. College, 1966).

Consulting Professor: Joseph DeVeauugh-Geiss, M.D. (SUNY-Upstate, 1972).

Adjunct Professor: Harold A. Pincus, M.D. (Albert Einstein College, 1975).

Associate Professor: Andrew Krystal, M.D. (Duke, 1987).

Associate Clinical Professor: Leonard Handelsman, M.D. (Albert Einstein College of Medicine, 1980).

Associate Consulting Professors: David M. Hawkins, M.D. (Duke, 1966); Alan Metz, M.B.B.Ch. (Univ. Witwaterstand, 1978).

Assistant Professor: Kathryn M. Conner, M.D. (Univ. Maryland, 1993).

Adjunct Assistant Professors: Charles D. Casat, M.D. (Boston Univ., 1963); Tana A. Grady, M.D. (Duke, 1986).

Assistant Clinical Professors: Diana L. Dell, M.D. (Louisiana State Univ., 1982); Leslie Forman, M.D. (Tufts, 1972); Kishore Gadde, M.D. (Guntur Medical College, 1978); Caroline Haynes, M.D., Ph.D. (Duke, 1983); David Naftolowitz, M.D. (Albany Medical Ctr., 1986); Grace Thrall, M.D. (Univ. Connecticut, 1991); Patricia A. Ziel, M.D. (Michigan, 1968).

Assistant Consulting Professors: Jack W. Bonner, III, M.D. (Southwestern, 1965); Martin G. Groder, M.D. (Columbia, 1964); Robert D. Phillips, M.D. (Pennsylvania, 1952); W. James Ryan, M.D. (LSU, 1972); Suzanne Sutherland, M.D. (Michigan State Univ., 1988); Pierre V. Tran, M.D. (Univ. de Franche, France, 1987).

Clinical Associates: Eileen P. Ahearn, M.D. (Duke, 1990); Melinda L. Brown, M.D. (Medical Univ. S.C., 1988); Greg Clary, M.D. (Univ. Texas, Houston, 1986); Doris M. Iarovici, M.D. (Yale, 1992); Marlene I. Robles, M.D. (Univ. Arizona, 1994); Nerine E. Tatham, M.D. (Howard Univ., 1992); Susan Wicke, M.D. (Ohio State, 1989); Floyd C. Wiseman, M.D. (Univ. 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. (Univ. North Carolina at Chapel Hill, 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 Medical College, 1968); Tracey C. Holsinger, M.D. (Univ. Virginia, 1992); Duncan McEwen, M.D. (Tulane Univ., 1982); Rex Moody, M.D. (Univ. North Carolina at Chapel Hill, 1987); Mindy Oshrain, M.D. (Duke, 1983); Peter Z. Perault, M.D. (Vermont, 1977); Roger Perilstein, M.D. (Temple, 1982); William Price, M.D. (Univ. North Carolina at Chapel Hill, 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. (Univ. North Carolina at Chapel Hill, 1983); David M. Susco, M.D. (Pennsylvania, 1983); Ronald L. Vereen, M.D. (Duke, 1981); James R. Weiss, M.D. (Louisiana, 1973); James S. Wells, Jr., M.D. (Univ. North Carolina at Chapel Hill, 1977).

Research Associate: Rosario Hidalgo, M.D. (Univ. Buenos Aires, 1991).

DIVISION OF PSYCHIATRIC SOCIAL WORK

Associate Muki Fairchild, M.S.W. (Univ. of North Carolina at Chapel Hill, 1976), Division Head.

Associate Clinical Professor: Lisa Gwyther, M.S.W. (Case Western Reserve, 1969).

Assistant Clinical Professors: William S. Meyer, M.S.W. (Illinois, 1977).

Associates: Edward Lueth, M.S.W. (Univ. North Carolina at Chapel Hill, 1982); Patricia Meadows, M.S.W. (Univ. Cincinnati, 1979); Diane E. Meglin, M.S.W. (Yeshiva, 1982).

Clinical Associates: Edna M. Ballard, M.S.W. (Univ. North Carolina at Chapel Hill, 1980); Mary Sue Cherney, M.S.W. (Univ. North Carolina at Chapel Hill); S. Kay Patterson, M.S.W. (Ohio State, 1967); Andrew Silberman, M.S.W. (Univ. North Carolina at Chapel Hill, 1982); Libby E. Webb, M.S.W. (Indiana Univ., 1980).

Consulting Associates: Bess Autry, M.S.W. (Univ. North Carolina at Chapel Hill, 1976); Mary Ann Black, M.S.W. (Univ. North Carolina at Chapel Hill, 1970); Mary Jane Burns, M.S.W. (Univ. North Carolina at Chapel Hill, 1974); Mary C. Cole, M.S.W. (Univ. Tennessee, 1971); Stephen Hawthorne, M.S.W. (California, 1974); Debbie Hill, M.S.W. (Univ. North Carolina at Chapel Hill, 1987); Lois P. Ostow, M.S.W. (Univ. North Carolina at Chapel Hill, 1981); Betty B. Parham, M.S.W. (Smith, 1971); Carolyn Thornton, M.S.W. (Univ. North Carolina at Chapel Hill, 1968); Stella Waugh, M.S.W. (Univ. North Carolina at Chapel Hill, 1986); Elinor T. Williams, M.S.W. (Univ. North Carolina at Chapel Hill, 1977); Margaret Wilner, M.S.W. (Columbia, 1977).

Instructors: Nan T. Birchall, M.S.W. (Pennsylvania, 1979); Vicki-Lynn Brown, M.S.W. (Univ. North Carolina at Chapel Hill, 1993); James Dolan, M.S.W. (Rutgers Univ., 1981); Cooley Gaffigan, M.S.W. (Univ. North Carolina at Chapel Hill, 1996); James R. Gonzalez, M.S.W. (Univ. North Carolina at Chapel Hill, 1998); M. Jane Howard, M.S.W. (Texas, 1979); Meryl Kanfer, M.S.W. (Univ. Pennsylvania, 1994); Laurel J. Lawson, M.S.W. (Univ. North Carolina, Chapel Hill, 1979); Gael McCarthy, M.S.W. (Univ. North Carolina at Chapel Hill, 1985); Ylana N. Miller, Ph.D. (California at Berkeley, 1975); Patrick J. Murphy, M.S.W. (Our Lady of the Lake, 1974); Maureen Murray, M.S.W. (Smith College, 1986); Linda A. Noyes, M.S.W. (Univ. Tennessee, 1983); Kristin K. Paulig, M.S.W. (Ohio State Univ., 1993); Natalie F. Peacock, M.S.W. (North Carolina at Chapel Hill, 1996); Twyla J. Peterson, M.S.W. (North Carolina at Chapel Hill, 1985); Donna Potter, M.S.W. (Syracuse Univ., 1997); Marilyn D. Reedy, M.S.W. (Tulane, 1964); Mickey Tullar, M.S.W. (North Carolina at Chapel Hill, 1982); Janis A. Williams, M.S.W. (Univ. Georgia, 1983); Bobby Williamson, M.S.W. (Michigan State, 1979); Ann S. Willoughby, M.S.W. (North Carolina at Chapel Hill, 1988); Maryanne Zabrycki, M.S.W. (Univ. Illinois, 1980).

DIVISION OF SOCIAL AND COMMUNITY PSYCHIATRY

Professor Marvin S. Swartz, M.D. (Tufts, 1980), Division Head.

Professors: Kurt Back, Ph.D. (MIT, 1949); James H. Carter, M.D. (Howard, 1966); Linda K. George, Ph.D. (Duke, 1975).

Adjunct Professor: David B. Larson, M.D. (Temple, 1973).

Associate Research Professor: Deborah T. Gold, Ph.D. (Northwestern, 1986).

Associate Consulting Professor: Nicholas Stratas, M.D. (Toronto, 1957).

Assistant Professors: Elizabeth M.Z. Farmer, Ph.D. (Duke, 1991); Jeffrey W. Swanson, Ph.D. (Yale, 1985).

Adjunct Associate Professor: B. Kathleen Jordan, Ph.D. (Duke, 1986).

Assistant Consulting Professors: Sally Johnson, M.D. (Jefferson, 1976); John G. Wagnitz, M.D. (Ohio State, 1971).

Assistant Research Professor: L. Richard Landerman, Ph.D. (Duke, 1978).

Clinical Associates: Ayesha Chaudhary, M.D. (Agakhan Univ., Pakistan, 1991); James N. Finch, M.D. (South Florida, 1981); Holly B. Rogers, M.D. (Univ. Texas, 1990); Susan A. Van Meter, M.D. (Univ. Oklahoma, 1991).

Consulting Associates: Bruce A. Berger, M.D. (Univ. Minnesota, 1977); Jeffrey Brantley, M.D. (Univ. North Carolina at Chapel Hill, 1977); Wiley Dickerson, M.D. (Medical Univ. S.C., 1989); Amilda Horne, M.D. (Univ. Texas Biomedical Graduate School, 1979); Gordon Lavin, M.D. (Case Western Reserve, 1978); Robert A. Millet, M.D. (Louisiana State, 1991); Thomas D. Owens, M.D. (LSU, 1985); Mark S. Reynolds, M.D. (Tulane Univ., 1983); James A. Smith, III, M.D. (Howard, 1976).

Instructor: Joanne B. Dellaero, M.Ed. (Univ. Houston, TX 1991).

Research Associate: Lori Ebert, Ph.D. (Univ. Illinois, 1999).

Associates in Research: Michael Hannon, Ph.D. (Ohio State Univ., 2000); Sandra C. Leak, M.A. (Duke, 1979).

Lecturers: Robert Rollins, M.D. (Duke, 1956); N.P. Zarzar, M.D. (American University, 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

ty 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 whenever appropriate opportunities can be provided. Credit: 6. *Stein*

Basic Science Electives

PSYCHTRY-213B. Human Development: Birth–Adolescence. This course is a survey of the psychological development of the child from birth through adolescence. The first segment of the course is designed to provide the student with an awareness of some of the major theoretical orientations to child development including the psychoanalytic, Piagetian, and social learning positions. This is followed by a systematic study of the normal sequence of child development, focusing in particular on some of the major events in the cognitive, social, and emotional life of the child. The course is run in seminar fashion utilizing numerous theoretical and research papers as well as observation of children in naturalistic settings to facilitate class discussion. Students also are required to familiarize themselves with research in child development by doing a review of the literature in a defined area. Students interested in this elective must contact Dr. Roy Stein at least eight weeks in advance of the rotation to confirm availability and develop a plan of study. Credit: 2. Enrollment: min 1. *Staff*

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. 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: 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-227C. Behavioral Aspects of Pediatrics. This course offers medical students the opportunity to study, as a part of an interdisciplinary team, the diagnosis and treatment of children and adolescents (ages two to twenty-one) with a variety of psychiatric problems. This may include anorexia nervosa, bulimia, enuresis, encopresis, school phobia, psychosomatic disorders, Tourette syndrome, suicidal and acting-out adolescents, chronically or terminally ill children, and child abuse and neglect cases.

Students study principles of psychological development, psychoanalytic, and family systems theory. The student participates in child, parent, and family interviews as an integral part of the treatment team. There is opportunity to be involved in the inpatient and outpatient treatment process on pediatric and adolescent psychiatric wards. C-L: PEDS-227C. Credit: 2-6. *McSwain-Kamran*

PSYCHTRY-240C. Subinternship in Psychiatry. This course is an intensive clinical experience in the diagnosis and treatment of severe and incapacitating psychiatric 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. *VanMeter*

PSYCHTRY-245C. Consultation-Liaison Psychiatry. The consultation-liaison services at both Duke Medical Center and 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 depends 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 (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-251C. Community Psychiatry. The student develops a course based on selections from a variety of community and special population settings. These include the Durham Mental Health Center and its component units (children's services, alcohol and drug abuse and dependency treatment programs, programs for the care and training of the mentally retarded, and adult psychiatry services), the Federal Corrections Center at Butner, and the psychiatric services and clinics at Duke and the Durham VA Hospital. Students interested in this elective must contact Dr. Marvin Swartz at least eight weeks prior to the term selected for this course in order to develop a program tailored to the student's interests. Credit: 4 or 8. Enrollment: max 2. *Swartz*

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. The student must contact Dr. Volow four weeks prior to the term selected to confirm availability. 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 assess-

ment 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 psychotherapy. Students function as members of the multidisciplinary treatment team at either site. Students interested in this elective must contact Roy Stein (for the VA) or Paul Nagy (for DAP) at least eight weeks prior to desired term in order to develop a plan appropriately tailored to the student's interests. Credit: 4-8. Enrollment: min 1, max 2. *Stein, Nagy.*

RADIATION ONCOLOGY

Professor Edward C. Halperin, M.D. (Yale, 1979), Chairman.

Professors: Christopher Coughlin, M.D. (Harvard, 1973); Mark W. Dewhirst, D.V.M., Ph.D. (Colorado, 1979); Randy Jirtle, Ph.D. (Wisconsin, 1975); Gustavo S. Montana, M.D. (Bogota, Columbia, 1960); Leonard Prosnitz, M.D. (SUNY, 1961).

Associate Professors: Mitchell S. Anscher, M.D. (Virginia, 1981); David Brizel, M.D. (Northwestern, 1983); Lawrence B. Marks, M.D. (Rochester, 1985); Thaddeus V. Samulski, Ph.D. (New York at Buffalo, 1975).

Assistant Professors: Shiva K. Das, Ph.D. (Duke, 1990); Patricia Hardenbergh, M.D. (Brown, 1991); Ellen L. Jones, M.D., Ph.D. (Dartmouth, 1992, 1990); M. Mifton, Ph.D.; Michael T. Munley, Ph.D. (Duke, 1993); Timothy Shafman, M.D. (Harvard, 1989); Curtis Whiddon, Ph.D. (Indiana, 1993); Su-Min Zhou, Ph.D. (Chicago, 1992).

Associates: Cynthia Ballenger, M.D. (North Carolina, 1995); Rachel Chou, M.D. (Tufts, 1992); Carol A. Hahn, M.D. (Georgetown, 1990); Sally S. Ingram, M.D. (North Carolina, 1988); Catherine G. Lee, M.D. (South Florida, 1988); Sushma Patel, M.D. (Pennsylvania State, 1993).

Basic Science Electives

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. Credit: 2. Enrollment: max 10. *DeWhirst*

RADONC-228B. The Basic Science of Oncology. In this course we discuss the molecular and cellular biology of cancer including oncogenes, tumor suppressor genes, growth factors, chromosomal abnormalities, cellular invasion and metastases, and the control of cell cycling. Tumor biology is considered including concepts of tumor doubling time, cell loss, tumor hypoxia, and fiber and foreign body, viral, and tobacco induced carcinogenesis/mutagenesis. The course concludes with a consideration of the basic science underlying cancer prevention, diagnosis, and therapy including the pharmacology of cancer chemotherapy, biologic and immunotherapy principles, radiobiology and hyperthermic oncology, and the scientific basis of surgical oncology practice.

Credit: 3. Enrollment: min 3, max 25. *Halperin, Marks, and guest lecturers*

RADONC-230B. Selected Topics in the Basic Science of Oncology. During the spring semester of the third year, students in the Cancer Biology Study Program are required to enroll in this seminar format course. Each week, students read a group of selected papers pertinent to the class. Then, at the ensuing class sessions, one of the researchers of the Cancer Center discusses the readings with the students and explores their application in his/her own laboratory. At the end of the semester, students are asked to review their own research in a format similar to a graduate seminar. Course grading is based on class participation and on a research paper which reviews the literature pertinent to the student's selected research topic. Credit: 1. *Halperin and staff*

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 in the ambulatory clinics of the Radiation Oncology Department as well as participation in brachytherapy procedures, care of inpatients, and new patient consultations. 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); James D. Bowie, M.D. (Oklahoma, 1967); Barbara Carroll, M.D. (Stanford, 1972); R. Edward Coleman, M.D. (Washington Univ., 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. (Univ. Texas-San Antonio, 1972); Barbara Hertzberg, M.D. (Duke, 1980); Ronald Jaszczak, Ph.D. (Florida, 1968); G. Allan Johnson, Ph.D. (Duke, 1974); Salutarío Martínez, M.D. (Havana Univ., 1961); Gregory McCarthy, Ph.D. (Illinois, 1980); Rendon C. Nelson, M.D. (Loma Linda, 1980); Edward F. Patz Jr., M.D. (Maryland, 1985); Tony P. Smith, M.D. (East Carolina, 1981); Leonard D. Spicer, Ph.D. (Yale, 1968); Charles Spritzer, M.D. (Pittsburgh, 1981); Michael R. Zalutsky, Ph.D. (Washington, 1974).

Associate Professors: Salvador Borges-Neto, M.D. (Federal Fluminense University, 1981); Hal Cecil Charles, Ph.D. (New Orleans, 1981); William Currie, Ph.D. (North Carolina-Chapel Hill, 1964); James Dobbins III, Ph.D. (Wisconsin, 1985); William Foster, Jr., M.D. (Duke, 1973); Donald P. Frush, M.D. (Duke, 1985); Michael W. Hanson, M.D. (West Virginia, 1974); Mark A. Kliewer, M.D. (Duke, 1985); Linda Gray Leithe, M.D. (Ohio State, 1982); James R. MacFall, Ph.D. (Maryland, 1976); H. Page McAdams, M.D. (Duke, 1986); Glenn E. Newman, M.D. (Duke, 1973); Erik K. Paulson, M.D. (Duke, 1985); James M. Provenzale, M.D. (Albany Med. College, 1983); Paul Suhocki, M.D. (Georgetown, 1985).

Associate Clinical Professors: D. Lawrence Burk, Jr., M.D. (Pittsburgh, 1981); Richard A. Leder, M.D. (Boston, 1984); Robert Vandemark, M.D. (Upstate Medical Center, 1980).

Associate Research Professors: David Gilland, Ph.D. (North Carolina-Chapel Hill, 1989); 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 at Buffalo, 1992); David Enterline, (North Carolina-Chapel Hill, 1982); Rosalie J. Hagge, M.D. (Washington, 1988); Joan P. Heneghan, M.B., B.Ch., B.A.O. (Univ. College of Dublin, 1988); Laura E. Heyneman, M.D. (North Carolina-Chapel Hill, 1992); Vincent Low, M.B.B.S., F.R.A.C.R. (Western Australia, 1983); Nancy Major, M.D. (Tufts, 1988); Edith Marom, M.D. (Sackler, 1990); Jeffrey R. Petrella, M.D. (Univ. of Medicine and Dentistry of New Jersey, 1987); Neil A. Petry, R.Ph., M.S., B.C.N.P., F.A.P.H.A. (Purdue, 1977); J. Mark Ryan, M.B., B.Ch., B.A.O., B.A. (Trinity College, Dublin, 1988); Ehsan Samei, Ph.D. (Michigan, 1997); Douglas Sheafar, M.D. (Washington, 1992); Allen W. Song, Ph.D. (Medical College of Wisconsin, 1996); Mary Scott Soo, M.D. (Wake Forest, 1987); Terence Z. Wong, M.D., Ph.D. (Dartmouth, 1990).

Assistant Clinical Professors: David Curtis, M.D. (Colorado, 1971); Michael W. Hanson, M.D. (West Virginia, 1974); Robert E. Reiman, M.D. (Case Western Reserve, 1987); Ruth Walsh, M.D. (Oklahoma, 1987); Donald Wenzel, M.D. (Georgetown, 1968); Margaret Eileen Williford, M.D. (Duke, 1976); Terry Yoshiumi, Ph.D. (Cincinnati, 1980).

Assistant Research Professors: Gamal Akabani-Hneide, Ph.D. (Texas AandM, 1990); Alan H. Baydush, Ph.D. (Duke, 1994); James Bowsher, Ph.D. (North Carolina-Chapel Hill, 1989); Michael J. Campa, Ph.D. (Florida, 1989); Timothy DeGrado, Ph.D. (Wisconsin at Madison, 1988); Edward Hsu,

Ph.D. (Johns Hopkins, 1996); Joseph Lo, Ph.D. (Duke, 1993); Atsushi Takahashi, Ph.D. (McGill, 1995); 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).

Associates: Eric L. Rosen, M.D. (California-San Francisco, 1991).

Clinical Associates: Siobhan Dumbleton, M.D. (Univ. College of Dublin, 1988); Lisa Ho, M.D. (Maryland, 1992).

Fellows: Diane Bergin, M.D. (Univ. College of Dublin, 1993); R. Lee Cothran, Jr., M.D. (Duke, 1995); Robert Cranley, M.D. (Boston, 1995); Royden Daniels, M.D. (Medical College of Virginia, 1996); Theodore Dorsay, M.D. (George Washington, 1991); Stephen Fine, M.D. (Massachusetts, 1995); Alexander Guo, M.D. (Johns Hopkins, 1994); Jeffrey Hinman, M.D. (Wayne State, 1995); Caroline Hollingsworth, M.D. (Texas, 1996); Markus Holzhauser, M.D. (Heidelberg, 1987); Janice Hwang, M.D. (Maryland, 1995); Shannon Kirk, M.D. (Loma Linda, 1994); Lisa Lee, M.D. (Medical College of Ohio, 1995); Jorge Leon, M.D. (Pontificia Universidad Javeriana, 1993); Thanh Nguyen, M.D. (McGill, 1995); Ryan Nielsen, M.D. (Creighton Univ., 1995); Tracey O'Connell, M.D. (North Carolina-Chapel Hill, 1996); Thomas Presson, Jr., M.D. (Wake Forest, 1995); James Ravenel, M.D. (Wake Forest, 1992); John Thomas, M.D. (Trivandum Medical College, 1987).

Basic Science Elective

RADIOL-250B. Research in Radiology. An individually arranged experience in which the student identifies with and participates in an established research program of a faculty member. Program should be arranged with DPA and proposed faculty member well in advance of starting date. Credit: 1-16. Enrollment: max 10. *G.A. 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. Prerequisite: must contact Dr. Frush prior to registration. 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. Prerequisites: must contact Dr. Provenzale prior to registration. 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 VA Hospital services. Credit: 4. Enrollment: min 4, max 9. *Major and staff*

RADIOL-230C. Thoracic Imaging. This course will provide the ability to interpret chest radiographs and increase the students 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: General Radiology elective preferred but not mandatory. Credit: 4. Enrollment: max 1. *Goodman and staff*

SURGERY

Professor Robert W. Anderson, M.D. (Northwestern, 1964), Chairman.

DIVISION OF GENERAL SURGERY

Professor Ralph R. 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); James B. Duke Professor Dani P. Bolognesi, Ph.D. (Duke, 1964), Experimental Surgery; J. W. and D. W. Beard Professor Eli Gilboa, Ph.D. (Weizmann Inst. Sci., 1977), Experimental Surgery; Gregory S. Georgiade, M.D. (Duke, 1973); John P. Grant, M.D. (Chicago, 1969); Walter J. Koch, Ph.D. (Cincinnati, 1990); Paul Kuo, M.D. (Johns Hopkins, 1985); George S. Leight, Jr., M.D. (Duke, 1972); H. Kim Lysterly, M.D. (California at Los Angeles, 1983); Richard L. McCann, M.D. (Cornell, 1974); Joseph A. Moylan, M.D. (Boston, 1964); Theodore N. Pappas, M.D. (Ohio State, 1981); Hilliard F. Seigler, M.D. (North Carolina, 1960); Bruce A. Sullenger, Ph.D. (Indiana, N/A); John L. Weinerth, M.D. (Harvard, 1967); Kent J. Weinhold, Ph.D. (Pennsylvania, 1979); Samuel A. Wells, M.D. (Emory, 1961).

Consulting Professor: Peter McKeown, M.B.A. (Florida, 1996).

Research Professors: Darel D. Bigner, M.D., Ph.D. (Duke, 1965, 1971); Per-Otto F. Hagen, F.H.W.C. (Watt Univ., Edinburgh, 1961), Experimental Surgery; Alphonse J. Langlois, Ph.D. (Duke, 1966), Experimental Surgery; Edwin L. Jones and Lucille Finch Jones Cancer Research Professor David C. Montefiori, Ph.D. (Clemson, 1982).

Associate Professors: Kathleen J. Clem, M.D. (Loma Linda, 1989), Emergency Medicine; Thomas J. Matthews, Ph.D. (Missouri, 1971), Experimental Surgery; Emil R. Petrusa, Jr., Ph.D. (Utah, 1979); Harry W. Severance, Jr., M.D. (Duke, 1981); Celette S. Skinner, Ph.D. (North Carolina at Chapel Hill, 1991); Douglas S. Tyler, M.D. (Dartmouth, 1985); Steven N. Vaslef, M.D. (Virginia, 1984); Kent J. Weinhold, Ph.D. (Pennsylvania, 1979), Experimental Surgery.

Associate Research Professors: Jeffrey R. Marks, Ph.D. (California, 1985), Experimental Surgery; David C. Montefiori, Ph.D. (Clemson, 1982).

Assistant Professors: Bryan M. Clary, M.D. (California, 1991); Bradley Collins, M.D. (Duke, 1989); W. Steve Eubanks, Jr., M.D. (Alabama, 1987); John L. Gray, M.D. (Duke, 1985); Jeffrey Lawson, M.D., Ph.D. (Vermont, 1991); Christopher Mantyh, M.D. (Wisconsin, 1991); John A. Olson, M.D. (Florida, 1992); Scott K. Pruitt, M.D. (Columbia, 1987), Ph.D. (Duke, 1994); Mark W. Sebastian, M.D. (Rush, 1987), Experimental Surgery; Janet E. Tuttle-Newhall, M.D. (Bowman Gray, 1988); Lee G. Wilke, M.D. (Duke, 1993).

Assistant Research Professors: Zeinab A. Abdel-Wahab, Ph.D. (Eastern Virginia, 1985), Experimental Surgery; Eric M. Clary, D.V.M. (Kansas, 1991); Timothy L. Darrow, Ph.D. (SUNY, 1980); Yuping Deng, Ph.D. (Virginia Polytechnic Inst., 1991); Sanford C. Garner, Ph.D. (North Carolina, 1989); Michael L. Greenberg, Ph.D. (SUNY, 1984), Experimental Surgery; Yiwen Li, M.D. (Zhejiang Medical, 1986); Smita K. Nair, Ph.D. (Tennessee, 1993); Emmanuel C. Opara, Ph.D. (London, 1984); William R. Parker, Ph.D. (Nebraska, 1992).

Assistant Clinical Professors: John J. Dallara, M.D. (Med. Coll. of Virginia, 1987); David N. DuBois, M.D. (Georgetown, 1983), Emergency Medicine; Paul C. Hendrix, B.S. (Coll. Charleston, 1970), B.H.S. (Duke, 1975), Emergency Medicine; Philip J. Hess, Jr., M.D. (ECU, 1992); Kirk A. Ludwig, M.D. (Cincinnati, 1988); Richard K. Serra, M.D. (Michigan, 1977), Emergency Medicine; Catherine A. Share, M.D. (Emory, 1986).

Assistant Consulting Professors: Louis H. Barr, M.D. (Georgetown, 1973); Rollins S. Burhans, Jr., M.D. (Louisville, 1963); Walter W. Burns, M.D. (North Carolina, 1969); John T. Daniel, M.D. (Howard, 1964); Joel Horowitz, M.D. (Pittsburgh, 1988); 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. Loehr, M.D. (Cornell, 1963); Stephen K. Rerych, M.D. (Columbia, 1974); David C. Ritter, M.D. (Texas, 1988); Phillip P. Shadduck, M.D. (California, 1986); Harvey A. Shub, M.D. (Rome, Italy, 1971); Peter S. Turk, M.D. (Indiana, 1985); James P. Weaver, M.D. (Pennsylvania, 1969); James S. Wilson, Jr., M.D. (North Carolina, 1975).

Adjunct Assistant Professors: Enrique Craido, M.D. (Complutensis, 1978); Stephen R. Petteway, Jr., Ph.D. (Alabama, 1980), Experimental Surgery.

Clinical Associates: Janet J. Hsu-Lin, M.D. (Tufts, 1994), Emergency Medicine; James E. Nicholson, III, M.D. (North Carolina, 1978).

Associates: John M. Brown, M.D. (Florida, 1984), Emergency Medicine; David A. Knapp, M.D. (California-San Diego, 1984), Emergency Medicine; John L. Morris, M.D. (Ohio State, 1986), Emergency Medicine; Bernadette R. Page, M.D. (Loyola, 1970), Emergency Medicine.

Research Associates: Andrea D. Eckhart, Ph.D. (North Carolina, 1997); Guido Ferrari, M.D. (Genoa, 1985); Wenshi Gao, M.D. (Capital Inst., 1982); Amy Hobeika, Ph.D. (Florida, 1997); Gudrun Huper, M.A. (Stuttgart, 1966); Brian St. John Manning, Ph.D. (Crumlin Hosp. 1992); Alexander Miron, Ph.D. (Duke, 1993); Takeshi Nagayasu, M.D., Ph.D. (Nagasaki Univ., 1987, 1996); Coren O. H. Oei, Ph.D. (Natl. Inst. Singapore, 1992); Laurence T. Rimsky-Clarke, Ph.D. (Paris, 1984); Christopher P. Rusconi, Ph.D. (Colorado, 1996); Eric Wagner, Ph.D. (Laval Univ., 1994); Takashi Watanabe, M.D. (Chiba Univ., 1986), Ph.D. (Nagoya Univ., 1995); Si-Xun Yang, M.D. (Suzhou Med. Col., 1986); Rahima Zennadi, Ph.D. (Nantes, 1992); Jintao Zhou, Ph.D. (Shanghai, 1985); Jiying Zhou, Ph.D., (Chinese Pharm. Univ., 1984).

DIVISION OF THORACIC SURGERY

Professor Peter K. Smith, M.D. (Duke, 1977), Chief.

Professors: Donald D. Glover, 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 at Los Angeles, 1973); James B. Duke Professor David C. Sabiston, M.D. (Johns Hopkins, 1947); Walter G. Wolfe, M.D. (Temple, 1963).

Associate Professors: James Jagggers, M.D. (Nebraska, 1988); David H. Harpole, M.D. (Virginia, 1984).

Associate Research Professor: Ares D. Pasipoularides, M.D., Ph.D. (Minnesota, 1971, 1972).

Associate Consulting Professor: Thomas J. Berger, M.D. (Tufts, 1971).

Assistant Professors: Thomas A. D'Amico, M.D. (College of Physicians and Surgeons, 1987); Robert D. Davis, M.D. (California, 1984); James Jagggers, M.D. (Nebraska, 1988); Kevin P. Landolfo, M.D. (Manitoba, 1985); Robert H. Messier, M.D. (Georgetown, 1988); Carmelo Milano, M.D. (Chicago, 1990); Eric M. Toloza, M.D., Ph.D. (UCLA, 1991).

Assistant Research Professors: James W. Davis, Ph.D. (Duke, 1993); Doris A. Taylor, Ph.D. (Texas, 1987).

Assistant Consulting Professors: Calvin P. Claxton, M.D. (Virginia, 1961); Robert Fietsam, M.D. (Wayne State, 1986); Charles A. Keller, Jr. (Louisiana State, 1959); John C. Lucke, M.D. (St. Louis, 1985); F. Maxton Mauney, Jr., M.D. (Duke, 1959); Amir A. Neshat, M.D. (Isfahan, 1960); Wayne H. Welscher, M.D. (SUNY at 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: Herbert E. Fuchs, M.D., Ph.D. (Duke, 1984); Michael M. Haglund, M.D., Ph.D. (Washington, 1987, 1988).

Associate Research Professors: Peter G. Aitkin, M.D. (Connecticut, 1978); Roger Madison, Ph.D. (Duke, 1981), Experimental Surgery; Ashok K. Shetty, Ph.D. (India Inst. Med. Sciences, 1990).

Assistant Professors: Michael J. Alexander, M.D. (Georgetown, 1991); Timothy M. George, M.D. (New York, 1986); John P. Gorecki, M.D. (Queens, Canada, 1983); William J. Richardson, M.D. (Eastern Virginia, 1977); John Sampson, M.D., (Manitoba, 1998), Ph.D. (Duke, 1996).

Assistant Research Professor: Rok Cerne, M.D. (Slovenia, 1987), Ph.D. (Iowa, 1993).

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, M.D. (Harbin Med., 1986); Janice O. Levitt, Ph.D. (Temple, 1963); Robert D. Pearlstein, M.S. (North Carolina, 1978); Gowri K. Pyapali, Ph.D. (Nehru Univ., 1989); Darion Rapoza, Ph.D. (Chicago, 1990); Maria Rapazo, Ph.D. (Duke, 1994).

DIVISION OF ORAL SURGERY

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).

Assistant Consulting Professor: George A. Walsh, D.D.S. (Georgetown, 1972).

DIVISION OF ORTHOPAEDIC SURGERY

Virginia Flowers Baker Professor James R. Urbaniak, M.D. (Duke, 1962), Chief.

Professors: John M. Harrelson, M.D. (Duke, 1964); James H. McElhaney, Ph.D. (West Virginia, 1964), Experimental Surgery; James A. Nunley, M.D. (Tulane, 1973).

Associate Professors: David E. Attarian, M.D. (Duke, 1980); Robert D. Fitch, M.D. (Duke, 1976); Richard D. Goldner, M.D. (Duke, 1974); William T. Hardaker, Jr., M.D. (Duke, 1973); L. Scott Levin, M.D. (Temple, 1982); Steven A. Olson, M.D. (Columbia, 1986); William J. Richardson, M.D. (Eastern Virginia, 1977); Sean P. Scully, M.D., Ph.D. (Rochester, 1986); Thomas Parker Vail, M.D. (Loyola, 1985).

Associate Consulting Professor: William J. Mallon, M.D. (Duke, 1984).

Associate Research Professors: Long-en Chen, M.D. (Peking Med. Coll., 1967), Ph.D. (Shanghai, 1983); Farshid Guilak, Ph.D. (Columbia, 1991).

Assistant Professors: Carl J. Basamania, M.D. (George Washington, 1984); Mark Easley, M.D. (Virginia, 1992); Lloyd A. Hey, M.D. (Harvard, 1988); Laurence D. Higgins, M.D. (SUNY, 1992); Edward G. Lilly, III, M.D. (Duke, 1993); S. David Stanley, M.D. (Duke, 1993).

Assistant Clinical Professors: George S. E. Aitken, M.D. (Case Western Reserve, 1982); Stephen N. Lang, M.D. (Illinois, 1965); Richard S. Moore, M.D. (North Carolina, 1991); Christopher Talley, M.D. (Virginia, 1991).

Assistant Consulting Professors: Quinn H. Becker, M.D. (Louisiana State, 1956); Edward W. Bray, III, M.D. (Med. Univ. 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); Rafael F Escamilla, Ph.D. (Auburn, 1995); 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); James J. Hoskie, M.D. (Michigan); Ralph A. Liebelt, M.D. (Michigan, 1985); C. Robert Lincoln, M.D. (Med. Coll. Virginia, 1960); Keith M. Maxwell, M.D. (Oral Roberts, 1982); Mark L.

Moody, M.D. (Georgetown, 1987); Ronald J. Neimkin, M.D. (Cornell, 1975); William S. Ogden, M.D. (Med. Coll. 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).

Assistant Research Professor: Wen-Ning Qi, M.D. (Peking Med. Univ., 1967).

Consulting Associates: Richard F. Bruch, M.D. (Illinois, 1972); Albert T. Jennette, M.D. (North Carolina, 1959); Ronald A. Pruitt, M.D. (Med. Coll. Virginia, 1959); William A. Somers, M.D. (Duke, 1972).

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).

Associate Professor: Debra L. Tucci, M.D. (Virginia, 1985).

Associate Research Professor: David W. Smith, Ph.D. (Michigan, 1986).

Assistant Professors: Gregory F. Hulka, M.D. (Duke, 1988); Richard L. Scher, M.D. (Cincinnati, 1985); David L. Witsell, M.D. (Colorado, 1990).

Assistant Research Professor: Roger L. Miller, Ph.D. (California, 1993).

Assistant Consulting Professors: Charles E. Clark, III, M.D. (Michigan, 1968); J. Charles Finn, M.D. (Case Western Reserve, 1989); Cameron A. Gillespie, M.D. (Virginia, 1974); Lynn A. Hughes, M.D. (Oklahoma, 1968); Johns F.P. Langford, M.D. (Mississippi, 1989); Robert E. Taylor, M.D. (Alabama, 1976); C. Emery Williams, M.D. (Louisiana, 1963).

Adjunct Assistant Professors: Charles C. Finley, M.D. (North Carolina, 1983); Dewey T. Lawson, Ph.D. (Duke, 1972); Christopher Van Den Honert, Ph.D. (Case Western Reserve, 1979).

Associate: Rowena J. Dolor, M.D. (Duke, 1991).

Consulting Associates: Peter G. Chikes, M.D. (North Carolina, 1972); Edward V. Hudson, M.D. (Bowman Gray, 1962).

DIVISION OF PEDIATRIC SURGERY

Associate Professors: Samuel M. Mahaffey, M.D. (West Virginia, 1979); Michael A. Skinner, M.D. (Rush, 1984).

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).

Consulting Professor: Verne C. Lanier, Jr., M.D. (Vanderbilt, 1966).

Associate Professor: Gregory S. Georgiade, M.D. (Duke, 1973).

Associate Clinical Professor: Ronald Riefkohl, M.D. (Tulane, 1972).

Associate Consulting Professor: Verne C. Lanier, Jr., M.D. (Vanderbilt, 1966).

Assistant Professor: Michael R Zenn, M.D. (Cornell, 1988).

Assistant Clinical Professors: James A. Hoke, D.D.S. (Ohio State, 1972), M.S. (Michigan, 1976); Gregory L. Ruff, M.D. (Michigan, 1978).

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 Univ., 1981); Kim E. Koger, M.D. (Duke, 1990); Roger B. Russell, M.D. (Bowman Gray, 1976); Luis R. Scheker, M.D. (Univ. of Santo Domingo, 1976).

Assistant Research Professor: Bruce M. Klitzman, B.S.E. (Duke, 1974), Ph.D. (Virginia, 1979); Kevin C. Olbrich, Ph.D. (Duke, 1997).

Consulting Associate: James T. White, D.D.S. (Loyola, 1966), M.S. (North Carolina, 1976).

Clinical Associate: Detlev Erdmann, Ph.D. (Tech. Univ. of Munich, 1990); Laura A. Gunn, M.D. (Tennessee, 1991).

DIVISION OF UROLOGIC SURGERY

Professor David F. Paulson, M.D. (Duke, 1964), Chief.

Professors: E. Everett Anderson, M.D. (Duke, 1958); Glenn M. Preminger, M.D. (New York Med. Coll., 1977); Cary N. Robertson, M.D. (Tulane, 1977); Philip J. Walther, M.D., Ph.D. (Duke, 1975); George D. Webster, M.B., Ch.B. (Univ. Coll. Rhodesia, 1968); John L. Weinerth, M.D. (Harvard, 1967).

Associate Professor: Craig F. Donatucci, M.D. (Temple, 1979); John S. Wiener, M.D. (Tulane, 1988).

Associate Research Professor: Pei Zhong, Ph.D. (Texas-Southwestern, 1992).

Assistant Professors: Yehia Daaka, Ph.D. (Southern Florida, 1995); John S. Wiener, M.D. (Tulane, 1988); Johannes Vieweg, M.D. (Munich Med. School, 1988).

Assistant Research Professors: John W. Day, Ph.D. (Iowa, 1972); Wendy Demark-Wahnefried, Ph.D. (Syracuse, 1988).

Assistant Clinical Professor: Andrew F. Meyer, M.D. (New York, 1969).

Assistant Consulting Professors: Robert W. Andrews, M.D. (Bowman Gray, 1980); Niall J. Buckley, M.B., B.Ch. (Univ. Coll. Dublin, 1979); Timothy Bukowski (SUNY, 1987); Hector H. Henry II, M.D. (Tulane, 1965); G. Byron Hodge, M.D. (Duke, 1977); George K. Ibrahim, M.D. (Duke, 1987); Raymond E. Joyner, M.D. (Bowman Gray, 1968); Jay H. Kim, M.D. (Boston Univ., 1989); Ignacio Sarmine, M.D.

(Med. Coll. of Ohio, 1982); Wade S. Weems, M.D. (Duke, 1962); Arthur W. Whitehurst, M.D. (Virginia, 1968).

Clinical Associate: Steven H. Herman, Ph.D. (Duke, 1977).

Research Associate: Liza Barki-Harrington, Ph.D. (Ben Gurion Univ., 1999); Karl B. Thor, Ph.D. (Pittsburgh, 1985).

DIVISION OF SPEECH PATHOLOGY AND AUDIOLOGY

Associate Clinical Professor Frank DeRuyter, Ph.D. (Washington, 1978), Chief.

Associate: Robert G. Paul, Ph.D. (Oklahoma, 1969).

Clinical Associates: Kevin Caves, B.S.M.E., A.T.P. (College of Engineering, Maryland, 1987); Gwendolyn O'Grady, Ph.D. (Kansas, 1999).

Required Course

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 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*

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, Anderson, Wiener, Weinerth, 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. Prerequisites: student must have the approval of Dr. Allan Friedman to register for this course. 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. Prerequisites: permission of instructor. 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 own individual project with the help of the neurosurgery staff. Attendance at weekly conferences is also required. Prerequisites: SURGERY-235C suggested. The student must have the approval of Dr. Wilkins and Dr. Turner to register for this course. 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. *Scher, Farmer, Fisher, Witsell, Hulka, and Tucci*

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 sub-interns 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. *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. Prerequisite: permission of instructor. 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 Brown*

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. *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, and operating room experience 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 surgical specialties, or orthopaedics. Credit: 4. Enrollment: max 5 for 4 weeks. *Urbaniak, Hardaker, Nunley, Goldner, Fitch, Lang, Richardson, Vail, Levin, Hey, Higgins, Basamania, Lilly, Moorman, and Olson*

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 out-patients, 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. *Jaggers*

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. Prerequisites: brief pre-enrollment interview with Dr. Kenneth Mahaffey. Credit: 4 or 8. Enrollment: max 2. *Mahaffey, Skinner, and Rice*

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, orthopaedics 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 participating 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. Attendance at Fracture Conference is required on Wednesdays and Saturdays at 7:30 a.m. in addition to two nights on call in the emergency room. Seeing patients in the Outpatient Clinic one day per week is required. Credit: 3. Enrollment: max 2. *Urbaniak, Duke orthopaedics staff, and Durham Regional Hospital orthopaedics 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 seventy-five 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, Davis, D'Amico, Georgiade, Grant, Jones, Jagers, Landolfo, Leight, Lowe, Lyerly, McCann, Sebastian, Seigler, Smith, Vaslef, and Wolfe*

SURGERY-301C. Emergency Department Surgical Care. Students desiring additional experience working with care of emergency surgical patients are assigned to the Emergency Department one night per week for each credit desired. They participate in the diagnosis and care of acute and traumatic surgical emergencies. Credit: 1-3. Enrollment: max 8. *Minogue*

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 multisystem 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*

Special Interdisciplinary Study Programs

ANESTHESIOLOGY, SURGERY, AND ENVIRONMENTAL PHYSIOLOGY STUDY PROGRAM (ASEP)

PROGRAM DIRECTORS: Kathryn P. King, M.D. (Coordinating Director), Richard Moon, M.D., Bryant W. Stolp, 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 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 using the students' projects as examples. 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 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 and Experimental Design" at the beginning of the year. Additional courses in Advanced Diving Physiology and Medicine are available for interested students.

Students meet with the coordinating director to monitor progress in the laboratory. The course directors meet regularly regarding the individual progress of students in the laboratories.

FACULTY: Richard L. Auten, Jr., Ph.D.; Peter B. Bennett, Ph.D., D.Sc.; Steve Eubanks, M.D.; Hilary P. Grocott, M.D., F.R.C.P.C.; Kathryn P. King, 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.; Thomas F. Slaughter, M.D.; Bryant W. Stolp, M.D., Ph.D.; Richard D. Vann, Ph.D.; Steven N. Vaslef, M.D., Ph.D.; David S. Warner, M.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 laboratory 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 required of all students: PSYCHTRY 223B, Neurobehavioral Basis of Behavior.

The courses listed below, although not required, are recommended for consideration:

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.; Jed E. Rose, Ph.D.; Saul M. Schanberg, M.D., Ph.D.; Susan S. Schiffman, Ph.D.; Rochelle D. Schwartz-Bloom, Ph.D.; David C. Steffens, M.D.; Andrew Sherwood, Ph.D.; 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.

BIOMEDICAL ENGINEERING STUDY PROGRAM (BES)

PROGRAM DIRECTORS: Donald D. Glower, M.D. and Farshid Guilak, Ph.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 organs and organ systems. The faculty have research laboratories that investigate these areas at the microscopic to the 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 hypotheses, 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.; Spencer Brown, Ph.D.; Raphael Escamilla, Ph.D., C.S.C.S.; Robert D. Fitch, M.D.; Morton Friedman, Ph.D.; Farshid Guilak, Ph.D.; Donald D. Glower, M.D.; Craig S. Henriquez, Ph.D.; Bruce M. Klitzman, Ph.D.; Andrew D. Krystal, M.D.; Jeffery H. Lawson, M.D., Ph.D.; Bruce J. Leone, M.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.; 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.; Greg Trahey, Ph.D.; George A. Truskey, Ph.D.; Ross M. Ungerleider, M.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.

BIOPHYSICS STUDY PROGRAM (BPP)

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 written summary of their work, 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: H. Cecil Charles, Ph.D.; James T. Dobbins, III, Ph.D.; Carey E. Floyd, Jr., Ph.D.; Laurence W. Hedlund, 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.

CANCER BIOLOGY STUDY PROGRAM (CBP)

PROGRAM DIRECTOR: TBA

The Cancer Biology Study Program offers third year medical students a thirty-two 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, radiobiology and hyperthermic oncology, and the pharmacology of cancer chemotherapy.

All students are required to take the three credit course RADONC 228B, "The Basic Science of Oncology", during the fall semester. In the spring semester, students are required to take RADONC 230B, Selected Topics in the Basic Science of Oncology. In this one credit seminar, students review selected topics in cancer biology. The remaining twenty-eight credits are earned through CBP 301B, Research in Cancer Biology.

FACULTY: Andrew Berchuck, M.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.; 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.; Michael C. Ostrowski, 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.

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 tract 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.; G. Vann Bennett, M.D., Ph.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.; Barton F. Haynes, M.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.; Robert J. Lefkowitz, M.D.; Ann LeFurgey, Ph.D.; Anthony R. Means, Ph.D.; Claude A. Piantadosi, M.D.; Keith A. Reimer, M.D., Ph.D.; Howard Rockman, M.D.; Debra A. Schwinn, M.D.; Jonathan S. Stamler, M.D.; Antonius M. J. VanDongen, Ph.D.; Xiao-Fan Wang, Ph.D.; A. Richard Whorton, Ph.D.

CLINICAL RESEARCH STUDY PROGRAM (CRP)

PROGRAM DIRECTOR: William E. Wilkinson, Ph.D.

This study program offers students the opportunity to explore the quantitative and methodological principles of clinical research. Under the direction of two preceptors, a clinical investigator and a statistician, students use the methods and techniques of biostatistics and related disciplines to address a clinical research question.

During the fall term, students are required to take two courses: Introduction to Statistical Methods (CRP 241) and Principles of Clinical Research (CRP 242). Other courses may be taken with the approval of the student's preceptors.

FACULTY: Lori A. Bastian, M.D.; Hayden B. Bosworth, Ph.D.; Robert M. Califf, M.D.; Elizabeth C. Clipp, Ph.D.; Harvey Jay Cohen, M.D.; G. Ralph Corey, M.D.; Elizabeth R. DeLong, Ph.D.; David Edelman, M.D.; Gerda G. Fillenbaum, Ph.D.; Linda K. George, Ph.D.; Steven C. Grambow, Ph.D.; Christopher Granger, M.D.; Robert A. Harrington, M.D.; Victor Hasselblad, Ph.D.; Helen Hoenig, M.D.; Ronnie D. Horner, Ph.D.; James Jollis, M.D.; Sheri A. Keitz, M.D.; Harold G. Koenig, M.D.; Maggie Kuchibhatla, Ph.D.; Kerry L. Lee, Ph.D.; Paul P. Lee, M.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.; L. Kristen Newby, M.D.; Eugene Z. Oddone, M.D.; Maren K. Olsen, Ph.D.; Eric D. Peterson, M.D.; Carl F. Pieper, Dr.P.H.; Dawn T. Provenzale, M.D.; Jaya Rao, M.D.; Gregory P. Samsa, Ph.D.; Kenneth Schmader, M.D.; Daniel J. Sexton, M.D.; David L. Simel, M.D.; Karen E. Steinhäuser, Ph.D.; Sandra S. Stinnett, Dr.P.H.; James A. Tulskey, 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: Laurence G. Branch, Ph.D.

The Epidemiology and Public Health Study Program is designed to provide third year Duke medical students with the knowledge regarding research tools to design 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 faculty preceptor in consultation with the program director.

Courses. Two courses are required: Introduction to Statistical Methods (CRP 241) and Principles of Clinical Research (CRP 242).

Practicum. Each student works in an epidemiology/health services/public health independent research activity (for example, illness etiology treatment, and outcome, decision analysis, health economics, or medical center financial operations). This occupies at least 50% of the student's time through the nine months and can occupy more depending on the election of courses.

Required Research. In conjunction with the practicum, each student is required to produce a research paper analyzing an area of epidemiology, health service research, finance, health systems, or health policy, 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 nine months, accumulating with the acceptance of the completed paper. Oral presentations at the AOA Symposium are also expected.

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. A student must apply both to the other school and to the Medical School by completing the Duke Third Year Elective Form. 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 and to complete all requirements for the M.P.H. degree during one academic year in fulfillment of their third year requirement. Dr. Branch is the director of this 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; Dr. Branch is the director), and the Duke Master's in Business Administration from the Fuqua School of Business (M.D./M.B.A. program; Dr. Kevin Schulman is the director). 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 Study Program Committee. Placements in the Cloisters 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: Lori A. Bastian, M.D.; Dan G. Blazer, M.D., Ph.D.; Laurence G. Branch, Ph.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.; Linda K. George, Ph.D.; Deborah T. Gold, Ph.D.; Judith C. Hays, Ph.D.; Ronnie D. Horner, Ph.D.; Robert H. Jones, M.D.; Daniel B. Mark, M.D., M.P.H.; David B. Matchar, M.D.;

Evan R. Myers, M.D., M.P.H.; Joellen M. Schildkraut, Ph.D.; Kevin A. Schulman, M.D., M.B.A.; David L. Simel, M.D., M.H.S.; Marvin S. Swartz, M.D.; James A. Tulsky, M.D.; Emmanuel Walter, M.D., M.P.H.

HUMAN GENETICS STUDY PROGRAM (HGP)

PROGRAM DIRECTORS: Marcy C. Speer, Ph.D. (Director); Assistant Directors: Margaret Pericak-Vance, Ph.D., and Jeffrey M. Vance, M.D., 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, 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 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. Students are expected to produce a written summary of their work at the end of the program, which may be a scientific manuscript.

In addition to the laboratory work, the program requirements include a 2 credit course Genetic Analysis for Human Disease offered in the fall semester and a year-long seminar series held weekly 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.; Yuan-Tsong Chen, M.D., Ph.D.; John R. Gilbert, Ph.D.; 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.; Margaret Pericak-Vance, Ph.D.; Joellen Schildkraut, Ph.D.; David A. Schwartz, M.D., M.P.H.; Marcy C. Speer, Ph.D.; Bruce Sullenger, Ph.D.; Jeffrey M. Vance, M.D., Ph.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 development 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 L. Gandy, M.D., Ph.D.; Eli Gilboa, Ph.D.; Russell P. Hall, III, M.D.; Barton F. Haynes, M.D.; Maureen R. Hoffman, M.D., Ph.D.; Donna D. Kostyu, Ph.D.; Michael S. Krangel, Ph.D.; Virginia B. Kraus, M.D., Ph.D.; 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.; Hilliard F. Seigler, M.D.; Ralph Snyderman, 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 care of patients of all ages and in each clinical specialty from surgery, pediatrics, and medicine to obstetrics-gynecology and family medicine. This study program provides students with the opportunity to directly explore infectious diseases in a laboratory setting coupled with lecture/seminar courses designed to provide knowledge of the host, microorganisms, and their interactions. The goals of the program are to instill a critical assessment of information, to provide the opportunity for 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. Most of the participating faculty members are involved in research that relates to microbial pathogenesis.

Each student selects a faculty preceptor with whom to work on an original research project. The student is expected to develop her or his own project within the framework of an existing laboratory, but designs her or his own experiments, critically assesses the relevant literature, learns to evaluate data, and has the opportunity to solve the problems associated with the project. Appropriate guidance and assistance are provided by the faculty and others within the laboratory setting.

- *Preceptorship.* This is the major emphasis of the program with students functioning essentially as graduate students. 30 hours or more per week.
- *Courses.* During the spring term, students may take either Virology and Viral Oncology (MICROBIO 252B), Comprehensive Immunology (MICROBIO 291B), or Microbial Pathogenesis (MICROBIO 282B), depending on the student's laboratory research interests.
- *Seminars.* Students in the Infectious Diseases Study Program attend seminars in which faculty members, fellows, and students present their ongoing research. Such presentations enable the student to observe and participate in critical analysis of research before it reaches the publication stage.
- *Additional Course Work.* Although other basic science electives in microbiology and immunology may be taken upon approval by the program director, the student is discouraged from excessively diluting her or his laboratory experience.

FACULTY: Kenneth Alexander, M.D., Ph.D.; John A. Bartlett, M.D.; Dani P. Bolognesi, Ph.D.; Rebecca H. Buckley, M.D.; Richard Frothingham, M.D.; Mariano A. Garcia-Blanco, M.D., Ph.D.; Carol Dukes Hamilton, M.D.; John D. Hamilton, M.D.; Joseph Heitman, M.D., Ph.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. Rietz, M.D., Ph.D.; Daniel J. Sexton, M.D.; Herman F. Staats, Ph.D.; J. Brice Weinberg, M.D.; Kenneth H. Wilson, M.D.

NEUROSCIENCES STUDY PROGRAM (NSS)

PROGRAM DIRECTORS: Michael D. Ehlers, M.D., Ph.D.

Through the Neurosciences Study Program, students may examine the nervous system at many levels. Areas of study include neuroanatomy, neurochemistry, neuropharmacology, neurophysiology, and developmental neurobiology as well as the neurobiology of a number of important diseases. Faculty in the study program are engaged in research that ranges from the molecular to the systems level. The program emphasizes a basic research experience or tutorial under the guidance of a preceptor, a weekly research seminar, and the opportunity to audit appropriate neurobiology courses during the year.

- *Research Experience.* The basic component of the NSS Study Program is an in-depth research experience in a basic science laboratory under the supervision of one of the participating faculty. Involvement in the research process can be at several levels. Most students wish to work full-time in a laboratory pursuing an independent research project, including an analysis of experiments and communication of the results. Students in this category who wish to attend courses are usually advised to audit them. Other students may wish to combine a part-time research experience with extensive course work. The appropriate level for each student should be determined in consultation with the study program directors and the research mentor. All students are expected to prepare written statements of their goals for the year with a detailed plan for accomplishing these goals. This could take the form of stating the problem to be studied, the hypotheses, and an outline of the work to be done. A final report is required and may take the form of a research paper or literature review. Publication is not required, but many students have been successful in publishing a report with their preceptors.
- *Seminar.* Students enrolled in the program meet weekly with the program directors and mentors for an informal seminar. In the beginning of the fall term, seminars focus on the planned projects of each student. At the end of the spring semester, the seminar focuses on work accomplished as each student presents a report of her or his research. During the rest of the year, invited speakers are asked to address particular topics of interest to be decided upon by the group, and literature readings are discussed.

FACULTY: George J. Augustine, Ph.D.; Jorge V. Bartolome, Ph.D.; Helene D. Benveniste, M.D., Ph.D.; Rose-Mary Boustany, M.D.; Nell B. Cant, Ph.D.; Dona M. Chikaraishi, Ph.D.; Joseph M. Corless, M.D., Ph.D.; Michael D. Ehlers, M.D., Ph.D.; Robert P. Erickson, Ph.D.; David Fitzpatrick, Ph.D.; William C. Hall, Ph.D.; Michael M. Haglund, M.D., Ph.D.; David A. Hosford, M.D., Ph.D.; Erich Jarvis, Ph.D.; Lawrence C. Katz, Ph.D.; Cynthia M. Kuhn, Ph.D.; Darrell V. Lewis, Jr., M.D.; Donald C. Lo, Ph.D.; Roger D. Madison, Ph.D.; William D. Matthew, Ph.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.D.; E. Lee Tyrey, Ph.D.; Jeffery M. Vance, M.D., Ph.D.; Wilkie A. Wilson, Jr., Ph.D.; Fulton Wong, Ph.D.

OPHTHALMOLOGY AND VISUAL SCIENCE STUDY PROGRAM (OVS)

PROGRAM DIRECTORS: Catherine Bowes Rickman, Ph.D. 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 director. 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 regularly scheduled 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, pathobiology, 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: Tereté Borrás, Ph.D.; 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 DIRECTORS: Patrick J. Buckley, M.D., Ph.D. (Coordinating Director) and Charles Steenbergen, 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) organized course work, b) independent, but guided research experience (bench or library), and c) active participation in small group seminars.

To meet the diverse interests and needs of Duke medical students, there are three tracks within the Pathology Study Program. All curriculum plans must be approved and signed by Dr. Buckley or Dr. Steenbergen prior to registration.

PSP Track I

Required Courses:	Systemic pathology; didactic lectures (PATHOL 241B); student seminar
Elective Courses:	None
Independent Study:	Research with thesis/project report required
Max number students:	6

PSP Track II

Required Courses:	Systemic pathology; didactic lectures (PATHOL 241B); autopsy, surgical, or cytopathology rotation (PATHOL 223B, PATHOL 348B, PATHOL 281B); student seminars
Elective Courses:	Limited
Independent Study:	Thesis/project report required
Max number students:	4

PSP Track III

Required Courses:	Systemic pathology; didactic lectures (PATHOL 241B); student seminars; autopsy, surgical or
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Elective Courses:	cytopathology rotation (PATHOL 223B, PATHOL 348B, PATHOL 281B) A carefully planned selection of preceptorships, e.g., molecular pathology, microbiology, surgical pathology, autopsy pathology, or transfusion medicine selected with the advice of Dr. Buckley or Dr. Steenbergen
Independent Study:	Thesis/project report required
Max number students:	2

Advisory Plan for Pathology Study Program. The Department of Pathology participates in the Medical School orientation to the third year. Following the general information session, interested students may meet with advisors to establish interviews for individual mentors. Every student must have a study program advisor and an individual mentor. The curriculum plan, academic schedule, and registration cards of each student selected for the Pathology Study Program must be reviewed and approved by Dr. Buckley or Steenbergen prior to registration.

FACULTY: Soman N. Abraham, Ph.D.; Darell D. Bigner, M.D., Ph.D.; Sandra H. Bigner, M.D.; Edward H. Bossen, M.D.; William D. Bradford, M.D.; Stephen J. Bredehoeft, M.D.; Dennis A. Clements, M.D., Ph.D.; Shella Collins, Ph.D.; Mark W. Dewhirst, D.V.M., Ph.D.; Steven Eubanks, M.D.; Marcia R. Gottfried, M.D.; Charles S. Greenberg, M.D.; Laura P. Hale, M.D.; David H. Harpole, M.D.; Maureen R. Hoffman, M.D., Ph.D.; David Howell, M.D., Ph.D.; Randy L. Jirtle, Ph.D.; William H. Kane, M.D., Ph.D.; Russel Kaufman, M.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.; Neil R. MacIntyre, M.D.; John F. Madden, M.D., Ph.D.; Sara E. Miller, Ph.D.; Salvatore V. Pizzo, M.D., Ph.D.; Alan D. Proia, M.D., Ph.D.; Mazin Qumsiyeh, Ph.D.; F.A.M.B.G.; 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.; Frank Sedor, Ph.D.; Christopher Shea, M.D.; 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.; Philip J. Walther, M.D., Ph.D.; J. Brice Weinberg, M.D.

PHARMACOLOGY AND MOLECULAR THERAPEUTICS (PMT)

PROGRAM DIRECTOR: Madan 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. A course in Pharmacotherapy of Common Problems in Internal Medicine (MEDICINE 255/PHARM 255) has been developed to enrich the research experience and is required for all students. In addition, a weekly seminar series, the Signal Transduction Collo-

quium, exposes participating students to a variety of topics presented by experts in the various relevant fields of research.

FACULTY: Mohamed Abou Donia, Ph.D.; Robert Abraham, Ph.D.; Nels C. Anderson, Jr., Ph.D.; Peter B. Bennett, Ph.D., D.Sc.; Vann Bennett, M.D., Ph.D.; Scott Brazer, M.D.; Marc G. Caron, Ph.D.; Patrick J. Casey, Ph.D.; Jonathan A. Cohn, M.D.; Sheila Collins, Ph.D.; O. Michael Colvin, M.D.; Christopher M. Counter, Ph.D.; Carlos de Castro, M.D.; Mark W. Dewhirst, D.V.M., Ph.D.; Everett H. Ellinwood, M.D.; Michael Freemark, M.D.; Larry Goldstein, M.D.; Christopher Granger, M.D.; John Hamilton, M.D.; Joseph Heitman, M.D., Ph.D.; Homme W. Hellinga, Ph.D.; Jack Keene, Ph.D.; Daniel P. Kiehart, Ph.D.; John A. Klingensmith, Ph.D.; Walter Koch, Ph.D.; Sally Kornbluth, Ph.D.; William E. Kraus, M.D.; Ranga R. Krishnan, M.D.; Cynthia M. Kuhn, Ph.D.; Peter Kussin, M.D.; Madan Kwatra, Ph.D.; Robert J. Lefkowitz, M.D.; Daniel Lew, Ph.D.; Rodger A. Liddle, M.D.; Haifan Lin, Ph.D.; Donald P. McDonnell, Ph.D.; James O. McNamara, M.D.; Anthony R. Means, Ph.D.; Elliott Mills, Ph.D.; Paul Modrich, Ph.D.; Thomas M. Murphy, M.D.; Victor Nadler, Ph.D.; Joseph R. Nevins, Ph.D.; Kristin Newby, M.D.; Christopher Nicchitta, Ph.D.; Christopher O'Connor, M.D.; Thomas Ortel, M.D.; Ann Marie Pendergast, Ph.D.; John Perfect, M.D.; David Pisetsky, M.D.; Gregory J. Riggins, M.D.; Don C. Rockey, M.D.; Johannes Rudolph, Ph.D.; Patricia M. Saling, Ph.D.; Saul M. Schanberg, M.D.; David W. Schomberg, Ph.D.; Rochelle D. Schwartz-Bloom, Ph.D.; Debra A. Schwinn, M.D.; Sean P. Scully, M.D., Ph.D.; Shirish Shenolikar, Ph.D.; Michael A. Shetzline, M.D., Ph.D.; Theodore A. Slotkin, Ph.D.; William St. Clair, M.D.; Bryant W. Stolp, M.D., Ph.D.; Laura Svetkey, M.D.; E. Lee Tyrey, Ph.D.; Antonius M. VanDongen, Ph.D.; Steven R. Vigna, Ph.D.; Judith A. Voynow, M.D.; David K. Walmer, M.D., Ph.D.; Xiao-Fan Wang, Ph.D.; Thomas Weber, M.D.; Richard A. Whorton, Ph.D.; Wilkie A. Wilson, Ph.D.; Jo Rae Wright, Ph.D.; Tso-Pang Yao, Ph.D.; Heather N. Yeowell, Ph.D.; John D. York, Ph.D.

Roster of Students*

Class of 2001

Altman, Jennifer J. (Tulane), Somerville, New Jersey
Anderson, Deverick J. (North Carolina at Chapel Hill), Durham, North Carolina
Asplin, Iain R. (Virginia), Charlottesville, Virginia
Balius, Anastasia M. (California at Berkeley), Anaheim, California
Banerjee, Audreesh (Delaware), Newark, Delaware
Bertrand, Scott W. (North Carolina at Chapel Hill), Greensboro, North Carolina
Bindal, Vishal (Duke), McLean, Virginia
Blackmon, Scott M. (North Carolina at Chapel Hill), Tabor City, North Carolina
Brown, Kimberly E. (Howard), Temple Hills, Maryland
Bucher, Laurette A. (Ohio), Kettering, Ohio
Burnett, Daniel R. (Pennsylvania), Greenfield, Massachusetts
Buxbaum, Evan R. (Williams), Madison, New Jersey
Cavazos, Christina M. (Harvard), Laredo, Texas
Chappell, Jonathan D. (Davidson), Mooresville, North Carolina
Cherwek, David Hunter (North Carolina at Chapel Hill), Fredericksburg, Virginia
Cigler, Tessa (Harvard), Charlotte, North Carolina
Cohen, Theodore (Oberlin), San Francisco, California
Courtney, Kevin D. (Dartmouth), Keene, New Hampshire
Deming, Katie A. (California-Santa Barbara), San Rafael, California
Dixon, Mary B. (Duke), Society Hill, South Carolina
Erickson, Christian P. (Texas-Austin), Waco, Texas
Evans, Lillian Q. (North Carolina at Charlotte), Charlotte, North Carolina
Gelaw, Bethlehem (Pennsylvania), Philadelphia, Pennsylvania
George, Isaac (Massachusetts Institute of Technology), Wendell, North Carolina
Gillary, Jennifer (Pennsylvania), San Francisco, California
Gist, Lauren E. (Wellesley), Del Mar, California
Gopal, Satish (North Carolina at Chapel Hill), Cary, North Carolina
Green, Ari Justin (Miami), Durham, North Carolina
Grunberg, Gregory E. (Amherst), New York, New York
Halperin, Terri J. (Harvard), Granville, New York
Harker, Eric J. (Willamette), Boise, Idaho
Harrild, David M. (Dartmouth), Durham, North Carolina
Hartwig, Matthew G. (Birmingham Southern), Hattiesburg, Mississippi
Hobbs, Hasan A. (Morehouse), Stone Mountain, Georgia
Holmes, Thomas M. (Duke), Buies Creek, North Carolina
Iyengar, Rajashri S. (California-Berkeley), Newark, Delaware
Jacobs, Michael K. (Vanderbilt), Stone Mountain, Georgia
Johnson, Kristine E. (North Carolina at Chapel Hill), Winston-Salem, North Carolina
Kaminski, Brian J. (Duke), Cincinnati, Ohio
Kong, Garyun B. (Harvard), Fresno, California
Kuhls, Elizabeth A. (Vanderbilt), Manassas, Virginia
Kukes, Thellea J. (Amherst), Woodland Hills, California
Lam, Gordon K. (Princeton), Honolulu, Hawaii
Lawrence, Laura B. (Wake Forest), Asheville, North Carolina
Legrand, Alexander B. (North Carolina State), Shelby, North Carolina
Leveque, Jean-Christopher (Amherst), Olney, Maryland
Liao, Peggy B. (Michigan-Ann Arbor), Novi, Michigan
Looney, Colin G. (Washington and Lee), Durham, North Carolina
Mallette, Quinterol J. (Duke), Hartford, Connecticut
Margolis, David A. (California at Los Angeles), Rolling Hills, California
Martinez, Frank (Illinois at Chicago), Chicago, Illinois
Martinez, Roger A. (Stanford), Socorro, New Mexico
McIntire, Katherine N. (California at Los Angeles), Solana Beach, California
McLachlan, Douglas I. (Morehouse), Redwood City, California
Minter, Karin T. (Cornell), New Haven, Connecticut
Mitchell, Duane A. (Rutgers), Somerset, New Jersey

*Hometown does not denote legal residence.

Morcos, John P. (Massachusetts College Pharmacy/Allied Health), Suitland, Maryland
 Murphy, Richard C. (Duke), Tarrytown, New York
 Murray, John P. (Boston), Winchester, Massachusetts
 Nallamshetty, Shriram (Columbia), Orlando, Florida
 Parsons, Daniel J. (Trinity), Minneapolis, Minnesota
 Patel, Akash A. (North Carolina State), Cary, North Carolina
 Pham, DuyKhanah T. (North Carolina at Chapel Hill), Charlotte, North Carolina
 Pollock, Maria C. Gonzalez, (North Carolina at Chapel Hill), Wilmington, North Carolina
 Port, Carolyn Caltyon (Duke), Charlotte, North Carolina
 Pulver, Aaron F. (Vanderbilt), Medford, Oregon
 Pulver, Laurie Self (Davidson), Greenwood, South Carolina
 Quinn, Michele T. (North Carolina at Chapel Hill), Charlotte, North Carolina
 Raetz, Jaqueline G. (Yale), Rougemont, North Carolina
 Richeimer, William E. (Cornell), Orange, Connecticut
 Richmond, Marc E. (Pennsylvania), Franklin Square, New York
 Rouf, Rosanne (Massachusetts Institute of Technology), Glen Carbon, Illinois
 Sachdev, Molly (Duke), East Amherst, New York
 Sarvis, Sarah S. (Massachusetts Institute of Technology), Rockville, Maryland
 Scannell, Ryan B. (Duke), Worcester, Massachusetts
 Schofield, Kelly A. (Utah), Logan, Utah
 Shah, Amit N. (Maryland College Park), Potomac, Maryland
 Shin, Eun J. (Harvard), Baltimore, Maryland
 Sinnar, Shamim A. (Maryland at College Park), Columbia, Maryland
 Stevens, Keisha C. (Duke), Goldsboro, North Carolina
 Sudarshan, Sharon (Harvard), Wichita Falls, Texas
 Tebbit, Christopher L. (North Carolina at Chapel Hill), Greensboro, North Carolina
 Tillem, Elizabeth J. (Michigan-Ann Arbor), Jackson Heights, New York
 Twining, Christine (Harvard), Falmouth, Maine
 Walton, Kelly A. (North Carolina at Chapel Hill), Charlotte, North Carolina
 Waugh, Michael S. (Bucknell), Durham, North Carolina
 Weiss, Stefan C. (Yale), Hollywood, Florida
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 Weng, Haoling (Duke), Taipei, Taiwan ROC
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 Woel, Roxanne T. (Yale), Baltimore, Maryland
 Wu, Chen-Sen (Stanford), Federal Way, Washington
 Wu, Joy Yee-Jia (Stanford), Voorhees, New Jersey
 Yacoubian, Talene A. (Harvard), Chattanooga, Tennessee
 Yi, Sang P. (Stanford), Potomac, Maryland
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Adlakha, Charu L. (Massachusetts Institute of Technology), Columbia, Maryland
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 Atchison, Fawn W. (Minnesota), Duluth, Minnesota
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 Baker-Lepain, Julie C. (Notre Dame), St. Charles, Illinois
 Barnett, Andy S. (Harvard), North Brunswick, New Jersey
 Bass, Adam J. (Amherst), Bethesda, Maryland
 Berg, Sigrid E. (Harvard), Arlington, Virginia
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 Bordeaux, Jeremy S. (North Carolina State), Castle Hayne, North Carolina
 Bowman, Michael K. (Dartmouth), Atlanta, Georgia
 Brazeale, Caryn B. (Johns Hopkins), Elyria, Ohio
 Brown, Carrie L. (Princeton), Cohasset, Massachusetts
 Cabrera, Yessica E. (Massachusetts Institute of Technology), North Miami, Florida
 Cancel, Quinton V. (Washington), Florissant, Missouri
 Casal, Suzette G. (Duke), Coral Gables, Florida
 Changizi, Barbara K. (Virginia), Newtown, Pennsylvania
 Chen, Jarvis C. (Washington), Lincoln, Nebraska
 Chen, June (Harvard), Pine Brook, New Jersey

Choy, Catherine (Yale), San Francisco, California
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 Edghill, Benjeil Z. (North Carolina at Chapel Hill), Brooklyn, New York
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 Hirsch, Dana L. (Duke), Mount Kisco, New York
 Holley, Christopher L. (Duke), Apex, North Carolina
 Horton, April C. (Furman), Murfreesboro, Tennessee
 Howard, Brandon A. (Swarthmore), Lovettsville, Virginia
 Hsu, Michael C. (Harvard), Burr Ridge, Illinois
 Huang, Erich S. (Harvard), Durham, North Carolina
 Hwang, Eugene I. (William Marsh Rice), College Station, Texas
 Iyengar, Rajashri S. (California-Berkeley), Newart, Delaware
 Janssen, Erin M. (Massachusetts Institute of Technology), Farmington, Hills, Michigan
 Kahl, Christina R. (Dartmouth), Winston-Salem, North Carolina
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 Khurana, Rahul (Stanford), Monte Sereno, California
 Killian, Jonathan K. (Stanford), Saratoga, California
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 Knab, Brian R. (Virginia), Great Falls, Virginia
 Kuniholm, Erin F. (Brown), Durham, North Carolina
 Larger, Patrick J. (Whitman), Shelby, Montana
 Lee, Edward (North Carolina at Chapel Hill), Burlington, North Carolina
 Lee, Patrick Y. (Northwestern), Piedmont, California
 Lee, Shelly T. (Harvard), Yucaipa, California
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 Lo, Wayne R. (Yale), Tucker, Georgia
 Maercks, Rian A. (Florida), Miami, Florida
 Manousos, George A. (North Carolina at Chapel Hill), Matthews, North Carolina
 Mavropoulos, John C. (Chicago), Atlantic City, New Jersey
 McCoy, Allison N. (Duke), Durham, North Carolina
 McGirt, Matthew J. (Duke), Charlotte, North Carolina
 Miksad, Rachel E. (Duke), Charlottesville, Virginia
 Molino, Arlene C. (Northwestern), Chicago, Illinois
 Morgan, Katherine S. (Yale), Maysville, North Carolina
 Morgan, Marcello A. (Harvard), Upper Nyack, New York
 Mummery, Heather J. (Rochester), Alden, New York
 Nimjee, Shahid M. (Yale), Brampton, Ontario, Canada
 Norris, Regina D. (Duke), Gaffney, South Carolina
 O'Halloran, Elizabeth K. (Chicago), Spokane, Washington
 Odom, Audrey R. (Duke), High Point, North Carolina
 Odunze, Millicent J. (Harvard), Orem, Utah
 Olson, Michael Ray (Harvey Mudd), East Greenwich, Rhode Island
 Ormsbee, Susan M. (Yale), New Bern, North Carolina
 Parker, Rodney D. (Harvard), Durham, North Carolina
 Pasquali, Sara K. (Michigan), Ann Arbor, Michigan
 Payne, Perry W., Jr. (Stanford), Pine Bluff, Arizona

Pickering, Trevor R. (California at Berkeley), Durham, North Carolina
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 Reed, Robyn C. (Wake Forest), Durham, North Carolina
 Rohatgi, Anand D. (Duke), Durham, North Carolina
 Rovak, Jason M. (Michigan), Ann Arbor, Michigan
 Sabo, Gregory J. (Notre Dame), Colorado Springs, Colorado
 Sanchez, Carlos D. (Dartmouth), Highland Park, New Jersey
 Sandler, Aaron J. (Yale), Gaithersburg, Maryland
 Schoenecker, Jonathan G. (Middlebury), St. Louis, Missouri
 Schweigler, Lisa M. (Harvard), Bethesda, Maryland
 Scott, Lisa M. (William and Mary), Richmond, Virginia
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 Shah, Bimal R. (North Carolina at Chapel Hill), Winston-Salem, North Carolina
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 Sheetz, Jonathan P. (North Carolina at Chapel Hill), Durham, North Carolina
 Simpson, Amanda E. (Cornell), Latham, New York
 Singh, Rakesh K. (Cornell), Coram, New York
 Smith, Monica L. (North Carolina at Chapel Hill), Durham, North Carolina
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 Sufka, Susan A. (St. Mary's), St. Cloud, Minnesota
 Sweis, Ranya N. (Wheaton), Carol Stream, Illinois
 To, Binh K. (California at San Diego), Alhambra, California
 Trinh, Jane V. (Rice), Lake Charles, Louisiana
 Van de Ven, Thomas J. (Canisius), Grand Island, New York
 Vanderveldt, Stephanie Lynn (Princeton), Boston, Massachusetts
 Walton, Geoffrey B. (North Carolina State), Raleigh, North Carolina
 Wang, Alice M. (Duke), Chester Spring, Pennsylvania
 Wang, Emily A. (Harvard), Houston, Texas
 Wang, George T. (Rice), Sugar Land, Texas
 Wang, Gin R. (Oklahoma), Apex, North Carolina
 Wellman, Samuel S. (North Carolina at Chapel Hill), Raleigh, North Carolina
 West, Jesse L., IV (North Carolina at Chapel Hill), Asheville, North Carolina
 Wickham, Michael Q. (Duke), Raleigh, North Carolina
 Winkfield, Karen M. (SUNY at Binghamton), Binghamton, New York
 Wirk, Shaheen A. (Duke), Beaver Creek, Ohio
 Woo, Joan S. (California at Berkeley), Glendale, California
 Wood, William A., Jr. (Harvard), Newport Beach, California
 Ye, Qing B. (Fudan, China), Chicago, Illinois
 Yesus, Ambeshie (Yale), Columbia, Missouri
 Yoo, David S. (Duke), Spring, Texas
 Yu, Yen-Rei A. (Duke), Katy, Texas
 Zamah, Alberuni M. (Williams March Rice), Kansas City, Missouri

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Alexander, Thomas (Arizona), San Diego, California
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 Asomugha, Chisaraokwu (Stanford), Lawndale, California
 Bernstein, Michael (Duke), Durham, North Carolina
 Boiman, Erica (Yale), Lake Bluff, Illinois
 Bourque, Jamieson (Virginia), Bethesda, Maryland
 Buschmann, Robert (North Carolina at Chapel Hill), Gold River, California
 Bush, Errol (Emory), Decatur, Georgia
 Carter, Khalil (Florida), San Jose, California
 Chang, Wendy (Yale), Redmond, Washington
 Chen, Carol C. (North Carolina at Chapel Hill), Raleigh, North Carolina
 Chen, Weip (Massachusetts Institute of Technology), Los Angeles, California
 Chi, Sulene (Princeton), Potomac, Maryland
 Chien, James (Creighton), Omaha, Nebraska
 Chien, Lynn (Duke), Chapel Hill, North Carolina
 Cho, Patricia (Harvard), Cincinnati, Ohio
 Chung, Edward (Massachusetts Institute of Technology), Knoxville, Tennessee
 Cole, Catherine (Princeton), Severna Park, Maryland

Corey, Kathleen (Michigan-Ann Arbor), Ann Arbor, Michigan
 Crotty, Laura (Duke), Durham, North Carolina
 Dawn, Aeryn (Harvard), San Francisco, California
 Dombrowski, Julie Cook (New Mexico), Albuquerque, New Mexico
 Edwards, David (New Mexico), Albuquerque, New Mexico
 Edwards, Marianne (Stanford), Baltimore, Maryland
 Ekeruo, Wesley (California at Berkeley), Fremont, California
 Fecci, Peter (Cornell), Plainview, New York
 Feldman, Zachary W. (Virginia), Dunwoody, Georgia
 Gardner, Kim (Florida State), Gainesville, Florida
 Gilbert, Brett (Illinois at Urbana), Buffalo Grove, Illinois
 Gillespie, Heather (Brown), Rochester, New York
 Gupta, Summit (Pennsylvania), Durham, North Carolina
 Hatfield, Ann (Notre Dame), Cedar Rapids, Iowa
 Hervey, Sheleika (Stanford), Duncanville, Texas
 Hoffman, Karen (Virginia), Annandale, Virginia
 Hu, Patrick (California at Berkeley), Durham, North Carolina
 Ibom, Valerie (Ohio), Columbus, Ohio
 Jan, Farhana (Massachusetts Institute of Technology), Exton, Pennsylvania
 Jones, Kermit L. (Clark Atlanta), Marietta, Georgia
 Kao, James (Duke), Loveland, Ohio
 Kawamoto, Kensaku (Harvard), Durham, North Carolina
 Kelly, Patrick (Notre Dame), Stonington, Connecticut
 Khalatbari, Dara (Vanderbilt), Kingwood, Texas
 Khan, Farah (New Jersey), HolM.D.el, New Jersey
 Kim, Hyung (Harvard), Somerville, New Jersey
 Kim, Luke (Johns Hopkins), Columbia, Maryland
 Kotloski, Robert (Wisconsin-Madison), Berlin, Wisconsin
 Lai, Kenny (Harvard), Cranbury, New Jersey
 Lhamon, Margie (Richmond), Lima, Ohio
 Linden, Diane C. (Middlebury) Los Angeles, California
 Louie, Gregory (Stanford), W. Vancouver, BC, Canada
 Lucas, Chere (Dartmouth), Spokane, Washington
 McCoy, Theresa (North Carolina Central), Durham, North Carolina
 McDade, Henry (North Carolina State), Hillsborough, North Carolina
 McFadden, Adrienne (Maryland at Baltimore County), Bowie, Maryland
 McIntosh, Belinda (Harvard), Miami, Florida
 McLean, Kia (Stanford), Silver Spring, Maryland
 Meade, William (Duke), Martinsville, Virginia
 Melgiri, Ryan (Rice), Sugar Land, Texas
 Merchant, Faisal (Emory), Lawrenceville, Georgia
 Meyer, Laura (Harvard), Washington, District of Columbia
 Miller, Aaron (Duke), Norfolk, Virginia
 Mobley, Victoria (Duke), Fairfax, Virginia
 Moeller, Benjamin (Massachusetts Institute of Technology), Omaha, Nebraska
 Moore, Karen (Middlebury), Durham, North Carolina
 Murphy, Michael (Notre Dame), Schenectady, New York
 Nicholas, Jennifer (Miami), Durham, North Carolina
 Nielsen, Nathan (Stanford), Titusville, New Jersey
 Obembe, Olufolajimi (California at Los Angeles), Los Angeles, California
 Onyewu, Chiatogu (Maryland at Baltimore County), Olney, Maryland
 Palestrant, Daniel, (Johns Hopkins), Phoenix, Arizona
 Palker, Todd (Virginia), Kings Park, New York
 Patel, Yogin (Duke), Salisbury, North Carolina
 Pernell, Chris (Princeton), East Orange, New Jersey
 Phelps, B. Ryan (Texas at Austin), Denison, Texas
 Phillips, Katie (Michigan-Ann Arbor), Midland, Michigan
 Powell, Tiffany (Michigan-Ann Arbor), West Bloomfield, Michigan
 Prempeh, Maxwell (Duke), Maplewood, New Jersey
 Purves, Harriett (Macalester), Chapel Hill, North Carolina
 Raja, Ali (Rice), Katy, Texas
 Rauscher, Frederic (Indiana at Bloomington), Griffith, Indiana
 Reynolds, Christopher (Duke), Durham, North Carolina

Rimel, Bobbie (Rochester), Fayetteville, North Carolina
Rineer, Craig (Pennsylvania), Mount Joy, Pennsylvania
Ro, Richard (Oklahoma-Norman), Stillwater, Oklahoma
Robinson, Barrett (Morehouse), Dayton, Ohio
Ruiz-de-Luzuriaga, Brian (Ohio), West Chester, Ohio
Saharia, Kapil (Johns Hopkins), Rockville Centre, New York
Sair, Haris (Duke), Cary, North Carolina
Silver, Rebecca (Wellesley), Durham, North Carolina
Stewart, Laura (Vanderbilt), Knoxville, Tennessee
Sturm, Jesse (Duke), North Granby, Connecticut
Taylor, Steve (Duke), Durham, North Carolina
Thomas, Lisa-Gail (Miami), Clarendon, Jamaica
Tiku, Anjali (Duke), Raton, New Mexico
Toomayan, Glen (Duke), Palisades Park, New Jersey
Townsend, Brent (Harvard), Tulsa, Oklahoma
Tseng, Timothy (Harvard), Houston, Texas
Udayakumar, Krishnakumar (Virginia), Jonesville, Virginia
Vesley, Cheryl Bright (Yale), Durham, North Carolina
Villani, John (Pennsylvania), Durham, North Carolina
Walker, Tamesha (Yale), Memphis, Tennessee
Wang, Caroline Wu (Rice), Durham, North Carolina
Wang, David (Rice), Corpus Christi, Texas
Weinzierl, Elizabeth (Emory), Tampa, Florida
Wright, Tarra (Texas Tech), Lubbock, Texas
Young, Laura (Duke), Durham, North Carolina

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Abdel-Wahab, Omar Ibrahim (Duke), Durham, North Carolina
Abuelo, Carolina (Tufts), Woodside, California
Anderson, Ryan Berger (St. Mary's College of Maryland), Telluride, Colorado
Bansal, Niharika (Johns Hopkins), Bethesda, Maryland
Barkauskas, Christina (Princeton), Allendale, New Jersey
Barker, Joseph Uhalt (Wake Forest), Asheville, North Carolina
Benitez-Graham, Ana Maria (Texas at Austin), Austin, Texas
Bradshaw, Marques Levar (Morehouse), Atlanta, Georgia
Brashears, James Henry (William and Mary), Midlothian, Virginia
Brooks, Richard Benjamin (Furman), Harriman, Tennessee
Burwick, Nicholas Raymond (Johns Hopkins), Gardena, California
Buscher, April (Wake Forest), Kernersville, North Carolina
Carle, Timothy Ryan (Tulane), Advance, North Carolina
Cheran, Sendhil Kumar (North Carolina at Chapel Hill), Cary, North Carolina
Clark, Marie Ann (Kent State), Norton, Ohio
Corwin, Michael Thomas (Rochester), Brecksville, Ohio
Davis, Kathryn Rachel (Brown), Minneapolis, Minnesota
DeCamp, Matthew Wayne (Purdue), Indianapolis, Indiana
DePass, Tienicia (Stanford), Stone Mountain, Georgia
Durtan, Lindsay Jane (Virginia), Fort Washington, Pennsylvania
Edwards, Anthony Charles (Texas A and M), San Antonio, Texas
Elliott, Rebecca Lynn (Princeton), Wheeling, West Virginia
Floyd, James Song (Duke), Tacoma, Washington
Freedman, Joshua (Duke), Pittsford, New York
Gibson, Sarah (Emory), Columbus, Georgia
Goudar, Ranjit Kumar (Virginia), Virginia Beach, Virginia
Gowda, Charan (Georgetown), Rockville, Maryland
Griffin, Jeffrey Michael (North Carolina at Chapel), Chapel Hill, North Carolina
Han, Ernest Cheng-Shun (Cornell), North Potomac, Maryland
Haney, John Carroll (Williams), Durham, North Carolina
Hanks, Roy Kyle (Duke), Seneca, South Carolina
Hardee, Matthew (Henderson State), Arkadelphia, Arkansas
Hartzell, Tristan Layton (Washington), Seattle, Washington
Henriott, Amy (Emory), Knoxville, Tennessee
Hick, Ryan Walter (Brigham Young), Laguna Hills, California
Hildreth, Kerry Lynn (Washington), Cheney, Washington
Horvath, Brian David (Duke), Pittsburgh, Pennsylvania
Huang, Melissa (Princeton), Athens, Georgia

Huber, Mary Hays (Brown), Durham, North Carolina
 Jackson, Tara Elizabeth (Eckerd), St. Petersburg, Florida
 Jagadeesan, Rajasekar (Stanford), Mountain View, California
 Jeffcoat, Devon Michael (California-San Diego), La Crescenta, California
 Joynt, Karen Ellen (Princeton), Ann Arbor, Michigan
 Kamath, Amita (Rice), San Antonio, Texas
 Kansagra, Susan (North Carolina at Chapel Hill), Greenville, North Carolina
 Karra, Ravi (Wisconsin), Franklin, Wisconsin
 Klein, Peter (Duke), Durham, North Carolina
 Ko, Jason (Duke), Warren, Ohio
 Kogan, Yelena (Duke), Socorro, New Mexico
 Kulkarni, Sonali (Duke), Warren, Ohio
 Lau, Michelle (California-Berkeley), San Francisco, California
 Lott, Kristen (McGill), Woodbridge, Connecticut
 Maclean, Courtney (Stanford), Grant Junction, Colorado
 Magnussen, Robert Andrew (Davidson), Gallipolis, Ohio
 Malone, Robin Wendy (Stanford), Carrboro, North Carolina
 McClaine, Rebecca (Juniata), Clarion, Pennsylvania
 Mettu, Priyatham Sai (Duke), Pikeville, Kentucky
 Millington, Timothy (Duke), Durham, North Carolina
 Mixco, Javier (Harvard), Salt Lake City, Utah
 Moore, Christopher (North Carolina at Chapel Hill), Medford, Massachusetts
 Nieto, Ana (Fort Lewis), Indian Hills, Colorado
 Nussbaum, Jesse (Harvard), Cambridge, Massachusetts
 Palmeri, Mark (Duke), Dix Hills, New York
 Parsons, Elizabeth (Rice), Bellaire, Texas
 Pascoe, David (Michigan), Oregon, Wisconsin
 Paulson, Benjamin Stanley (Washington), Ogden, Iowa
 Perry, Charles Andrew (Davidson), Charlottesville, Virginia
 Poppe, Angela (Dartmouth), Morrisville, North Carolina
 Radcliff, Kristen (Harvard), New Orleans, Louisiana
 Rampersaud, Edward (St. John's), East Meadow, New York
 Rasheed, Derek Alan (North Carolina at Chapel Hill), Freeport, Illinois
 Rashid, Omar Maen (Dartmouth), Pembroke Pines, Florida
 Ray, Gregory Thomas (North Carolina at Chapel Hill), Cary, North Carolina
 Reedy, Jennifer Lynne (Cornell), Vestal, New York
 Riel, Ryan (Brown), Providence, Rhode Island
 Ross, Lisa Christine (Virginia), Yorktown, Virginia
 Safley, Anne Michele (Duke), Edina, Minnesota
 Scales, Charles (Georgia Institute of Technology), Atlanta, Georgia
 Schmit, Kristine Marie (Creighton), Decatur, Georgia
 Schulteis, Ryan David (Wisconsin), Hartford, Wisconsin
 Shah, Amit Kantilal (Duke), Poughkeepsie, New York
 Shanbhag, Manisha (Duke), Spartanburg, South Carolina
 Skavdahl, Maryanne (Nebraska), Marsland, Nebraska
 Smith, Jason Landon (Lamar), Lubbock, Texas
 Smith, Roxanne Elizabeth (Chicago), Madison, Wisconsin
 Sommer, David Brian (Rice), Henderson, Nevada
 Stephano, Paul Anthony (Harvard), Woodinville, Washington
 Sung, Jeffrey Chil-jek (Stanford), Bellaire, Texas
 Swaminathan, Rajesh (Duke), Washington, North Carolina
 Talley, Brad Douglas (Florida State), Apex, North Carolina
 Venkat, Arun (Texas-Austin), San Antonio, Texas
 Wang, Luke (Harvard), Prairie Village, Kansas
 Wang, Sam (Stanford), Albany, California
 Wang, Wei (Cornell), Forest Hills, New York
 Wilder, Julius Middleton (Maryland), North Potomac, Maryland
 Wu, Joanne (Stanford), San Jose, California
 Wu, Jack Jyk-perng (Cornell), New York, New York
 Wyse, Aaron Jonathon (Virginia), Edison, New Jersey
 Yang, Qinghong (Foreign College), Milpitas, California
 Yue, Brian (Stanford), Rancho Palos Verdes, California

Class of 2000 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*

- Swati Agarwal , (Hollidaysburg, Pennsylvania) Duke University, Stanford University Hospital – Pediatrics, Palo Alto, California, Pediatrics
- Rodney K. Alan, Tallahassee, Florida, Morehouse College, Palmetto Richland Memorial – University of South Carolina – Orthopaedic Surgery, Columbia, South Carolina, Orthopaedic Surgery
- Brandy Maxine Allen, Yankton, South Dakota, University of Kansas, University of Colorado School of Medicine - Medicine, Denver, Colorado
- Carlos Antonio Bagley Marietta, Georgia, Duke University, Johns Hopkins University – Neurosurgery, Baltimore, Maryland, Neurosurgery
- Monica June Bauman, Woodland Hills, California, University of California – Los Angeles, Carilion Roanoke Memorial Hospital – Internal Medicine, Roanoke, Virginia, University of Virginia Medical Center- Anesthesiology, Charlottesville, Virginia
- Stephanie Robin Bruce, Asheville, North Carolina, Georgetown University, Duke University Medical Center – Internal Medicine, Durham, North Carolina
- Suzanne Margarete Bruch, Durham, North Carolina, California Institute of Technology, University of North Carolina Hospitals – Psychiatry, Chapel Hill, North Carolina
- Marie Archambault Carlson, Fayetteville, North Carolina, North Carolina State University, Duke University Medical Center – Internal Medicine, Durham, North Carolina, Geriatrics
- Daniel Hen-An Chang, Knoxville, Tennessee, California Institute of Technology, Atlanta Medical Center – Transitional, Atlanta, Georgia, Emory University Hospital – Ophthalmology, Atlanta, Georgia
- Christine Denise Ching, Santa Ana, California, Wellesley College, Duke University Medical Center – General Surgery, Durham, North Carolina
- Deborah E. Citrin, Thomasville, North Carolina, North Carolina State University, Washington Hospital Center – Internal Medicine, Washington, DC, National Cancer Institute/NIH – Radiation Oncology, Bethesda Maryland, Radiation Oncology
- Vanessa R. Cole, Albuquerque, New Mexico, Cornell University, Wake Forest University Baptist Medical Center – Internal Medicine, Winston- Salem, North Carolina, Internal Medicine/ Cardiology
- Nicole Lisa Cote, North Babylon, New York, University of Virginia, Medical College of Virginia – Internal Medicine, Richmond, Virginia, Medical College of Virginia – Dermatology, Richmond, Virginia
- Jesse Aaron Davidson, Washington, DC, Yale University, Mount Sinai Hospital – Internal Medicine, New York, New York
- Bridget McNamara Degele, Burlington, North Carolina, North Carolina State University, Duke University Medical Center – Pediatrics, Durham, North Carolina
- John Paul Denny, Raleigh, North Carolina, North Carolina State University, Duke University Medical Center – Internal Medicine, Durham, North Carolina, Duke University Medical Center – Ophthalmology, Durham, North Carolina
- Susan Davenport Denny, Hickory, North Carolina, University of North Carolina at Chapel Hill, Duke University Medical Center – Internal Medicine, Durham, North Carolina, Primary Care Internal Medicine
- Fatu Monique Forna, Sierra Leone, West Africa, Florida A and M University, Emory University School of Medicine - Obstetrics and Gynecology, Atlanta, Georgia
- Kendra Marshae Franklin, Gahanna, Ohio, Ohio State University, Moses Cone Hospital – Internal Medicine, Greensboro, North Carolina, Duke University Medical Center – Radiology, Durham, North Carolina, Interventional Radiology
- Vernetta Dionne Gallop, Bronx, New York, Yale University, Albert Einstein College of Medicine/ Jacobi – Internal Medicine, Bronx, New York, Primary Care Internal Medicine
- Jeremy Hardison, Cherryville, North Carolina, Duke University, Duke University Medical Center – Internal Medicine, Durham, North Carolina
- Ankie Marie Hata, Elyria, Ohio, Wheaton College, Duke University Medical Center – Internal Medicine, Durham, North Carolina
- Jonathan Andrew Hata, Portland, Oregon, Wheaton College, Duke University Medical Center – General Surgery, Durham, North Carolina
- Hughes Montgomery Helm, Danville, Kentucky, University of North Carolina at Charlotte, University of Kentucky Medical Center – Family Practice, Hazard, Kentucky, Rural Family Medicine
- Jason David Hickey, Norcross, Georgia, Colgate University, Residency Deferred

Janie Angela Ho, Chapel Hill, North Carolina, Harvard University, Metrowest Medical Center – Transitional, Framingham, Massachusetts, University of California – Ophthalmology, San Francisco, California, Ophthalmology

Jarrold Paul Holmes, Easley, South Carolina, Duke University, United States Naval Medical Center – Internal Medicine, San Diego, California

Benjamin Yu-bin Huang, Chapel Hill, North Carolina, University of North Carolina at Chapel Hill, Kaiser-Permanente Medical Group – Internal Medicine, San Francisco, California, University of North Carolina at Chapel Hill – Radiology, Chapel Hill, North Carolina

Xuewei Huang, Brookline, Massachusetts, Massachusetts Institute of Technology, University of Washington Affiliated Hospitals – Medicine, Seattle, Washington, Gastroenterology

Matthew Timothy Hume, Fayetteville, North Carolina, United States Military Academy, Walter Reed Army Medical Center – Surgery, Washington, D.C., General Surgery/Cardiothoracic Surgery

Brian Jaquette, Glenville, New York, Duke University, University of Colorado School of Medicine – Pediatrics, Denver, Colorado

Janet Ann Jenkin, Whitehouse Station, New Jersey, Duke University, Indiana University School of Medicine – Pediatrics, Indianapolis, Indiana

Michael Reesal Jones, Fayetteville, North Carolina, Duke University, Duke University Medical Center – Obstetrics and Gynecology, Durham, North Carolina, Obstetrics and Gynecology

Relief Jones, III, Buras, Louisiana, Stanford University, Stephens Eye Research Institute – Postdoctoral Fellowship, Boston, Massachusetts, Ophthalmology

Andrew Laurence Kaplan, Woodbury, New York, Duke University, Duke University Medical Center-Internal Medicine, Durham, North Carolina, Duke University Medical Center-Dermatology, Durham, North Carolina

Mohit S. Kasibhatla, Greensboro, North Carolina, Columbia University, University of Pennsylvania – Internal Medicine, Philadelphia, Pennsylvania

Andrew V. Kayes, Cincinnati, Ohio, Duke University, Mayo Graduate School of Medicine – Transitional, Jacksonville, Florida, University of California Medical Center – Diagnostic Radiology, Los Angeles, California, Musculoskeletal Radiology

Jason Kendelhardt, Matthews, North Carolina, Wake Forest University, Tripler Army Hospital – Internal Medicine, Honolulu, Hawaii

Eun Yeong Kim, Bayside, New York, Harvard University, University of California Medical Center – Internal Medicine, Los Angeles, California, Rheumatology

Abby Bergholtz Kunz, Cincinnati, Ohio, Dartmouth College, Duke University Medical Center – Pediatrics, Durham, North Carolina

William T. Lawson, Jr. Lakeland, Florida, Duke University, Duke University Medical Center – Surgery, Durham, North Carolina, Duke University Medical Center – Neurosurgery, Durham, North Carolina, Neurosurgery

Thuy Thanh Le, Bakersfield, California, University of California - Los Angeles, Stanford University School of Medicine – Plastic Surgery, Palo Alto, California, Plastic Surgery

Kelly Robert Lindauer, Denver, Colorado, University of Colorado, Carilion Health Systems – Transitional, Roanoke, Virginia, Duke University Medical Center – Diagnostic Radiology, Durham, North Carolina

Stacy Jennifer Marcus, Silver Spring, Maryland, Duke University, University of Cincinnati Hospitals – Pediatrics/Physical Medicine and Rehabilitation, Cincinnati, Ohio

Jamila C. Martin, Berkeley, California, Duke University, University Hospitals of Cleveland – Medicine and Pediatrics, Cleveland, Ohio, Combined Medicine and Pediatrics

Carter Maurer, Ashland, Oregon, Duke University, United States Naval Medical Center - Surgery, San Diego, California, Orthopaedics

Shannon Elizabeth Jones McCall, High Point, North Carolina, North Carolina State University, Duke University Medical Center – Pathology, Durham, North Carolina, Anatomic and Clinical Pathology

Benjamin Borden McDaniel, Grand Junction, Colorado, Duke University, Riverside Regional Medical Center - Transitional, Newport News, Virginia, Emory University Hospitals - Radiology, Atlanta, Georgia, Radiology

Connette Pearl McMahon, Granite Quarry, North Carolina, Duke University, Duke University Medical Center – Obstetrics and Gynecology, Durham, North Carolina, Obstetrics and Gynecology

Michelle Taylor McMurry, Oakland, California, Harvard University, American Association for the Advancement of Science, Engineering Policy Fellowship

Tara Ann Mills, Wilson, North Carolina, Winston-Salem State University, East Carolina University Health Systems – Family Practice, Greenville, North Carolina

Frederick Marshall Moore, Durham, North Carolina, U.S. Naval Academy, National Naval

Medical Center – General Surgery, Bethesda, Maryland, Orthopedic/Plastic Surgery
 Elahe Anna Mostaghel, Salt Lake City, Utah, Harvard University, University of California Medical
 Center – Internal Medicine, San Francisco, California, Infectious Disease
 Prerana N. Patel, Hickory, North Carolina, Rice University, University of Michigan Hospitals –
 Orthopaedic Surgery, Ann Arbor, Michigan
 Vikas Jayanti Patel, Cary, North Carolina, Duke University, California Pacific Medical Center –
 Internal Medicine, San Francisco, California, Duke University Medical Center – Dermatology,
 Durham, North Carolina, Dermatology
 Joseph Richard Payne, Greenville, North Carolina, Georgia Institute of Technology, Duke
 University Medical Center – Internal Medicine, Durham, North Carolina
 Paula Lightfoot Peake, Fort Thomas, Kentucky, University of Cincinnati, University of Cincinnati
 – Internal Medicine and Pediatrics, Cincinnati, Ohio, Internal Medicine and Pediatrics
 Erica Lee Peterson, Lincoln, Nebraska, University of Nebraska - Lincoln, Duke University Medical
 Center – Internal Medicine and Pediatrics, Durham, North Carolina, Internal Medicine and
 Pediatrics
 Kyle Kirkpatrick Pond, Cape Elizabeth, Maine, Duke University, University of Washington
 Medical Center – Internal Medicine, Seattle, Washington
 Katherine Elizabeth Posther, Fort Wayne, Indiana, Harvard University, Duke University Medical
 Center – Surgery, Durham, North Carolina
 Aditee Ashok Pradhan, Des Moines, Iowa, Duke University, Duke University Medical Center –
 Pediatrics, Durham, North Carolina, Pediatrics
 Ashutosh Ashok Pradhan, Dix Hills, New York, Johns Hopkins University, Duke University
 Medical Center – Surgery, Durham, North Carolina, Neurosurgery
 Jay Joseph Quayle, IV, Charlottesville, Virginia, Princeton University, Barnes-Jewish Hospital/
 Washington University – Surgery, St. Louis, Missouri
 Ariel N. Rad, Holmdel, New Jersey, Princeton University, University College London – Fellowship
 in Immunology, London, United Kingdom, Orthopaedic Surgery
 Christopher A. Radkowski, Greensburg, Pennsylvania, Johns Hopkins University, Duke
 University Medical Center – Surgery, Durham, North Carolina, Duke University Medical Center
 – Orthopaedic Surgery, Durham, North Carolina, Orthopaedic Surgery
 Adam Gates Ravin, Durham, North Carolina, Vanderbilt University, Duke University Medical
 Center – Surgery, Durham, North Carolina, Duke University Medical Center – Plastic Surgery,
 Durham, North Carolina, Plastic Surgery
 Maurice Andre Recanati, New York, New York, Rensselaer Polytechnic Institute, Massachusetts
 Institute of Technology, Research Fellowship, Bethesda, Maryland
 Felice Anais James - Rodriguez, Marion, South Carolina, Duke University, Duke University
 Medical Center – Family Practice, Durham, North Carolina, Primary Care
 Humberto Gerardo Rosas, San Antonio, Texas, Stanford University, Washington University School
 of Medicine - Neurosurgery, St. Louis, Missouri
 Daniel Todd Rose, Nashville, North Carolina, University of North Carolina at Chapel Hill,
 University of Alabama Hospital - Orthopaedics, Birmingham, Alabama, Orthopaedic Surgery
 Daniel T. Ruan, Trumbull, Connecticut, Middlebury College, Brigham and Women's Hospital –
 Surgery, Boston Massachusetts
 Charles Edwin Saldanha, Dallas, Pennsylvania, Emory University, Brigham and Women's
 Hospital – Internal Medicine, Boston, Massachusetts
 Joshua David Scholnick, Williamsburg, Virginia, Yale University, University of Utah Affiliated
 Hospitals – Preliminary Medicine, Salt Lake City, Utah, Barnes-Jewish Hospital/ Washington
 University – Diagnostic Radiology, St. Louis Missouri
 George Lee Shih, Lexington, Kentucky, Duke University, St Luke's/Roosevelt Hospital –
 Preliminary Medicine, New York, New York, New York Presbyterian Hospital/Columbia
 University – Diagnostic Radiology, New York, New York, Radiology
 Brian Aaron Smith, St. Albans, West Virginia, Vanderbilt University, West Suburban Hospital –
 Family Practice, Chicago, Illinois, Family Practice
 Eric Graham Smith, Baltimore, Maryland, John Hopkins University, Boston University Medical
 Center – Psychiatry/ Preventative Medicine, Boston, Massachusetts, Optimizing Physical and
 Mental Health,
 Laurie Dee Snyder, Columbus, Ohio, DuPauw University, University of California School of
 Medicine – Internal Medicine, San Francisco, California
 Sejal Pathik Soni, Marietta, Georgia, Yale University, Washington University Hospitals - Urology,
 St. Louis, Missouri
 Jocelyn Carol Stamat, Chapel Hill, North Carolina, Harvard University, McGraw Medical Center/
 Northwestern University – Surgery, Chicago, Illinois, Northwestern University Hospitals –
 Otolaryngology, Chicago Illinois

Michael D. Sullivan, New Orleans, Louisiana, Harvard University, Stanford University Hospital – Medicine, Palo Alto, California, University of North Carolina Hospitals – Dermatology, Chapel Hill, North Carolina, Dermatology

Oliver S. Tai, Germantown, Tennessee, Harvard University, University of Washington Affiliated Hospitals – Internal Medicine, Seattle, Washington

Damon S. Tweedy, Lanham, Maryland, University of Maryland, Residency Deferred

Stephen Lifan Wang, Lexington, Kentucky, University of Kentucky, University of Hawaii – Transitional, Honolulu, Hawaii, Stanford University Hospital - Radiology, Palo Alto, California, Diagnostic Radiology

Mark Alan Ward, Raleigh, North Carolina, North Carolina State University, Bayfront Medical Center – Family Practice, St. Petersburg, Florida

Brent White, Columbus Georgia, Emory University, Dartmouth – Hitchcock Medical Center – Surgery, Lebanon, New Hampshire, Surgery – General and Surgical Critical Care

Brooke Emerson Winkle, Palo Alto, California, Harvard University, Residency Deferred

Jimmie C. Wong, Monterey Park, California, Columbia University, Virginia Mason Medical Center – Internal Medicine, Seattle, Washington, University of Washington Medical Center - Diagnostic Radiology, Seattle, Washington, Diagnostic Radiology

Stephen Wong, Los Angeles, California, California Institute of Technology, Hospital of the University of Pennsylvania – Internal Medicine, Philadelphia, Pennsylvania, Hospital of the University of Pennsylvania – Neurology, Philadelphia, Pennsylvania, Academic Neurology

Zhenqing Brett Wu, Shanghai, China, Franklin and Marshall College, St. Vincents Hospital – Surgery, New York, New York, New York Eye and Ear Infirmary - Otolaryngology, New York, New York, Otolaryngology – Head and Neck Surgery

Kathleen Elizabeth Wurth, Bethlehem, Pennsylvania, University of North Carolina at Chapel Hill, University of North Carolina Hospitals – Pediatrics, Chapel Hill, NC, General Pediatrics

Zi Yin, Durham, North Carolina, Davidson College, Duke University Medical Center – Medicine, Durham, North Carolina, University of California Medical Center - Radiology, Los Angeles, California

Charles Warren Yowell, Durham, North Carolina, Duke University, Duke University Medical Center – General Surgery, Durham, North Carolina, Duke University Medical Center – Urology, Durham, North Carolina, Urology

Shan Yuan, Milpitas, California, Oberlin College, University of Washington Medical Center – Pathology, Seattle, Washington

Jeffrey Ian Zaref, Haworth, New Jersey, Harvard University, University of California School of Medicine – Pediatrics, San Francisco, California, Pediatrics and Public Health

Ming M. Zang, Rowland Heights, California, University of California – Berkeley, Duke University Medical Center – Surgery, Durham, North Carolina, Vascular Surgery

Ali R. Zomorodi, Winter Haven, Florida, Duke University, Duke University Medical Center – Surgery, Durham, North Carolina, Duke University Medical Center – Neurosurgery, Durham, North Carolina

Doctor of Physical Therapy Program



Doctor of Physical Therapy Program

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 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, 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 and geriatrics. Beyond clinical practice, physical therapists may also pursue roles in education, research and administration.

Mission Statement of the Doctor of Physical Therapy Degree Program

The mission of the Doctor of Physical Therapy degree program 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 degree 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 the Commission on 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

Chairman/Professor:

J. K. Richardson, PT, PhD, OCS

Director of Graduate Studies: Daniel E. Erb, PT, PhD

E. Villanueva, PT, AM; C. Odom, PT, DPT, ATC; L. White, PhD; D. Dore, PT, MPA; C.C. Figuers, PT, EdD; L.M. Lawrence, PT, MS; M.E. Riordan, PT, MS; W. Richardson, PT, MEd; T. Worrell, PT, EdD; D. Erb, PT, PhD; E. Ross, PT, MMS; L. Fishman, PT, MS, NCS; J. Cavanaugh, PT, MS, NCS; L. Case, PT, MS, PCS; R. Crouch, PT, MS; E. Hegedes, PT, DPT; A. B. Taylor, PhD; D. Bongiorne, PT, MS; W.D. Roy, III, PT; K. Varvel, PT, MPH

Program of Study. The curriculum is comprised of 126 credits of academic work, completed over 8 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 internships 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. Human Physiology and Histology	3 credits
PT-D-303. Cell Biology and Embryology	2 credits
PT-D-304. Normal Human Development	2 credits
PT-D-305. Physical Therapist Interventions I	2 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 and Tissue Biomechanics	3 credits
PT-D-313. Physical Therapist Intervention II	4 credits
PT-D-314. Integumentary Practice Management	2 credits
PT-D-315. Cardiopulmonary Practice Management	3 credits
PT-D-316. Clinical Examination, Evaluation, Diagnosis and Prognosis	3 credits
PT-D-317. Scientific Inquiry 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	2 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 Intervention III	3 credits
PT-D-327. Integrated Health Care Seminar I	2 credits
PT-D-328. Clinical Internship	1 credit
Total	20 credits

Year Two

Fall Semester

PT-D-401. Neuropathology	2 credits
PT-D-402. Arthological and Pathological Movement Science II	4 credits
PT-D-403. Musculoskeletal Practice Management II	4 credits
PT-D-404. Neurological Practice Management I	4 credits
PT-D-405. Scientific Inquiry II	3 credits
PT-D-406. Integrated Health Care Seminar II	2 credits
Total	19 credits

Spring Semester (8 weeks)

PT-D-411. Psychosocial Aspects of Care	2 credits
PT-D-412. Neurological Practice Management II	4 credits
PT-D-413. Educational Theory and Practice	2 credits
PT-D-414. Administration I	3 credits
PT-D-415. Integrated Health Care Seminar III	2 credits
Total	13 credits

Spring/Summer Semester (20 weeks)

PT-D-416. Clinical Residency I	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. Advanced Practice Elective I	3 credits
PT-D-505. Advanced Practice Elective I	3 credits
Total	14 credits

Fall/Spring Semester (20 weeks)

PT-D-506. Clinical Residency II	4 credits
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Spring Semester (6 weeks)

PT-D-507. Professional Practice, Development and Evaluation	3 credits
PT-D-508. Scientific Inquiry 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 paper, as part of PT-D-508.

Program Policies and Grading Standards. Enrolled students should reference the *2000-2003 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 cor-

rect these performance issues may result in probation, suspension or expulsion from the program.]

Satisfactory Academic Progress. The faculty of the Doctor of Physical Therapy degree program 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 grading system will be *A, B, C, F, I*.

2. Clinical Courses

For Clinical Education Experiences I and II (PT-D 308 and 318) and for the Clinical Internship (PT-D 328), the grading system will be *P, F, I*.

For the Clinical Residency I and II, (PT-D 416 and PT-D 506) the grading system will be *A, B, F, I*. Residency I and II 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 Residency. A grade of *F* will result in the requirement to repeat the Residency. Students may only repeat an unsuccessful residency one time. If the student is unsuccessful in the repeat attempt, they will receive a failing grade and will be dismissed from the program. Repeat residencies are scheduled at the discretion of the chairman and ACCE.

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 student illness*. 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 deficiency, not to exceed more than one calendar year from the date the course ended. "Incompletes" which are not satisfied within one calendar year automatically become grades of *F* (fail). If an extension to this time limit is required, a written appeal must be sent via U.S. Registered Mail or Federal Express to the chair prior to the time the extension is requested. 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. Grades of *I* are not removed from the permanent record.

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 grade of Fail is recorded on the permanent record of a student by the registrar upon certification by the faculty member, the chair or director of Graduate Studies that unsatisfactory work has been done by the student. 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 which time, a passing grade is recorded on the official and permanent transcript.

B. Progression

All first year courses must be satisfactorily completed before a student may enroll in the sequential 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 will be considered for recommendation by the faculty, with approval by the chair.)

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 complete, with a grade of 80 percent (*B*) or better, or pass for Clinical Experiences or Clinical Internship courses, every course in the curriculum attempted. The student will remain in **good academic standing** if they receive *no more than one grade of C*.

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. When a student is placed on academic probation, they remain in this academic standing for the remainder of the curriculum. In these instances, the director of Graduate Studies will notify the registrar that the student should be placed on academic probation. The director of Graduate Studies will notify the student that his/her 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 Graduate Program in Physical Therapy will use the following standards for assigning the status of academic probation.

1. A student will be considered to be on **academic probation** following the attainment of *C* grades in two courses in the curriculum.
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)

A student who has been placed on **academic probation** may require remedial work to remediate areas of deficiency. Such remediation will be determined by the chair advised by the faculty, communicated to the student in writing by the director of Graduate Studies, and may entail additional registration 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 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.
2. A student who is currently on **academic probation** will be asked to **withdraw** following the attainment of a third letter grade of *C*.

III. Appeals of Academic Status (Academic Probation or Withdrawal)

A student placed on **academic probation** or **withdrawn** from the program may ap-

peal by indicating in writing by registered mail to the chair (a) reasons why he/she did not achieve minimum academic standards, and (b) factorial evidence why the academic standing should be changed. Each appeal will be considered on its merit. Individual cases will not be considered as precedent. The chair will notify the student of the decision on the appeal in writing within three weeks of receipt of the appeal.

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 project and of all clinical education courses.
2. Passing, with a grade of 70 percent or better, of a written comprehensive examination, and all practical examinations administered by the faculty.

B. Time Limits on Meeting Requirements for Graduation

1. The standard required length of study to complete the academic standards is 8 continuous academic semesters of full time work (including 2 summer terms), completed in 33 calendar months.

Under extraordinary conditions, a student may be permitted a time limit of 2 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, and the chair 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 / course grade. Under extraordinary circumstances a student may apply in writing to the chair for an exception to the typical pattern of progress towards degree requirements.

C. Remediation of Failure

1. If a student successfully appeals a grade of *F* or "No Credit" in a course and is permitted to continue in the curriculum, a plan for remediation of the failed course work will be developed and communicated to the student in writing. The student will be responsible for all financial implications of repeated course work. All remediation efforts must be completed within the outlined time limits for completion of the program. A grade of *F* (failure) 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 may 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. 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. The student will be afforded one opportunity to successfully remediate the Comprehensive Examination. If the student is unsuccessful in their attempt to remediate the Comprehensive Examination with a passing grade of 70 percent or

greater, the student will be immediately 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 chairman 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 physical therapist degree program include a baccalaureate degree, completion of prerequisite courses, Graduate Record Examination (G.R.E.) 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 G.R.E. 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, 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, 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 advance placement courses or to those showing a Pass/Fail grade. A baccalaureate degree in the natural sciences is not a requirement for admissions; 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, Graduate Program in Physical Therapy, Box 3965, Duke University Medical Center, Durham, NC 27710. Telephone: 919-681-4380. The application and all supporting documents must be post-marked no later than December 31 of the year preceding admissions. The application must be received in the department within 14 days of the December 31 postmark. The application fee is \$75. An early application deadline of December 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: you may complete an electronic application, located at <http://www2.mc.duke.edu/depts/ptot>.

Tuition and Expenses. The faculty of the Doctor of Physical Therapy degree program 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 2001-2002 school-approved costs will be available from the Office of Financial Aid in February prior to admissions in the fall, and 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

are 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 involves a detailed study of the human body through lecture, laboratory presentations and cadaver dissection. The emphasis is on gross anatomy and the relationships between the musculoskeletal, neurological and vascular systems of the human body. In addition, the course introduces the student to the surface anatomy and palpation skills of clinically pertinent anatomical structures of the head, trunk, upper and lower limbs. Emphasis is placed on the location and differentiation of bony landmarks, muscle bellies, tendons, ligaments, bursas, nerves, arteries and joint cavities of a live subject.

PT-D-302. Human Physiology and Histology. This course will cover tissue structure and major physiological systems of the human body. Topics in this course will include: structure and function of the cells and tissues of the body, tissue diversity, histology of major organs, and organ physiology of the cardiovascular, respiratory, musculoskeletal, renal, gastrointestinal, lymphatic, endocrine and immune systems.

PT-D-303. Cell Biology and Embryology. This course will cover basic cellular anatomy and developmental biology/embryology. Cell structure, function, cell diversity and communication will be covered. The course will cover topics of embryology from conception through birth.

PT-D-304. Normal Human Development. This course covers normal human development from birth to death including the physical, psychological, cognitive, social, and economic aspects. Emphasis in the course is on physical development. This 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 the basic physical therapist patient interventions and examinations used to ensure safe patient interaction, including: patient communication, safe and effective patient positioning and movement, monitoring of vital signs, use of assistive ambulatory devices, protective bandaging/taping. An emphasis is placed on psychomotor performance including transfers, gait training, positioning and basic patient handling skills.

PT-D-306. Practice Management/Health Delivery Systems. Orientation 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. Introduction to the patient management model in physical therapy including patient examination, evaluation, diagnosis, prognosis, intervention and outcomes. The course 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.

PT-D-307. Movement Sciences 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 eight half-day (4 hour) experiences. Emphasis will be placed on integrating didactic in-

formation 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 3 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 and Tissue Biomechanics. 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 will be covered: pulmonary, cardiac, neurological, infectious, genetic, immunosuppressive, metabolic and metastatic. 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 physical therapist's interventions including rest, stress, stretch, resistance, immobilization and work will be discussed. Complications and benefits of interventions, the effects of nutrition, aging, exercise and immobility will be discussed.

PT-D-313. Physical Therapists Intervention II. This course covers 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-314. Integumentary Practice Management. The practice management model for patients with pathology or impairments to their integumentary system will be presented. Medical lectures and clinical physical therapist lectures will combine to present current management of patients who have skin lesions. Direct physical therapist intervention for wound examination, evaluation, diagnosis, prognosis and intervention will be presented.

PT-D-315. Cardiopulmonary Practice Management. This course gives an overview of the related pathologies of the cardiopulmonary system, examination and evaluation procedures, diagnostic procedures, goal setting, interventions and patient management. A major focus of this course will be laboratory sessions with cardiac and pulmonary patients, applying examination and evaluation procedures, and the direct interventions related to exercise and airway clearance. This course will cover the principles of training, exercise and health promotion as related to the cardiovascular system.

PT-D-316. Clinical Examinations, Evaluations, 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. Scientific Inquiry I. This course covers the theory and methods of the research process in physical therapy, including research designs, research methods and basic data analysis. The course will emphasize the student's ability to access literature, read and critically evaluate research findings.

PT-D-318. Clinical Experience II. This course will continue to reinforce principles

learned in the classroom 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 be 4 full days of clinical education. The focus will be on the practice areas of cardiopulmonary care and integumentary care. Each student will spend 2 consecutive days in a practice setting in which they can experience and learn in these practice areas. 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 will be synthesized from multiple disciplines to provide a framework for physical therapy practice. Neurological mechanisms will be 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 also will be analyzed.

PT-D-322. Arthrological and Pathological Movement Science I. A critical examination of the morphology and function of the articulations of the axial skeleton, including the temporomandibular and lumbosacral joints. Course content stresses normal musculoskeletal biomechanics of the cervical, thoracic, and lumbar segments as well as the pathomechanics of common spinal deformities. The course exposes student to normal and pathological orthopedic radiology of the trunk, pertinent to clinical practice.

PT-D-323. Diagnostic Imaging. The study of the principles, procedures and interpretation of diagnostic imaging techniques. Emphasis on plain film radiography, myelograms, CT scans, magnetic resonance imaging and nuclear medicine.

PT-D-324. Musculoskeletal Practice Management I. This course starts with the introduction to principles of orthopedic medicine, the general concepts of selective tissue evaluation and joint mobilization. The course then goes on to cover the etiology, pathology, specific evaluation treatment prognosis and prevention of common musculoskeletal problems of the trunk, temporomandibular joint, headaches and sacroiliac regions. Included will be the basis of medical and surgical treatment of patients with spinal and TMJ pathologies as well as physical therapist intervention. The course will include lecture, laboratory, mock practicals, clinical hours, case problems, and outside projects.

PT-D-325. Medical Practice Management. This course will cover medical and physical therapy management of patients with general medical conditions. A systems approach will be utilized to cover the following areas: metabolic, malignancies, psychiatric, connective tissue, immunosuppressive and organ transplantation.

PT-D-326. Physical Therapist Intervention III. The final physical therapist intervention course will introduce the direct interventions of therapeutic exercise and ambulation, functional training in self-care and home management, functional training in community and work integration, and the prescription and application of assistive/orthotic/prosthetic devices and equipment. The effects of exercise across the lifespan will be discussed. Specific patient populations will be discussed as they are impacted by exercise training.

PT-D-327. Integrated Health Care Seminar I. This seminar provides the student with an opportunity to integrate and present medical and physical therapy management related to patients with general medicine conditions, cardiopulmonary and musculoskeletal diseases. Students will contrast different approaches to examination and intervention. They will analyze the influence of medical, social, and behavioral issues as well as age and developmental stages and will be able to discuss the clinical decision making process for specific patients.

PT-D-328. Clinical Internship. This first full time clinical experience will consist of a four week exposure in an inpatient setting, including: acute care, subacute, or skilled nursing. The focus of the experience will be the development of psychomotor skills, pro-

fessional behaviors, gross and specific examination and intervention procedures and documentation skills. Exposure to the multiple roles of the PT 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-401. Neuropathology. In this course the pathological mechanisms of acute and chronic neurological disorders will be presented. Physiological mechanisms will be analyzed for peripheral, central, and autonomic nervous system dysfunction. Major neurological disorders representative of each category will be included. Rationale for current medical management will be presented.

PT-D-402. Arthrorlogical and Pathological Movement Science II. A critical examination of the structure, morphology, and functions of each of the articulation of the upper and lower limbs. Course content stresses normal and pathological musculoskeletal biomechanics of each region and provides exposure to clinically pertinent orthopedic radiology of each segment. The last section of the course addresses the kinematics and kinetics of normal and pathological locomotion and provides opportunities for gait analysis of normal subjects and patients.

PT-D-403. Musculoskeletal Practice Management II. This course covers the etiology, specific evaluation, diagnosis, assessment, prognosis, treatment and prevention of common musculoskeletal problems of the upper and lower extremities. The class will include specific joint testing, joint mobilizations, medical and surgical management, prevention and physical therapy intervention. The class is composed of lecture, laboratory, mock practicals, written patient evaluations and clinical cases.

PT-D-404. Neurologic Practice Management I. An introduction to management of children and adults with neuromuscular disorders will be presented. Examination, evaluation, diagnosis, prognosis, and intervention will be discussed. Both concepts and skills will be addressed. Peripheral neuromuscular (e.g., muscular dystrophy, brachial plexus injury) and spinal cord disorders (e.g., spinal cord injury, spina bifida) will be included.

PT-D-405. Scientific Inquiry II. In this course students will develop a research proposal for their curriculum research requirement. Each student will develop a plan for implementation of either an empirical research study or a clinical case study. Content on epidemiological research and advanced statistical analysis will also be presented.

PT-D-406. Integrated Health Care Seminar II. This seminar provides the student with an opportunity to integrate and present medical and physical therapy management related to patients who have disorders of several systems (e.g., musculoskeletal, cardiovascular, and neuromuscular). Students will meet with an instructor to present a patient, including the patient history, examination, evaluation, diagnosis, prognosis, and intervention as well as objective determination of success of intervention. Students will be able to articulate and justify their clinical reasoning as they contrast different approaches to examination and treatment.

PT-D-411. Psychosocial Aspects of Care. In this course students will survey the various factors affecting the patient, the family and the patient 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. Management of children and adults with neuromuscular disorders will be continued with emphasis on more complex CNS and multisystem disorders. Examination, evaluation, diagnosis, prognosis, and intervention will be discussed. Both concepts and skills will be 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 pal-

sy) will be included.

PT-D-413. Educational Theory and Practice. In this course, principles of teaching and learning will be covered 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 personal and professional development as well as techniques for facilitating behavioral change.

PT-D-414. Administration I. Administration topics will include concepts and methods for the recruitment and effective utilization of personnel in a team atmosphere, and identification of factors encompassing professional practices.

PT-D-415. Integrated Health Care Seminar III. This seminar provides the student with an opportunity to present studies to demonstrate integration of medical and physical therapy management of patients with medical, musculoskeletal or neurologic disorders. Students will identify sequelae of these disorders, e.g., musculoskeletal impairments with neurological injury, and will articulate management approaches that encompass both the acute management and the sequelae to the disease process.

PT-D-416. Clinical Residency I. This 20 week clinical internship may occur in varied settings under the supervision of a selected and trained clinical instructor. The required focus of this clinical experience will be in either the musculoskeletal or neuromuscular practice areas. Students will practice all clinical and administrative aspects of their professional roles during the internship.

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 are included.

PT-D-502. Administration II. The knowledge and skills required for planning and implementing a physical therapy practice in multiple settings, will be covered in this course. Students will be introduced to the primary legal and management issues required of physical therapy practices including strategies to ensure safe and effective delivery of high quality services.

PT-D-503. Primary Care Practice. This seminar provides the student with an opportunity to present, analyze and integrate case studies of physical therapy practice as primary care clinical providers. Case studies will be drawn from patients with simple to complex problems in the general medicine, cardiopulmonary, musculoskeletal and neurologic systems, and who present to the physical therapist as a first point of contact for health care. Emphasis will be placed on the physical therapist's role, responsibilities, and risks when practicing as an entry point into the health care system.

PT-D-504/505. Advanced Practice Electives I and II. In these courses, students will choose two electives in which to deepen their knowledge base for practice. Advanced practice electives will be offered in: pediatrics, geriatrics, orthopedics, sports, cardiopulmonary, neurology, education, research, and administration.

PT-D-506. Clinical Residency II. This 20 week clinical internship may occur in varied settings under the supervision of a selected and trained clinical instructor. The required focus of this clinical experience will be in either the musculoskeletal or neuromuscular practice areas. Students will practice all clinical and administrative aspects of their professional roles during the internship.

PT-D-507. Professional Practice Development and Evaluation. This course will integrate the didactic, clinical and research components of the student's experience in preceding course work, with the goal of evaluating the student's strengths and weaknesses for practice. During this course, students will undergo extensive summative practical evaluations in an assessment center format. They will also complete a written comprehensive examination.

PT-D-508. Scientific Inquiry III. In this third course in the sequence, the student will finalize their research or scholarly project in written form, and will complete a formal research presentation of their project results. Class time will also be spent discussing the role of critical inquiry in the first few years of practice.

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: James L. Michener, M.D.

Program Director: Michelle J. Lyn, M.B.A., M.H.A.

Clinical Leadership Program Steering Committee:

Kathryn Andolsek, M.D., M.P.H.; Steve J. Bredehoeft, M.D., M.P.H.; Mary T. Champagne, Ph.D., R.N.; Christopher Conover, Ph.D.; Susan D. Epstein, M.P.A.; Linda K. Goodwin, Ph.D., R.N., C; Joseph S. Green, Ph.D.; Clark C. Havighurst, J.D.; J. Lloyd Michener, M.D.; Gwendolyn Murphy, Ph.D., RD; Adele Spitz Roth, M.S.; 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 that 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
CL 200 Seminar	2
Total	8
Spring Semester	
NUR 401 Dynamics of Management	3
NUR 402 Financial Management and Budget Planning	4
CL 201 Seminar	2
Total	9
Summer Semester	
PHYASST 250 Health Systems Organization	2
MEDINFO 233 Introduction to Medical Informatics	3
CL 205 Project	3
CL 202 Seminar	2
Total	10

Year Two

Fall Semester	
CL 206 Quality Management	3
CL 207 Operational Management	3
CL 203 Seminar	2
Total	8
Spring Semester	
BUS 437 Health Care Systems	3
CL 205 Project	3
CL 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 are 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-CL are required to have their own PC that is 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 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 2001-2002 academic year is July 1, 2001. 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, 2001. 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 2001-2002 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 \$19,100 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 scholarship 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.

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 Science 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 twenty-seven 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" 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 thirty 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

MGRECON 408.301. Management of Health Systems and Policy. The structure of a health delivery system is explored from four perspectives: patients, hospitals, physicians, and payers. The objective of the course is to provide students with a detailed understanding of the business aspects of health care delivery and allow an assessment of the interrelationship between the public and private sectors in this market. Topics include the role of consumer, provider organization (physician and hospital), insurance (organization and risk management), and government programs. The course culminates by considering how the market will evolve over the next five years. *Schulman*

CL-206. Quality Management. 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*

CL-207. Operational Management. Course covers the practical aspects of communication, meeting management, 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. *Israel*

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 and in 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*

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 judgements about services or approaches in prevention, early detection and intervention, correction or prevention of deterioration, and the provision of palliative care. Fall. *Goodwin and Epstein*

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. Prereq. 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 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, and public policy trends. *Strand and Conover*

The Clinical Research Training Program

MASTER OF HEALTH SCIENCES CURRICULUM

Program Director: William E. Wilkinson, Ph.D.

Associate Directors: Eugene Z. Oddone, M.D. and Linda S. Lee, 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 statistical 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 (or two years of medical school) 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 e-mail to crtp@mc.duke.edu. Additional information may be found on the program's web site 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) an official transcript from each post-secondary institution attended; (2) 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. Five courses (241, 242, 245, 246 and 247) 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 2001-2002 academic year is \$480 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 6 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 will be 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 will be presented using Microsoft Access and SAS. 4 credits.

CRP-242. Principles of Clinical Research. General principles and issues in clinical research design. Formulating the research objective and the research hypothesis; speci-

fying the study population, the experimental unit and the response variable(s). Classification of studies as experimental or observational, prospective or retrospective, case-control, cross-sectional, or cohort; their relative advantages and limitations and the statistical methods used in their analysis. 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. 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, 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-246. Research Management. A survey of unique challenges related to creating, managing, and completing clinical research projects, with focus on the methods used to set up systems and solve problems that maximize timeliness, accuracy, efficiency, and validity of the results. The structural framework is based on identifying the components necessary to perform a successful clinical research project and developing an understanding of how these components function and interact. A variety of types of clinical research projects will be used as examples. Includes the responsible conduct of research. Prerequisite: CRP-242. 4 credits.

CRP-247. Clinical Research Seminar. This seminar integrates and builds on the core courses to provide practical experience developing and critiquing 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. 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. 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 will be addressed. Application of traditional research designs (e.g., randomized trials) to address health services research questions. The interface between health services research and health policy. Prerequisites: CRP-242 and CRP-245. 2 credits.

CRP-250. Genetic Analysis of Human Disease. An introduction to methods associated with the analysis of human genetic data, with a focus 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 will be 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 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 will include evaluation of the physiologic and pathophysiologic factors involved in drug absorption, distribution, metabolism and elimination. A major focus will be determinants which result in inter- and intra-patient variability in pharmacokinetics/pharmacodynamics. A variety of tests used in a surrogate fashion for evaluation of drug response will be discussed. A practical guide to pharmacokinetic/pharmacodynamic data analysis will provide an introduction to common modeling approaches. Prerequisites: CRP-242 and CRP-245. 2 credits.

CRP-270. Research. An individualized research project under the direction and supervision of the student's mentor and examining committee. 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.

Chief, Pediatric Pathology: William D. Bradford, M.D.

Program of Study. This is a twenty-four 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 (NAACLS). Graduates are able to sit for the American Association of Pathologists' Assistants fellowship examination.

Degree Requirements. Passage of sixty-nine units of graduate credit is required for the MHS degree. An additional eleven credits are required to receive a certificate at the end of the program, there are mandatory comprehensive written, oral, and practical ex-

aminations administered by a panel of pathology department faculty which all students must pass for successful completion of the program.

Grading Policies. Grades for courses except the comprehensive final examination are assigned as follows: Excellent/High Pass (*H*), Good/Pass (*P*), Satisfactory/Low Pass (*L*), Failing (*F*), and Incomplete (*I*). In some medical school courses grades of *H* (Honors), *P* (Pass), and *F* (Fail) may be assigned. Failure in any course may result in removal from the program. If a student receives two *L*s, the student is placed on academic probation and is required to perform additional studies for the director. 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 and take the examination again. Any student who fails the final twice cannot complete the program.

Curriculum

Year 1

Fall

CELLBIO-200. Cell and Tissue Biology	3 credits
CELLBIO-201. Microscopic Anatomy	3 credits
CELLBIO-202. Medical Physiology	4 credits
BAA-200. Human Anatomy	3 credits
PATHASST-205. Immunology	3 credits

Year 1

Spring

PATHOL-250. General Pathology	4 credits
PATHOL-251. General Pathology Laboratory	4 credits
MICROBIO-221. Medical Microbiology	4 credits
PATHASST-200. Introduction to Dissection	2 credits
PATHASST-201. Basic Neuroanatomy	1 credit

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-364. Systemic Pathology	3 credits
PATHOL-361. Autopsy Pathology	4 credits
PATHASST-230. Surgical Pathology	4 credits
PATHOL-258. Cellular and Subcellular Pathology	2 credits
PATHASST-216. Histology Techniques	1 credit
PATHASST-240. Photography	1 credit

Year 2

Spring

PATHOL-364. Systemic Pathology	3 credits
PATHASST-231. Surgical Pathology	4 credits

PATHOL-362. Autopsy Pathology	4 credits
PATHASST-217. Histology Techniques	1 credit
PATHASST-241. Photography	2 credits

Year 2

Summer

PATHASST-300. Autopsy Practicum	4 credits
PATHASST-301. Surgical Pathology Practicum	4 credits
PATHASST-302. Forensic Rotations	3 credits
Total	80 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 (G.R.E.) or Medical College Admission Test (M.C.A.T.) 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. Telephone: (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 nonrefundable application fee of \$35;
2. Official transcripts of all colleges and universities attended;
3. G.R.E. or M.C.A.T. 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 nonrefundable deposit of \$350 to retain their places in the class. This deposit applies to tuition.

Tuition, Fees and Estimated Costs for Year One

Tuition	\$12,400
Recreation fee	50
Books	630
Lab fee	1000
Student health fee	690
Student insurance	847 (single)
Vehicle registration	65
Rent	5,330
Food	4,270
Miscellaneous	4,430
Total	29,712

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-305. 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*

CELLBIO-200. Cell and Tissue Biology. This is the introductory medical school and graduate course in microscopic anatomy. Students participate in lectures and laboratories on the structure and function of cells and tissues of the body. The course provides practical experience in the use of the light microscope analyzing an extensive slide collection of mammalian tissues. 3 credits. *McIntosh and staff*

CELLBIO-201. 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-202. Medical Physiology. Medical and graduate level course on organ and cell physiology. Human and medical aspects are stressed. 4 credits. *Anderson 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-250. General Pathology. This is the medical school core course in pathology. Lectures deal with broad concepts of disease and underlying molecular mechanisms. 4 credits. *Staff*

PATHOL-251. Laboratory Course in General Pathology. Fundamentals of pathology are presented by correlating gross and microscopic material to illustrate the structural changes in disease. Laboratories are broken into small groups of students and are held under the guidance of staff pathologists. 4 credits. *Staff*

PATHOL-258. Cellular and Subcellular Pathology. 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*

PATHOL-361, 362. Autopsy Pathology. A detailed consideration of the morphologic, physiologic, and biochemical manifestations of disease. Includes gross dissection, histologic examinations, processing, analyzing of all autopsy findings under tutorial supervision. 6 credits each course. *Lewis and staff*

PATHOL-364. Systemic Pathology. This is the medical school and graduate course in the detailed pathology of major organ systems. The course consists of lectures and seminars presenting the latest scientific concepts of disease. 6 credits. *Bradford 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. 3 credits. *Lewis and staff*

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 prosection and workup. Students assist residents in full autopsy dissections. 4 credits. *Lewis 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-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-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 prosections 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 Rotation. Students rotate through the laboratories of the Chief Medical Examiner assisting in forensic autopsies. 3 credits. *Butts and staff*

The Physician Assistant Program

MASTER OF HEALTH SCIENCES CURRICULUM

Department of Community and Family Medicine

Chairman: James L. Michener, M.D. Education Division
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
Director of Preclinical Education: J. Victoria Scott, M.H.S., PA-C
Director of Clinical Education: Philip A. Price, M.H.S., PA-C
Director of Recruitment and Minority Affairs: Lovest Alexander, M.H.S., PA-C
Surgical Coordinator: Paul C. Hendrix, M.H.S., PA-C
Clinical Laboratory Coordinator and Coordinator, ECU M.H.S. Option: Margaret Schmidt, Ed.D., M.T. (A.S.C.P.)
Clinical Medicine Coordinator: John C. Lord, B.H.S., PA-C
Behavioral Medicine Coordinator: Anthony Smith, Ph.D.
Instructor: Peggy R. Robinson, M.H.S., PA-C
Regional Clinical Coordinators: Toby S. Brown, M.H.S., PA-C; Gloria J. Jordan, M.H.S., PA-C; Brenda L. Kaminski, PA-C, Mary Jo Bondy, M.H.S., PA-C

The physician assistant (PA) concept originated at Duke over three decades ago. Dr. Eugene A. Stead Jr., then chairman of the Department of Medicine, believed that midlevel 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 who, working interdependently with physicians, 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 forty-seven states, the District of Columbia, and Guam, 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.

The role of the graduate PA has evolved substantially over the past thirty years. While the majority of PAs in clinical practice continue to provide primary care services, the percentage serving in solo practice or private group settings has declined, while the percentage practicing in institutional settings has risen. Today, over half of all graduate PAs are employed in large clinics, hospitals, and institutional settings. There are also more nonclinical positions developing for PAs; while these positions do not involve patient care, they depend on a strong clinical knowledge base (e.g., drug study coordinator, clinical services coordinator, etc.).

In recognition of the increased responsibilities and expanded roles of PAs, the increased number of applicants with college degrees, and the quality of the PA educational program, the university began offering the Master of Health Sciences (M.H.S.) degree to graduates in 1992. The M.H.S. curriculum is designed to provide PAs with a greater 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 twenty-five 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 twelve months of the program are devoted to preclinical studies in the basic medical and behavioral sciences, and the remaining thirteen 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 computer-assisted diagnostics using simulated patients. 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 services, outpatient medicine, 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 development of a written research protocol. 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. Introduction to Research and Epidemiologic Principles	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. Outpatient Medicine	8 credits
PHYASST-305. Research Period	3 credits
PHYASST-310. Behavioral Medicine	4 credits
PHYASST-320. Inpatient Medicine	8 credits
PHYASST-340. General Surgery	4 credits
PHYASST-350. Emergency/Outpatient Surgery	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 complete BLS, ACLS, and the research period. The four-week research period is scheduled during the clinical year.

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*), Low Pass (*L*), 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. Also, a student can receive no more than a total of three grades of "Low Pass" in the twenty-seven required courses during the clinical and preclinical phases of 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 thirty 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 (thirteen 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) 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 apprise the program director in writing of his or her wish to return to the PA Program or to extend the personal leave at least sixty 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 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 MHS 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. At least 11 semester credits in the biological sciences, including at least 3 credits each in anatomy and physiology. Courses in human anatomy and human physiology are recommended. At least 8 semester credits in chemistry are also required. These courses must be completed with grades of "C" or better (not C minus). Courses in microbiology and statistics are recommended, and preference is given to candidates who have completed these courses. Applicants from all academic disciplines are welcome, provided they meet the preparatory science course prerequisites.
3. Scores of the Graduate Record Examination (G.R.E. general test), taken within the last five years. No other test scores are accepted in lieu of the G.R.E.
4. A minimum of six months (1,000 hours) of patient care experience, with direct "hands-on" patient contact.

Application Procedures. Application Procedures. The PA Program application is Web-based. It may be accessed via the program's Web site at <http://pa.mc.duke.edu>. The application is revised each year and is available from July 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:

1. a nonrefundable application fee of \$55
2. official transcripts from all colleges/universities and other postsecondary institutions attended;
3. scores of the Graduate Record Examination (GRE). The GRE must be taken in advance of the application deadline, and scores must be reported on the application;
4. 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; forty-four 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 April 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 nonrefundable registration and deposit fees by May 1. 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 nonrefundable first registration fee of \$55, as well as a nonrefundable program deposit of \$275. For those who do matriculate, the program deposit is applied to the cost of tuition.

Expenses for the 2001 entering class of the Master of Health Sciences Physician Assistant Program are as follows:

Tuition	\$23,625
Books, uniforms, and instruments	1,810

Laptop computer rental fee	1,650
Internet Connection fee	200
Other fees (Student government, recreational, parking)	195
Food	4,270
First Year Fee (laboratory, etc.)	800
Lodging	5,330
Student Health Fee	690
Student Accident and Hospitalization Insurance	778 per year-single
Miscellaneous (travel, clothing, etc.)	4,430

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. Financial aid application packets are distributed on the admissions interview date.

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 will analyze the best loans in the marketplace and make a suggestion for a preferred lender. 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 919-571-4182 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 U.S.P.H.S. facilities. Interested applicants can call the National Health Service Corp Program directly at 1-800-221-9393 for further information.

Limited scholarship funds are available without a separate application process. 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.

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. 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.

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, the research period, and all clinical rotations scheduled to that date. The PA program certificate of completion is awarded four months later in early September, 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 and no transfer credit is accepted.**

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. 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 small-group format; lectures and audiovisuals are used, as well as extensive small group practice sessions. The final weeks of this course focus on orthopaedic physical diagnosis and common orthopaedic problems. 3 credits. *Price*

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 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. *Lord and Scott*

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. *Smith*

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. *Scott*

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. Introduction to Research and Epidemiologic Principles. Foundations of research methodology related to the study of disease distribution and issues in study design, data collection, and methods of analysis. The PA student develops a critical review of the literature pertaining to an assigned clinical research question. 3 credits. *Yankaskas*

Clinical Year Courses

COMMUNITY AND FAMILY MEDICINE

PHYASST-300. Outpatient Medicine. This eight-week rotation emphasizes the outpatient evaluation and treatment of conditions common at the community and family medicine level, and the appropriate health maintenance measures for different age groups. An alternative track in outpatient medicine is also available for those students who have a specific interest in interdisciplinary training. 8 credits. *Staff*

PHYASST-305. Research Period. During a four-week research period in the clinical year, the student attends weekly seminars and develops a written research protocol. This course is a practical application of principles learned in PHYASST-255. 3 credits. *Lief*

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/Outpatient Surgery. 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. There is also the opportunity to follow up patients on return visits. 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

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 Director of Clinical Education 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.

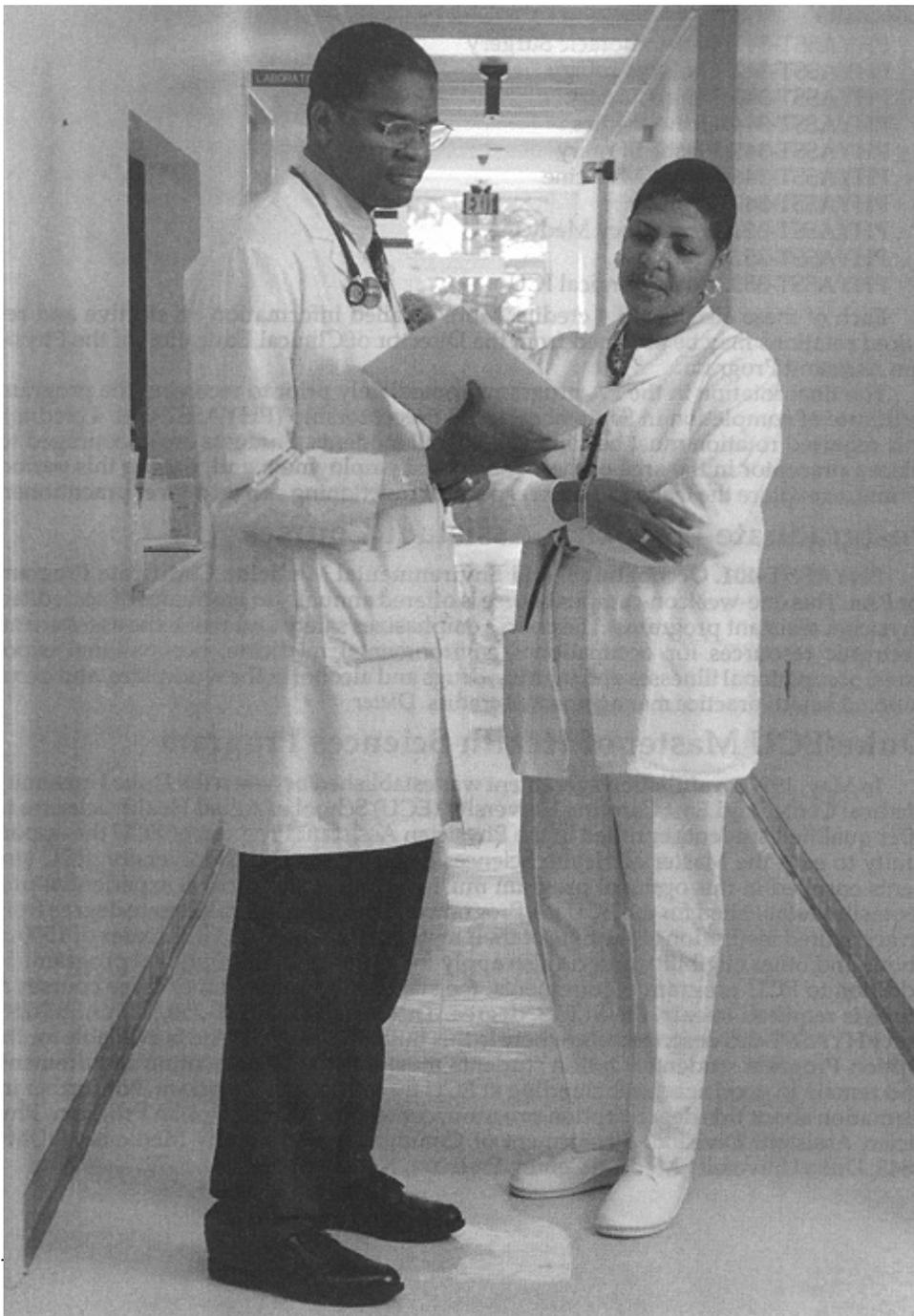
Postgraduate Physician Assistant Courses

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. 3 credits. *Dieter*

Duke/ECU Master of Health Sciences Program

In May, 1997 an affiliation agreement was established between the Duke University Medical Center and East Carolina University (ECU) School of Allied Health Sciences to offer qualified students enrolled in the Physician Assistant Program of ECU the opportunity to earn the Master of Health Sciences Degree from Duke University. ECU students enrolled in this optional program must meet all academic and experiential prerequisites established for the ECU PA Program and possess a baccalaureate degree from an accredited institution at the time of their matriculation at ECU. GRE scores of 1500 or above and other eligibility criteria also apply for entrance to this optional program. In addition to ECU program requirements, the successful completion of three courses at Duke is required to earn the M.H.S. degree. These are PHYASST-250, PHYASST-255, and PHYASST-305 described elsewhere in this Bulletin. Financial Aid is available for the Option Program students. Option students must meet all continuation requirements and remain in good academic standing at ECU throughout the program. For further information about this degree option program, contact the M.H.S. Option Program, Physician Assistant Division, Department of Community and Family Medicine, DUMC 3848, Duke University Medical Center, Durham, NC 27710, 919-684-3872.

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 internship training in clinical psychology 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, approved by the American Psychological Association, provides experience in many contexts with a wide diversity of patients. Internship training provides experience in the traditional activities of clinical psychologists: assessment, consultation, treatment, and research.

* Includes involuntary withdrawal for academic reasons.

Those successfully completing the requirements for the internship are awarded a Duke University Medical Center certificate. Requests for additional information and 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: W. Banks Anderson, M.D.
Program Director: Karen Summerville, C.O.M.T.

The Ophthalmic Medical Technician 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 designed to provide the basic clinical background necessary for the student to understand and perform the technical tasks designated to them by an ophthalmologist. Orientation and classes begin on the first Monday in July, and consist of fifty-two instructional weeks including twelve days of personal leave. The core curriculum is covered within the first three months supplemented by clinical experience under close supervision of clinical support staff and faculty. The following nine months consist of clinical rotations with the student working under the close supervision of qualified clinical support staff and faculty. Students are evaluated on a routine basis as their skills develop.

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 level of ophthalmic medical technician.

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 Allied Health application form, including a nonrefundable processing fee;
2. Official transcript(s) from the most recent schools attended;
3. Three letters of recommendation; and
4. A personal interview with members of the admissions committee may be requested following receipt 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 the 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.

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

Pastoral Care and Counseling

Associates in Instruction: Charla B. Littell, M.Div.; Uwe C. Scharf, Ph.D.; James L. Travis, Ph.D.

A graduate program in pastoral care and counseling is available to clergy, theological students, members of religious orders, and lay persons of all religious faith groups. There are five distinct program structures of Clinical Pastoral Education offered at Duke University Medical Center. All programs are designed to train individuals who desire to specialize in pastoral care, to enhance their skills as parish clergy, or to broaden their understanding of ministry. With the exception of the Parish-Based Extended Basic CPE Program, all who enroll in any of the programs of Clinical Pastoral Education are required to serve as chaplains in the Medical Center. All programs are accredited by the Association for Clinical Pastoral Education, Inc.

Programs of Study. One unit of Clinical Pastoral Education is offered in three forms: summer full-time CPE (June-August), hospital-based extended CPE, and parish-based extended CPE. The extended units are offered concurrently with the fall and spring semesters of Duke Divinity School. The year-long residency program (June-May) earns four progressing units of CPE. Supervisory CPE is designed for those seeking to be certified as a clinical pastoral education supervisor and is offered as available.

Requests for application and further information about any of the programs should be directed to the Director, Pastoral Services, Box 3112, Duke University Medical Center, Durham, North Carolina 27710. Admission procedures to each program include:

1. Completion and submission of written application materials;
2. An admission interview by a qualified interviewer;

3. Acceptance by the Duke University Medical Center CPE Center.

In addition to the above admission procedures, requirements for admission to specific CPE programs include:

1. Completion of a consultation process between a Duke University Medical Center CPE supervisor and a church board (Parish-Based Extended CPE);
2. Graduation from college and seminary (equivalences may be considered); and adequate ministry formation/development and experience in ministry which indicates readiness for this program (Residency CPE Program);
3. A personal interview with Duke University Medical Center faculty (Residency and Supervisory CPE);
4. Ecclesiastical endorsement; pastoral experience of usually not less than three years; completion of program objectives of ACPE; residency and consultation by the appropriate committee in the region with respect to his/her readiness to pursue supervisory training (Supervisory);
5. Submission of previous basic CPE unit(s) final evaluation by student and supervisor(s) (Residency and Supervisory CPE).

Salary and Fees. Stipends are available for students in the Residency Program and the Supervisory CPE Program. For 2001-2002, the salary for the Residency Program is \$22,000. For the Supervisory CPE Program the salary is \$23,000. There is no salary available for summer full-time and extended CPE units. Salaried students are eligible for the same benefit package as Duke University employees of comparable levels.

Tuition is \$425 per unit when enrolled through the Allied Health Division of Duke University Medical Center (\$325 for two or more consecutive units), and \$2,680 per unit when enrolled through Duke University Divinity School for academic credit. (A unit of CPE equals two academic courses.)

Fees include the following:

1. An application fee of \$30 must accompany an Allied Health form unless applying with intention of enrolling through Duke University Divinity School;
2. \$100 tuition deposit for those accepted into the year-long Residency Program;
3. \$50 tuition deposit for students accepted into the summer full-time and extended CPE programs;
4. \$60 per unit for mid-Atlantic region fee.

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 twelve-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. E-mail: byron.may@duke.edu or visit our website at: <http://pharmacy.mc.duke.edu>.

Stipend. A stipend of \$32,400 is granted for the twelve-month residency.

*The Duke University School of Nursing
Program*



The Duke University School of Nursing

Dedicated to excellence, the Duke University School of Nursing, is a national leader in nursing education. By providing advanced comprehensive education, conducting research that adds to our understanding of health and illness and practicing compassionate research-based nursing care, the faculty, students and graduates of the Duke University School of Nursing are shaping the future of professional nursing.

Programs

MASTER OF SCIENCE IN NURSING PROGRAM

The School of Nursing offers a flexible, 39 to 52 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 MSN/MBA) and the Divinity School (MSN/MCM). 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 MSN 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 and Progression

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 (NLN) 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 (G.R.E.) or Miller Analogies Test (M.A.T.).
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. Personal interview. Other arrangements will be made when distance is a factor.
9. Basic computer skills are required prior to matriculation.

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 NLN 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 work must include satisfactory completion of a course in descriptive and inferential statistics.

* 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 a distance-based student 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.

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 MSN program, a maximum of seven credits earned as a non-degree student will be accepted toward the MSN degree.

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 e-mail at Admissions@son3.mc.duke.edu. Information can also be accessed at the School of Nursing's web site: <http://www.nursing.duke.edu>.

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

** 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 a distance-based student 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.

Form and Report of Medical History, furnished by Duke University, should be completed and returned to the Director of Student Health Services, 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 (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.

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 Carolina and for obtaining a nonimmigrant 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 web site. 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 web site at <http://www.toefl.org>.

ADMISSION APPLICATION INFORMATION

All applicants to graduate programs at the Duke University School of Nursing must complete an application and submit that completed application to the Office of Admissions and Student Services. A check or money order for the nonrefundable processing fee of \$50 must accompany each application.

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 G.R.E. to indicate that you want a copy of your scores sent to the School of Nursing is R5173. The number to use on the M.A.T. 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.

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 – 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 nonrefundable tuition deposit. The tuition deposit is \$150 for all programs except the nurse anesthesia program, which requires a \$1000 deposit. This fee will be credited toward tuition or forfeited if the student decides not to matriculate.

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 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. 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 this publication.

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.

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 6 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.

TRANSFER TO ANOTHER GRADUATE NURSING MAJOR

A change of graduate nursing major may be made, contingent upon approval of the faculty involved. Should a change be made, a student must meet all requirements of the new major. Students must file a "Change of Major" form. "Change of Major" forms are available in the Office of Admissions and Student Services and at the Duke University School of Nursing website: <http://www.nursing.duke.edu>.

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.

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.

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 nonacademic 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 10 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 (MSN students) or 10 credits (PMC 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 regis-

tration 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.

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.

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.

COMMUNICATION BETWEEN DUKE UNIVERSITY AND STUDENTS

Electronic mail (e-mail) 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 e-mail account upon acceptance of an offer of admission. It is the student's responsibility to check this e-mail account regularly and to respond promptly to requests made by e-mail.

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 GRIEVANCE/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.*

Program Requirements

REQUIREMENTS FOR THE MASTER'S DEGREE

Each of the school's majors requires the completion of 39 to 56 units of credit. These

*The Hooding and Recognition Ceremony is held on the Saturday evening prior to Sunday Commencement exercises.

units include core courses required of all master's students, the research options, courses in the major, and electives.

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 MSN 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 21st century. The MSN 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:

Health Systems Leadership And Outcomes	Credits
MSN 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
N419. Leadership Residency	4
Electives	11
TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION	39 - 42
Informatics Minor	Credits
N410. Informatics Issues in Nursing Systems	3
N411. Nursing Informatics Theory and Application	3
N418. Nursing Informatics Residency	3 - 9
Total	9 - 15

*Required of all MSN candidates

MSN – MBA Program

The School of Nursing also offers, in conjunction with the Fuqua School of Business,

a joint MSN/MBA degree. Course work for the joint MSN/MBA includes the following:

	Credits
MSN 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
MSN 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
TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION	39 - 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 MSN 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
MSN 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	9
TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION	39-42

Family and Adult Nurse Practitioner Majors: 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 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 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 NP 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 re-

quired 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
MSN Core Courses	14-17
Nurse Practitioner Core Courses	16
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
N458. Nurse Practitioner Residency: Adult Acute Care	3
Total	41–46

Adult Nurse Practitioner –Primary Care	Credits
MSN 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
MSN 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
MSN 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
MSN Core Courses	14-17
Nurse Practitioner Core Courses	16
N440. Well Child Physical and Developmental Assessment for Family Nurse Practitioners	1
N441. Child Health in Family Care	4
N442. Sexual and Reproductive Health	4
N449. Nurse Practitioner Residency: Family	4
Elective	2
Total	45-48
Gerontology Nurse Practitioner	Credits
MSN 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, Acute Care Pediatric Nurse Practitioner and Neonatal Nurse Practitioner 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 is 600 hours, except for the Acute Care Pediatric Nurse Practitioner, which requires 1104 hours. This meets the requirements of the specialty organizations and qualifies the student to sit for certification examinations in the specialty.

Practitioner Core	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
Total	10
Pediatric Nurse Practitioner	Credits
MSN Core Courses	14-17
Nurse Practitioner Core Courses	10
N322. Common Pediatric Management Issues I	4
N323. Common Pediatric Management Issues II	4
N430. Issues in Infant and Young Child Development	3
N431. Issues in School Age Child and Adolescent Development	3
N439. Nurse Practitioner Residency: Pediatrics	4
Elective	2
Total	44-47
Neonatal Nurse Practitioner	Credits
MSN Core Courses	14-17
Nurse Practitioner Core Courses	10
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
Electives	2
Total	41-46
Pediatric Acute Care Nurse Practitioner	Credits
MSN Core Courses	14-17
Nurse Practitioner Core Courses	10
N322. Common Pediatric Management Issues I	4
N323. Common Pediatric Management Issues II	4
N430. Issues in Infant and Young Child Development	3
N431. Issues in School Age Child and Adolescent Development	3
N439. Nurse Practitioner Residency: Pediatrics	4
N427. Managing Acute and Chronic Health Conditions in Children II	4
N428. Nurse Practitioner Residency: Pediatric Acute Care	3
Total	49-52

Clinical Nurse Specialist

The clinical nurse specialist (CNS) 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 CNS students is 39-42.

Clinical Nurse Specialist – Gerontology	Credits
MSN Core Courses	14 – 17
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	2
Total	41-44

Clinical Nurse Specialist – Oncology/HIV	Credits
MSN Core Courses	14 – 17
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	5
Total	39-42

Clinical Nurse Specialist – Pediatrics	Credits
MSN Core Courses	14 – 17
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N430. Issues in Infant and Young Child Development	3
N431. Issues in School Age Child and Adolescent Development	3
N438. Clinical Nurse Specialist Residency: Pediatrics	3
Electives/Independent Study	6
Total	39 – 42

Clinical Nurse Specialist – Neonatal	Credits
MSN Core Courses	14 – 17
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3

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
Elective	2
Total	40-43

Clinical Nurse Specialist – Critical Care	Credits
MSN Core Courses	14–17
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	3-5
Total	40–45

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 that also understands the value of basic theological education. Coursework in the major includes the following:

MSN Core Courses	Credits 14-17
N332. Diagnostic Reasoning and Physical Assessment in Advance Nursing Practice	4
N500. Seminar in Parish Nursing I	1
N501. Seminar in Parish Nursing II	1
N502. Health Promotion and Disease Prevention	3
N503. Health and Nursing Ministries Residency	3
N504. Seminar on Care and the End of Life: Suffering and Dying Well	3
N509. Seminar in Health and Nursing Ministries	3
Divinity Electives	6
CT32. Christian Theology	3
CHE33. Christian Ethics	3

CHE266. Ethics in Health Care	3
TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION	47-50

Health and Nursing Ministries – Joint Master of Church Ministries/ Master of Science in Nursing

The MCM/MSN 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
MSN Core Courses	14-17
N332. Diagnostic Reasoning and Physical Assessment in Advance Nursing Practice	4
N500. Seminar in Parish Nursing I	1
N501. Seminar in Parish Nursing II	1
N502. Health Promotion and Disease Prevention	3
N503. Health and Nursing Ministries Residency	3
N504. Seminar on Care and the End of Life: Suffering and Dying Well	3
N509. Seminar in Health and Nursing Ministries	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 MINIMUM NUMBER OF CREDITS FOR GRADUATION	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 51 course credits, including 663 didactic hours and 1872 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.

	Credits
MSN Core Courses	14-17
N330. Selected Topics in Advanced Pathophysiology	3
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
N526. Professional Aspects of Nurse Anesthesia Practice	3
N529. Clinical Anesthesia Practicum (5 rotations at 1 credit per rotation)	5
TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION	51-54

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 will be prepared for roles in nursing education, staff development, hospital education, continuing education, and practice consultation. Courses in the program include the MSN core course and the following:

	Credits
MSN 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
3 Educational Cognate Courses	9
Nursing Education Residency	3
TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION	40

Post Master's Certificate Program

The purpose of the post master's certificate program is to provide opportunities for students who already have an MSN 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	4
N419. Leadership Residency	4
Total	14

INFORMATICS

	Credits
N410. Informatics Issues in Nursing Systems	3
N411. Nursing Informatics Theory and Application	3
N418. Nursing Informatics Residency	3 – 9
Total	9-15

CLINICAL RESEARCH MANAGEMENT

	Credits
N490. CRM: Trials Management	4
N491. CRM: Business and Financial Practices	4
N492. CRM: Regulatory Affairs	4
N499. CRM: Residency	4
Total	16

ACUTE CARE

	Credits
Nurse Practitioner	
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	3-4
N451. Management of Critically Ill Adult Patients II	3-4
N458. Nurse Practitioner Residency: Adult Acute Care	3
Total	27-29
Clinical Nurse Specialist – Critical Care	
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	21-23

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 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
N440. Well Child Physical and Developmental Assessment for Family Nurse Practitioners	1
N441. Child Health in Family Care	4
N442. Sexual and Reproductive Health	4
N449. Nurse Practitioner Residency: Family	1 – 4
Total	26 – 29

GERONTOLOGICAL NURSING

<i>Nurse Practitioner</i>	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

<i>Clinical Nurse Specialist</i>	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
Total	25

ONCOLOGY/HIV NURSING

<i>Nurse Practitioner</i>	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

<i>Clinical Nurse Specialist</i>	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
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	3
Total	19

NEONATAL NURSING

<i>Nurse Practitioner</i>	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
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	25 - 27

<i>Clinical Nurse Specialist</i>	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
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	24

PEDIATRIC NURSING

<i>Pediatric Nurse Practitioner</i>	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
N336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N430. Issues in Infant and Young Child Development	3
N431. Issues in School Age Child and Adolescent Development	3
N439. Nurse Practitioner Residency: Pediatrics	4
Total	28

<i>Clinical Nurse Specialist</i>	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
N430. Issues in Infant and Young Child Development	3
N431. Issues in School Age Child and Adolescent Development	3
N438. Clinical Nurse Specialist Residency: Pediatrics	3
Elective	3
Total	22

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
N430. Issues in Infant and Young Child Development	3
N431. Issues in School Age Child and Adolescent Development	3
N439. Nurse Practitioner Residency – Pediatrics	3
N427. Managing Acute and Chronic Health Conditions in Children II	4
N428. Nurse Practitioner Residency: Pediatric Acute Care	4
Total	35

NURSE ANESTHESIA

	Credits
N330. Selected Topics in Advanced Pathophysiology	3
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
N529. Clinical Anesthesia Practicum (5 rotations)	5
N531. Professional Aspects of Nurse Anesthesia Practice	3
Total	37

HEALTH AND NURSING MINISTRIES

	Credits
N332. Diagnostic Reasoning and Physical Assessment in Advance Nursing Practice	4
N500. Seminar in Parish Nursing I	1
N501. Seminar in Parish Nursing II	1
N502. Health Promotion and Disease Prevention	3
N503. Health and Nursing Ministries Residency	3
N504. Seminar on Care and the End of Life: Suffering and Dying Well	3
N509. Seminar in Health and Nursing Ministries	3
CT32. Christian Theology	3
CHE33. Christian Ethics	3
Divinity Electives	6
Total	30

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
3 Educational Cognate Courses	9
Nursing Education Residency	3
Total	26

Medical Spanish Elective Courses

The School of Nursing offers elective courses in medical Spanish and cultural competency designed to enable health care providers to be better able to serve Hispanic and Latino patients. Individuals who wish to enroll in these courses do not need to apply for admission to the School of Nursing. Further information is available from the Office of Admissions and Student Services: 1-877-415-3853; admissions@son3.mc.duke.edu.

	Credits
N531. Medical Spanish and Cultural Competency for Health Care– Beginner Level I	1
N532. Medical Spanish and Cultural Competency for Health Care– Beginner Level II	1

N533. Medical Spanish and Cultural Competency for Health Care— Intermediate Level I	1
N534. Medical Spanish and Cultural Competency for Health Care— Intermediate Level II	1
Total	4

Courses of Instruction*

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 judgements about services or approaches in prevention, early detection and intervention, correction or prevention of deterioration, and the provision of palliative care. Fall, spring. Instructor: Cameron. 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. Instructor: Anderson. 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 are covered. Fall, spring. Instructor: Turner. 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. Instructor: Coombs. 2 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. Prerequisite or concurrent: Nursing 307 and 308, or consent of instructor. Instructor: Staff. 3 credits.

313. Thesis. 1 to 6 credits. Fall, spring, summer. Instructor: Staff. Variable credit.

314. Nonthesis 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 pathophysiologic 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 eighteen years. Fall. Instructor: Brandon. 3 credits.

*Course offerings and content subject to change.

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: Bradshaw and Turner. 3 credits.

322. Common Pediatric Management Issues I. Focus on comprehensive assessment and management of selected pediatric 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), and 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. Focus on comprehensive assessment and management of selected pediatric 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.

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 pathophysiology of common health problems and complex physiological alterations encountered in advanced clinical practice. Fall. Instructor: Karlet. 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. Instructor: 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. Fall–Robert Wood Johnson Foundation program course only. Prerequisites: Nursing 330 and 332; prerequisite or concurrent: Nursing 331. Instructors: Brown 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: Adinolfi and Price. 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. Instructor: 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. Summer. 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 noninvasive 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. Students select a topic of professional interest within the specialty area or in support of the specialty area, 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. 1 to 3 credits. Fall, spring, summer. Prerequisite: matriculation into nursing curriculum. Instructor: Staff. Variable credit.

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. Dynamics of Management. An in-depth analysis of organizational behavior and management practices within integrated health care systems. Students identify issues, formulate questions, and pursue managerial interventions that will result in high quality patient care and organizational outcomes that are socially relevant and clinically cost-effective. Spring. Prerequisite: Nursing 400 or consent of instructor. Instructor: Anderson. 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. Prerequisite: Nursing 400, 401, 402, 480, 481 (may be taken concurrently), or by consent of instructor. Instructor: Anderson. 4 credits.

407. Leadership for Ethical Decision Making in Health Care. Applies ethical principles and decision-making models to complex healthcare 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.

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.

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 nurs-

ing 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. Instructor: Bradshaw, Brandon, 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: Bradshaw and Brandon. 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. Instructor: Turner. 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. Instructors: 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: Cameron. 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 are emphasized. Spring. 104 clinical hours. Prerequisites: Nursing 320, 321, and 336. Instructors: Cameron 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: Cameron. 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.

431. Issues in School Age Child and Adolescent Development. The discussion of important issues related to health maintenance and of complex medical and social problems in children from school age through adolescence. Normal cognitive, motor, social/emotional, and language development, and the usual developmental challenges of each age group are discussed. Summer. Prerequisites: Nursing 336 and 430 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 (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.

440. Well Child Physical and Developmental Assessment for Family Nurse Practitioners. Focuses on the physical and developmental assessment of well children from infancy through adolescence. Lectures and course assignments are designed to increase assessment skills needed in the care of children in the primary care setting. The newborn nursery, developmental evaluation centers, schools, clinical facilities that treat pediatric patients, and daycare centers are used as settings to increase pediatric assessment skills. Summer. Prerequisites: Nursing 330, 331, 333, 334, and 336. Instructors: Bradshaw, Friedman, and Linbeck. 1 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. Instructors: Friedman and 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. Instructor: Friedman. 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: Cheek, Harshaw-Ellis, and McFetridge. 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: Cheek, Harshaw-Ellis, and McFetridge. 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: Cheek. 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 ACNP. Prerequisites: Nursing 330, 331, 332, 333, 334, 442, 450, and 451. Instructors: Cheek, Harshaw-Ellis, and McFetridge. 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 Friedman. 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. Instructors: Bowers and McFetridge. 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. Instructors: Bowers and McFetridge. 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: Cheek, Harshaw-Ellis, and McFetridge. 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. 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. Instructor: Schneider. 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: McConnell. 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 Ouimette. 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. Instructor: Ouimette. 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: 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: 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, sum-

mer. Instructors: 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 setting gaining skills and experience working as an integral member of a project team on clinical product development research projects. 1 to 4 credits. Fall, spring, summer. 300 residency hours. Instructors: Dren and Turner. Variable credit.

500. Introduction to Parish Nursing. Provides a basic introduction to the fundamentals of parish nursing ministry. Students are introduced to an overview of the various roles filled by the parish nurse: health educator, health counselor, referral agent, coordinator, facilitator, advocate, and supporter. Fall. Also taught as Health and Nursing Ministries 11. Instructors: Ouimette and Beard (Divinity). 1 credit.

501. Parish Nursing II. Building upon the principles of Introduction to Parish Nursing, students in Parish Nursing II begin to implement the aspects of basic parish nursing within the context of a faith community. This course provides opportunities for discussion and exploration of parish nursing as both a ministry of the church and a subspecialty of professional nursing. 50 hours field experience. Spring. Prerequisite: Nursing 500. Also taught as Health and Nursing Ministries 12. Instructors: Ouimette and Meador (Divinity). 1 credit.

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.

503. Health and Nursing Ministries Field Experience. Provides the student with 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.

504. 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.

509. 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 given to the complex relationship between faith and health. Fall. Al-

so taught as Health and Nursing Ministries 300. Instructors: Ouimette and Meador (Divinity). 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: Temo. 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 orthopedic, 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: Temo. 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: Temo. 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: Temo. 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.

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.

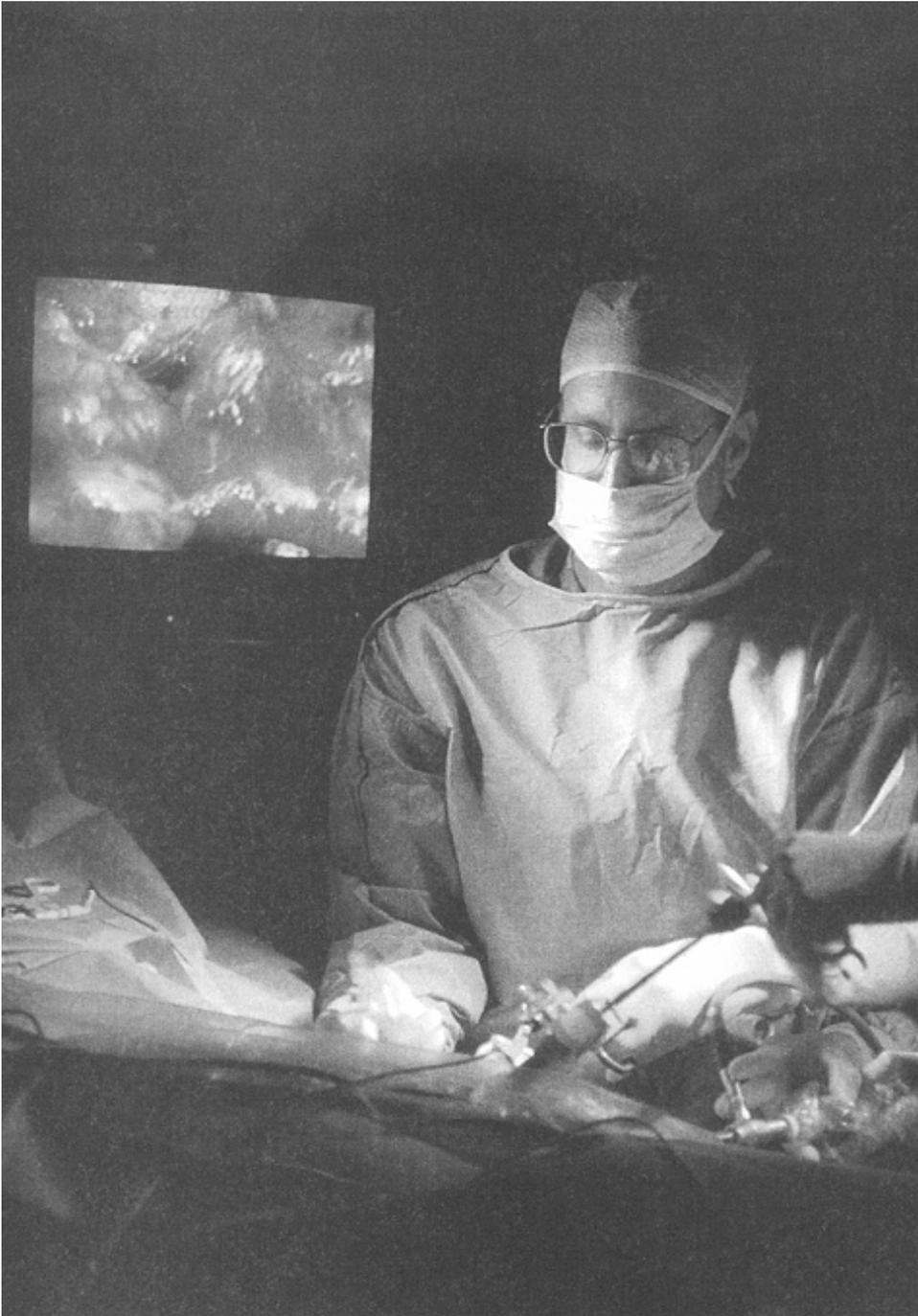
531. Medical Spanish and Cultural Competency for Health Care–Beginner Level I. Conversationally focused language course designed to develop beginning cultural competency and beginning language skills in medically focused Spanish language. The course is appropriate for anyone who works in the health care 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.

Graduate Medical Education



Graduate Program Information

Accreditation Council for Graduate Medical Education Programs. Appointments are from July 1 through June 30 with a few exceptions. Residents 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: Critical Care	Dr. Chris Young
Anesthesiology: Pain Management	Dr. Dr. Thomas Bucheit
Anesthesiology	Dr. Catherine Lineberger
Cardiovascular Disease	Dr. Thomas Bashore
Child Neurology	Dr. Darrel Lewis
Child Psychiatry	Dr. Myra McSwain-Kamran
Clinical Cardiac Electrophysiology	Dr. J. Marcus Wharton
Clinical Neurophysiology	Dr. Atif Husain
Critical Care Pediatrics	Dr. Eva Grayck
Dermatology	Dr. Sarah Myers
Dermatopathology	Dr. Christopher Shea
Endocrinology/Metabolism	Dr. Francis Neelon
Family Practice	Dr. Margaret Gradison
Gastroenterology	Dr. Rodger Liddle
Hematology/Oncology	Dr. Marilyn Telen
Infectious Diseases	Dr. John Hamilton
Internal Medicine: Geriatric Medicine	Dr. Kenneth Lyles
Internal Medicine	Dr. Ralph Corey
Interventional Cardiology	Dr. Michael Sketch
Medical Genetics	Dr. Marie McDonald
Medical Microbiology	Dr. Barth Reller
Medicine/Pediatrics	Drs. Ralph Corey/Deborah Kredich
Medicine/Psychiatry	Drs. Ralph Corey/Grace Thrall
Neonatal/Perinatal Medicine	Dr. Marie Pane
Nephrology	Dr. Thomas M. Coffman
Neurological Surgery	Dr. Allan Friedman
Neurology	Dr. Joel Morganlander
Neuropathology	Dr. Roger McLendon
Nuclear Medicine	Dr. Edward Coleman
Obstetrics-Gynecology	Dr. Charles Hammond
Ophthalmology	Dr. Terry Kim
Orthopaedic Hand Surgery	Dr. James Urbaniak
Orthopaedic Surgery	Dr. William Hardaker
Otolaryngology	Dr. Joseph Farmer
Pathology: Cytopathology	Dr. Sandra Bigner
Pathology: Hematology	Dr. Patrick Buckley
Pathology	Dr. William Bradford
Pediatric Cardiology	Dr. Brenda Armstrong
Pediatric Endocrinology	Dr. Michael Freemark
Pediatric Hematology-Oncology	Dr. Philip Rosoff

Pediatric Infectious Disease	Dr. Ross McKinney
Pediatric Nephrology	Dr. John Foreman
Pediatric Rheumatology	Dr. Deborah Kredich
Pediatric Pulmonology	Dr. Thomas Murphy
Pediatric Radiology	Dr. Donald Frush
Pediatrics	Dr. Deborah Kredich
Plastic Surgery	Dr. Scott Levin
Preventative Medicine: Occupational	Dr. Dennis Darcey
Psychiatry	Dr. Grace Thrall
Psychiatry: Addiction	Dr. Roy Stein
Psychiatry - Forensic	Dr. Sally Johnson
Psychiatry: Geriatric	Dr. David Steffens
Pulmonary Diseases/Critical Care Medicine	Dr. David Schwartz
Radiology: Neuroradiology	Dr. James Provenzale
Radiation Oncology	Dr. Larry Marks
Radiology: Diagnostic	Dr. Linda Gray
Radiology: Diagnostic (Nuclear)	Dr. Edward Coleman
Radiology: Vascular/Interventional	Dr. Paul Suhocki
Rheumatology and Genetics	Dr. David Pisetsky
General Surgery	Dr. Theodore Pappas
Surgery: Critical Care	Dr. Mark Sebastian
Thoracic Surgery	Dr. Walter Wolfe
Urology	Dr. Glenn Preminger

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 postmedical school appointments must register with this program.

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 web site 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 web site 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 web site at: ' 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) F.L.E.X., U.S.M.L.E. 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.

Roster of House Staff by Departments

Anesthesiology

Chief Residents: James McCurdy, M.D. (Oklahoma, 1997); David Schinderle, M.D. (Michigan, 1998).

Senior Residents: Jason Burke, M.D. (North Carolina, 1996); Peter Deballi, M.D. (Pennsylvania, 1996); Tarsha Garvin, M.D. (East Carolina, 1997); Jon-Paul Harmer, M.D. (Texas-San Antonio, 1997); Kurt Knauth, M.D. (Texas-Houston, 1997); Marcella Lanzinger, M.D. (T.U.M. Munich, 1995); Graham Lashley, M.D. (Utah, 1997); Holly William-Davis, M.D. (Texas-San Antonio, 1997); Julie Woosley, M.D. (Oklahoma, 1997).

Junior Residents: Peter Baek, M.D. (Duke, 1998); Shazia Choudry, M.D. (South Carolina, 1999); Anthony Colantonio, M.D. (Georgetown Univ., 1998); Will Corkey, M.D. (Duke, 1999); Daniel DeMeyts, M.D. (North Carolina, 1998); Ellen Flanagan, M.D. (North Carolina, 1999); Richard Griggs, M.D. (Penn. State, 1999); Keith Hanson, M.D. (Wisconsin, 1998); Scott Helsley, M.D. (Buffalo, 1998); Russel Jacobs, M.D. (Texas-Houston, 1997); Daphne Jones, M.D. (George Washington Univ., 1999); Laura Kihlstrom, M.D. (Duke, 1998); Patricia Macha, M.D. (Texas-Galveston, 1999); Eric Miller, M.D. (Baylor College, 1999); John Mitchell, M.D. (Univ. Michigan, 1999); Bill Norcross, M.D. (Penn. State, 1998); Cathleen Peterson-Layne, M.D. (Duke, 1998); Trenton Pierce, M.D. (Loma Linda Univ., 1999); Adam Schow, M.D. (Utah, 1999); Matt Taylor, M.D. (Texas-Houston, 1998); Adrienne Wells, M.D. (Rush, 1998).

Interns: Aaron Ali, M.D. (Texas-San Antonio, 2000); Genevieve Ali, M.D. (Texas-San Antonio, 2000); Atilio Barbeito, M.D. (Argentina, 1998); Timothy Grant, M.D. (South Carolina, 2000); Christopher Gunn, M.D. (Alabama, 2000); Abigail Melnick, M.D. (Mount Sinai, 2000); John Morreale, M.D. (Wayne State, 2000); Paul Shook, M.D. (Wake Forest, 2000).

Community and Family Medicine

Chief Residents: Anthony J. Choe, M.D. (Wayne State, 1998); George E. Harrison, M.D. (Morehouse, 1998).

Residents: Christopher S. Byrd, M.D. (East Carolina, 1999); Maria V. Gibson, M.D. (Russia, 1983); Shannon S. Hinner, M.D. (Wisconsin, 1999); Felice James-Rodríguez, M.D. (Duke, 2000); Rajya L. Kanuri, M.D. (India, 1992); Minh H. Le, M.D. (SUNY, 1999); Jamie A. Lovdal, M.D. (Duke, 1998); Tiffany Marum, M.D. (Florida, 1998); Jane Ann Moore, M.D. (Mississippi, 1999); David A. Pawlowski, M.D. (SUNY, 1999); Anelia Rose Petree, M.D. (Bowman Gray, 1998); Christopher A. Post, M.D. (Wisconsin, 1999); Geeta S. Ramchandani, M.D. (India, 1994); Wendy M. Scinta, M.D. (SUNY, 1998); Mark A. Stefaniuk, M.D. (Saba, 2000); Valarmathi Sundar, M.D. (India, 1987); Melinda L. Sutton, M.D. (Meharry, 1998); Xiaoming S. Wan, M.D. (Robert Wood Johnson, 2000); Guangbin Zeng, M.D. (China, 1985).

Medicine

Chief Residents: Steven D. Crowley, M.D. (Duke, 1996); Kimberly S. Johnson, M.D. (Johns Hopkins, 1997); Thomas A. Owens, M.D. (SUNY at Buffalo, 1995).

Senior Assistant Residents: Daniel R. Bensimhon, M.D. (Pittsburgh, 1998); James B. Brugarolas, M.D. (Univ. of Navarra Medical, 1993); Jason T. Call, M.D. (Vanderbilt, 1998); Anna Lisa Chamis, M.D. (Ohio State, 1998); Christine Chen, M.D. (Duke, 1997); Lisa Criscione, M.D. (Duke 1998); Chandan M. Devireddy, M.D. (Michigan Med. School, 1998); W. Lane Duvall, M.D. (Yale, 1998); Kimberley J. Evans, M.D. (UMDNJ, 1998); Amanda L. Green, M.D. (Baylor, 1998); Jonathan S. Green, M.D. (Duke, 1998); Nathan E. Green, M.D. (Univ. of Washington, 1998); Susan B. Gurley, M.D. (Washington Univ., 1998); S. Susan Hedayati, M.D. (George Washington, 1998); Todd E. Helton, M.D. (East Carolina, 1998); Peter D. Higgins, M.D. (Duke, 1998); Glenn C. Jones, M.D. (Univ. of Chicago, 1998); Catherine P. Kaminetzky, M.D. (Duke, 1998); James A. Kong, M.D. (Duke, 1998); W. McClure, M.D. (Duke, 1998); Jay R. McDonald, M.D. (Oregon Health Sciences, 1998); Sarah A. McGarry, M.D. (Georgetown, 1997); Trip J. Meine, M.D. (Duke, 1998); Christopher G. Nelson, M.D. (St. Louis Univ., 1998); Richard E. Nettles, M.D. (Duke, 1998); W. Jeff Petty, M.D. (North Carolina at Chapel Hill, 1998); Cheryl A. Russo, M.D. (SUNY at Syracuse, 1998); Thomas R. Smarz, M.D. (Georgetown, 1998); Srikanth Sola, M.D. (Univ. of Louisville, 1998); Lisa F. Soltani, M.D. (Duke, 1998); Jeremy Spector, M.D. (Vanderbilt, 1998); Nadine D. Tanenbaum, M.D. (Univ. of Miami, 1998); Gina M. Vaccaro, M.D. (Louisiana State, 1998); Martha Wadleigh, (Duke, 1998); Amy C. Weintrob, M.D. (Univ. of Virginia, 1998).

Senior Assistant Residents-Medicine/Pediatrics: Cynthia W. Brown, M.D. (Med. Coll. Georgia, 1997); Alexander W. Chen, M.D. (SUNY at Buffalo, 1997); Wayne J. Franklin, M.D. (UCLA, 1997); Keri L. Livingstone, M.D. (Miami, 1997); Michael G. Mallowney, M.D. (Georgetown, 1997); Lisa R. Young, M.D. (Duke, 1997).

Senior Assistant Residents-Medicine/Psychiatry: Jude R. Alexander, M.D. (Miami, 1996); Eric J. Christopher, M.D. (Med. Coll. of Wisconsin, 1996); Gregory C. Lunceford, M.D. (University of Chicago, 1990); Henry Radziewicz, M.D. (SUNY - Brooklyn, 1996).

Junior Assistant Residents: Mary A. Bethel, M.D. (Duke, 1999); Gregory A. Clines, M.D. (Texas at Dallas, 1999); Davey B. Daniel, M.D. (Johns Hopkins, 1999); Katja L. Elbert, M.D. (Univ. of Michigan, 1999); Steven G. Fein, M.D. (Johns Hopkins, 1999); Terry A. Fortin, M.D. (Univ. of Massachusetts, 1999); Camille G. Frazier, M.D. (Case Western, 1999); Radha Goel, M.D. (Baylor, 1999); Joseph Gottfried, M.D. (Pittsburgh, 1999); David Gregg, M.D. (Columbia, 1999); Christian N. Gring, M.D. (Virginia, 1999); Margaret M. Guo, M.D. (SUNY at Stony Brook, 1999); Donald D. Hegland, M.D. (Univ. of Florida, 1999); Edward P. Hu, M.D. (Washington Univ., 1999); Mark A. Iler, M.D. (Ohio State, 1999); David C. Isbell, M.D. (Virginia, 1999); Peter N. Kamilakis, M.D. (Med. Coll. of Virginia, 1999); Stephen D. Kendall, M.D. (Albany, 1999); Richard P. Konstance, M.D. (Hahnemann, 1999); Wissam M. Kourany, M.D. (Beirut, 1998); Jacob P. Laubach, M.D. (Duke, 1999); Peter F. Lebowitz, M.D. (Univ. of Pennsylvania, 1999); Lillian Lien, M.D. (Duke, 1999); Sauyu Lin, M.D. (Vanderbilt, 1999); Hemalatha Naganna, M.D. (Tulane, 1999); Quynh A-T. Nguyen, M.D. (Minnesota, 1999); India F. Reid, M.D. (UMDNJ, 1999); Naomi G. Romano, M.D. (Maryland, 1999); Daniel M. Sauri, M.D. (Northwestern, 1999); Teresa K. Tarrant, M.D. (Univ. of Florida, 1999); Melissa G. Teitelman, M.D. (Temple, 1999); Kevin L. Thomas, M.D. (North Carolina at Chapel Hill, 1999); Carol L. Venable, M.D. (Duke, 1999); Aaron Walton, M.D. (Duke, 1999); Sean M. Wu, M.D. (Duke, 1999); Monica M. Ziebert, M.D. (Med. Coll. of Wisconsin, 1999).

Junior Assistant Residents-Medicine/Pediatrics: Adam M. Bressler, M.D. (Med. Coll. of Georgia, 1998); Edward A. Evans, M.D. (UMDNJ, 1998); James W. Fox, M.D. (Cincinnati, 1999); Kristin E. Ito, M.D. (Harvard, 1999); Cynthia L. Johnson, M.D. (Rochester, 1999); Karen M. Kiang, M.D. (Yale, 1997); Jason E. Lang, M.D. (Duke, 1999); Scott M. Robert, M.D. (Univ. of Pennsylvania, 1999); Danielle E. Scheurer, M.D. (Tennessee, 1998); Mark A. Scheurer, M.D. (Univ. of Tenn., 1998); Jennifer L. Taylor, M.D. (Duke, 1998); Anita K. Ying, M.D. (Duke, 1999).

Junior Assistant Residents-Medicine/Psychiatry: Jane P. Gagliardi, M.D. (Duke, 1998); M. Ojinga Harrison, M.D. (Tennessee, 1997); Wei Jiang, M.D. (Binzhou, 1982); Eric J. Park, M.D. (Univ. of Maryland, 1998); Pritham M. Raj, M.D. (Maryland, 1997); Erin Silvertooth, M.D. (Texas at Galveston, 1998).

Interns: Saad M.H. Al-Hasaniah, M.D. (King Saudi, 1995); Albert M. Anderson, M.D. (North Carolina at Chapel Hill, 2000); Stephanie Bruce, M.D. (Duke, 2000); Marie A. Carlson, M.D. (Duke, 2000); Kenneth R. Carson, M.D. (USC, 2000); Hope E. Cawdery, M.D. (SUNY at Buffalo, 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); John P. Denny, M.D. (Duke, 2000); Susan D. Denny, M.D. (Duke, 2000); Raegan W. Durant, M.D. (Johns Hopkins, 2000); Mark H. Flasar, M.D. (Maryland, 2000); Lisa M. Goetz, M.D. (Vanderbilt, 2000); Daniel C. Grinnan, M.D. (Med. Coll. of Virginia, 2000); Jeremy Hardison, M.D. (Duke, 2000); Ankie Marie Hata, M.D. (Duke, 2000); Odette M. Houghton, M.D. (MUSC, 2000); Kim M. Huffman, M.D. (MUSC, 2000); Julia L. Inrig, M.D. (Loma Linda, 2000); Maya R. Jerath, M.D. (Vermont, 2000); Andrew L. Kaplan, M.D. (Duke, 2000); Ruediger W. Lehrich, M.D. (Freie University, 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); Hythem A. Omar, M.D. (Louisiana State, 2000); Wendy G. Owen, M.D. (North Carolina at Chapel Hill, 2000); Libbie Parker, M.D. (Duke, 1999); Taral N. Patel, M.D. (NYU, 2000); Joseph R. Payne, M.D. (Duke, 2000); Brian C. Pien, M.D. (Hawaii, 2000); Asma Poonawala, M.D. (Johns Hopkins, 2000); Richard F. Riedel, M.D. (Jefferson, 2000); Sith Sathornsumetee, M.D. (Mahidol, 1998); Amy Seidel, M.D. (Hahnemann, 2000); Tanguy Y. Seiwert, M.D.

(Johannes-Guttenberg, 1999); Jennifer S. Weizer, M.D. (Baylor, 2000); Heather E. Whitson, M.D. (Cornell, 2000); Matthew J. Wolf, M.D. (Washington at St. Louis, 2000); Zi Yin, M.D. (Duke, 2000); Arash Zarimani, M.D. (UCSF, 2000).

Interns-Medicine/Pediatrics: R. Neal Axon, M.D. (Alabama, 2000); Matthew J. Gadbaw, M.D. (Washington at Seattle, 2000); Laura E. Helton, M.D. (Emory, 2000); Erica L. Peterson, M.D. (Duke, 2000); Judd L. Walson, M.D. (Tufts, 2000); Steven A. Yuki, M.D. (Michigan, 2000).

Interns-Medicine/Psychiatry: Kelly T. Clouse, M.D. (Iowa 2000); Charles W. Hargett, M.D. (Virginia, 1999); Susan L. Padrino, M.D. (Univ. of Maryland, 1999); Eve J. Wolinsky, M.D. (SUNY at Brooklyn 2000).

Fellows: Amy Abernethy, M.D. (Duke 1991); Anjali S. Advani, M.D. (Duke, 1996); Gregory Ahearn, M.D. (Hahnemann, 1995); Mark D. Aldous, M.D. (Duke, 1995); Michael L. Allen, M.D. (Wisconsin, 1997); Jamy D. Ard, M.D. (Duke, 1997); Manish D. Assar, M.D. (California at San Francisco, 1992); Maria C. Bahit, M.D. (Univ. of Buenos Aires, 1992); Crystal Bernstein, M.D. (Duke, 1996); Rajesh Bhagat, M.D. (Univ. College, 1983); Richard Blair, M.D. (Harvard, 1994); Cynthia D. Brown, M.D. (SUNY at Brooklyn, 1994); Cheryl D. Bushnell, M.D. (Med. Coll. of Wisconsin, 1995); Susan Bryne-O'Shea, M.D. (University College Cork, 1993); Christopher H. Cabell, M.D. (Duke, 1994); Kevin Campbell, M.D. (Bowman Gray, 1996); Allen Cheng, M.D. (Melbourne, 1993); Stephen Chui, M.D. (Duke, 1996); Joseph Coladonato, M.D. (Jefferson, 1995); Jeanine Connolly, M.D. (Univ. of Florida, 1995); Scott Cross, M.D. (Ohio State, 1997); Mark Donohue, M.D. (Univ. of Cincinnati, 1996); Christopher K. Dyke, M.D. (Texas, Southwestern, 1995); Mark A. East, M.D. (North Carolina at Chapel Hill, 1995); John Engemann, M.D. (Wayne State, 1996); G. Michael Felker, M.D. (Duke, 1993); Nishan H. Fernando, M.D. (Duke, 1997); Michael C. Fischl, M.D. (SUNY at Syracuse, 1997); Deborah Fisher, M.D. (Vanderbilt, 1996); Nadia Deborah Friedman, M.D. (Monash Univ., 1992); Peter L. Gallagher, M.D. (Nebraska, 1994); Thomas R. Gehrig, M.D. (Univ. of Florida, 1994); Diane Gesty-Palmer, M.D. (Duke, 1997); Ganesh T. Ghooray, M.D. (Med. Coll. of Ohio, 1996); Luigi A. Giugno, M.D. (Cincinnati, 1996); Michael J. Golioto, M.D. (UMDNJ, 1995); Todd Griffith, M.D. (North Carolina, Chapel Hill, 1997); Denis Hadjiliadis, M.D. (Univ. of Toronto, 1995); Kimberly J. Hamilton, M.D. (Vanderbilt, 1996); Aroti Hegde, M.D. (Bangalore, 1992); Adrian F. Hernandez, M.D. (Southwestern, 1997); Aaron B. Hesselton, M.D. (Robert Wood Johnson, 1994); John Hollingsworth, M.D. (Texas, Galveston, 1997); Timothy Hong, M.D. (Yale, 1995); Patrick H. Hranitzky, M.D. (Southwestern, 1996); Philip Huang, M.D. (Vanderbilt, 1996); Kandaswamy Jayaraj, M.D. (Stanley Med. Coll., 1992); Dean C. Johnston, M.D. (Univ. of British Columbia, 1992); Christopher Jordan, M.D. (East Carolina, 1995); Maria Joyce, M.D. (Boston, 1996); David E. Kandzari, M.D. (Duke, 1995); Joseph Kay, M.D. (SUNY at Buffalo, 1994); Robert M. Kaiser, M.D. (MCP, 1987); Hassan Kassem-Moussa, M.D. (Beirut, 1995); Faryal Khamis, M.D. (Sultan Qaboos, 1993); Preston S. Klassen, M.D. (Nebraska, 1994); Andreas Klein, M.D. (Yale, 1996); David F. Kong, M.D. (Johns Hopkins, 1993); Richard A. Krasuski, M.D. (Harvard, 1994); Geoffrey A. Kunz, M.D. (Ohio State, 1997); Elizabeth T. Le, M.D. (Louisiana State, 1996); Lawrence Liao, M.D. (Duke, 1996); A. Craig Lockhart, M.D. (Texas at Dallas, 1993); John R. Lynch, M.D. (Duke, 1994); Mel Mabusag Magboo, M.D. (Univ. of Santo Thomas, 1993); Lee Maddox, M.D. (Maryland, 1997); Steven T. Mast, M.D. (California, San Francisco, 1993); Charles E. Mayes, M.D. (Vanderbilt, 1995); Steven L. McCune, M.D. (Univ. of Alabama, 1996); Darren K. McGuire, M.D. (Johns Hopkins, 1993); Melissa Mendez, M.D. (Univ. of Puerto Rico, 1995); Debra L. Miller, M.D. (Albert Einstein, 1994); Phillippa H. Miranda, M.D. (Duke, 1997); Jennifer D. Moore, M.D. (Loyola, 1997); Can M. Nguyen, M.D. (McGill, 1994); Daniel Nikcevic, M.D. (Rush, 1995); J. Conor O'Shea, M.D. (University Cork College, 1989); Augusto Parra, M.D. (Escuela Colombiana, 1988); Manesh R. Patel, M.D. (Emory, 1997); John R. Pawloski, M.D. (St. Louis, 1994); Stephanie Perry, M.D. (Bowman Gray, 1996); John Petersen, M.D. (Washington, 1995); John Plankeel, M.D. (Ohio, 1996); Thomas J. Povsic, M.D. (Harvard, 1995); Arati Rao, M.D. (BJ Med Coll., 1996); Sunil V. Rao, M.D. (Ohio State, 1996); Abdallah G. Rebeiz, M.D. (American Univ., 1996); Donal Reddan, M.D. (Univ. College, 1992); Michael F. Reidy, M.D. (George Washington, 1990); Michael L. Reynolds, M.D. (Texas, 1996); Ana Rocha, M.D. (Fed. Univ. of Bahia, 1995); Paulo Rocha, M.D. (Fed. Univ. of Bahia, 1995); Arman Sabet, M.D. (New Mexico, 1996); Sumathira T. Sathanandan, M.D. (Amer. Univ. of Caribbean, 1996); Troy D. Schmidt, M.D. (Southwestern, 1997); Nathan Schmulewitz, M.D. (Columbia, 1996); David M. Seo, M.D. (Duke, 1997); Pearl Seo, M.D. (Cornell, 1995); Monica R. Shah, M.D. (Brown, 1989); Joseph C. Shanahan, M.D. (Robert Wood Johnson, 1997); Rushad D. Shroff, M.D. (TN Med. Coll., 1996); William T. Smith, M.D. (North Carolina, 1996); Susan E. Spratt, M.D. (Harvard, 1995); Jonathan A. Stiber, M.D. (New York Univ., 1997); Jason Stout, M.D. (SUNY at Syracuse, 1996); Shahnaz Sultan, M.D. (SUNY, Downstate, 1996); Thaddeus R. Tolleson, M.D. (Texas at Houston, 1993); Benjamin H. Trichon, M.D. (Northwestern, 1995); Gordana Vlahovic, M.D. (Zagreb, 1985); Eric J. Velazquez, M.D. (Albert Einstein, 1994); Momen N. Wahidi, M.D. (Univ. of Damascus, 1992); Alvin F. Wells, M.D. (Univ. of South Florida, 1996); Jeffrey Whitehill, M.D. (Baylor, 1996); Stephen Wilber, M.D. (Louisiana 1997); Craig J. Wilson, M.D. (Univ. of Queensland, 1993); Terry L. Wimpey, M.D. (Emory, 1995); Kelly Wood, M.D. (SUNY at Buffalo, 1993); William S. Yancy, M.D. (East Carolina, 1995); Sally York, M.D. (Washington Univ., 1996).

DIVISION OF DERMATOLOGY

Mary Helen Allen, M.D. (East Carolina, 1997); Lawrence Etter, M.D. (Yale, 1999); Camille Haisley-Royster, M.D. (Duke, 1996); Craig S. Heinly, M.D. (Duke, 1999); Linda H. Lee, M.D. (Duke, 1998); Sylvia Owen, M.D. (Duke, 1997); Jennifer B. Perone, M.D. (NYU, 1999); Caroline Hebert Rao, M.D. (Ohio State,

1996); Joni Glavan Sago, M.D. (Johns Hopkins, 1997).

DIVISION OF NEUROLOGY

Beth A. Belluscio, M.D. (Columbia Univ., 1997); Rhonda Gabr, M.D. (West Virginia, 1998); John W. Gibbs, M.D. (Med. Coll. of Virginia, 1998); Aneeta Gupta, M.D. (MGM Med. Coll., 1982); M. Luke James, M.D. (LSU, 1999); David McDonagh, M.D. (Georgetown, 1998); Chad Miller, M.D. (Ohio, 1999); Alan R. Moore, M.D. (Mississippi, 1999); Bennett Myers, M.D. (SUNY at Buffalo, 1998); Zaem A. Siddiqi, M.D. (Army Med. Coll., 1987); Katherine W. Timoszyk, M.D. (SUNY at Buffalo, 1999); Connie Tsang, M.D. (McGill, 1994).

Obstetrics and Gynecology

Chief Residents: Carol Brown (Johns Hopkins, 1997); William Catherino (Wisconsin, 1997); Damla Dryden (Washington, 1997); Mac Gustilo-Ashby (Mayo, 1996); Tina Jackson (Harvard, 1997); Nimesh Nagarsheth (Mount Sinai, 1997); Ted Roth (Rochester, 1996).

Senior Assistant Residents: Matthew Alvarez (Ohio State, 1998); Katherine Kent (Virginia, 1998); Karen Lee (Harvard, 1998); Eva Littman (Duke, 1998); Michael Paglia (Pennsylvania, 1998); Eleanor Rhee (Yale, 1998); Mildred Ridgway (Tulane, 1998).

Assistant Residents: Chad Grotegut (Temple, 1999); Eric Jelovsek (East Tennessee, 1999); Anouk Lambers (Lieden, 1996); Desiree McCarthy-Keith (North Carolina, 1999); Krystle Pham (Brown, 1999); Robyn Sayer (Hahanemann, 1999); Wendy White, (Duke, 1999).

Junior Assistant Residents: Kristen Cone (Emory, 2000); Janiel Cragun (Utah, 2000); Cescili Drake (North Carolina, 2000); Leigh Elmore (Yale, 2000); Michael Jones (Duke, 2000); Paula Lee (Tulane, 2000); Connette McMahon (Duke, 2000).

Ophthalmology

Chief Resident: Prithvi Mruthyunjaya, M.D. (New York, 1996).

Residents: Sameer Ahmad, M.D. (Tufts, 1994); Amy Fowler, M.D. (North Carolina, 1998); Herb Greenman, M.D. (Duke, 1999); Matthew Hammons, M.D. (Baylor, 1999); Jerry Hu, M.D. (Duke, 1998); Seema Garg, M.D. (Duke, 1997), Ph.D. (Duke, 1994); Alyse Khosla-Gupta, M.D. (North Carolina, 1997); Tamer Mahmoud, M.D. (Ain Shams, 1992); Kevin O'Neal, M.D., Ph.D. (Baylor, 1997); John Rose, M.D. (Duke, 1997); Nouman Siddiqui, M.D. (Duke, 1999).

Pathology

Chief Residents: Christopher R. Eedes, M.B.Ch.B (Cape Town, S. Africa, 1985); Timothy A. Fields, M.D., Ph.D. (Duke, 1997).

Residents: Russell T. Alexander, M.D. (Albert Einstein, 1999); Catharine M. Breen, M.D. (Duke, 1999); Michael B. Datto, M.D. (Duke, 1999); Louis R. DiBernardo, M.D. (Duke, 1991); Elizabeth A. Duncan, M.D., Ph.D. (UT Southwestern, 2000); D. Michelle P. DuPre, M.D. (Ross, 1999); John B. Holt, M.D. (Iowa, 1999); Shannon J. McCall, M.D. (Duke, 1999); Crystal A. Moore-Maxwell, M.D., Ph.D. (Med. Coll. of Virginia, 1999); Paul R. Morris, M.D. (Boston, 1997); Ruth Y. Peng, M.D. (Albert Einstein, 1999); Mark J. Roubort, M.D., Ph.D. (Duke, 1999); Matthew J. Snyder, M.D. (Med. Coll. of Virginia, 1999); David C. Williams, M.D., Ph.D. (Virginia, 1998).

Fellows: Anne H. Bussian, M.D. (Univ of Alabama, 1995); Kelly J. Butnor, M.D. (Duke, 1997); Thomas J. Cummings, M.D. (UMDNJ, 1991); Rajesh C. Dash, M.D. (Champaign, 1995); Dennis P. O'Malley, M.D. (Loma Linda, 1996); Cathy A. Petti, M.D. (Duke, 1995); Jean E. Thomas, M.D. (Med Coll. of Ohio, 1996); Christopher W. Woods, M.D. (Duke, 1994).

Pediatrics

Chief Resident: Ann Marie Valente, M.D. (Univ. of Vermont, 1996).

Third Year Residents: Brian Bowman, M.D. (Duke, 1998); Brooke Britton, M.D. (Univ. of Pittsburgh, 1998); Harmony P. Garges, M.D. (Duke, 1998); Sonja Haugeto, M.D. (SUNY at Syracuse, 1998); Tania Hurlbutt, M.D. (Uniformed Services Univ., 1998); William Malcolm, M.D. (Univ. of Minnesota, 1998); Vaishali Mankad, M.D. (Univ. of Illinois, 1998); Lisa McGregor, M.D. (Johns Hopkins, 1998); Anne McLaughlin, M.D. (Dartmouth, 1998); Jonathan NedreLOW, M.D. (Univ. of Minnesota, 1998); Ian Paul, M.D. (Pennsylvania State, 1998); Rachel Rosen, M.D. (Dartmouth, 1998); Betty Staples, M.D. (Univ. of Maryland, 1998); Nancy Strom Morgan, M.D. (Duke, 1998); Courtney Thornburg, M.D. (Duke, 1998).

Second Year Residents: Wendy Taylor Book, M.D. (Duke, 1999); Nicole DuPraw, M.D. (Northwestern, 1999); Walter Eppich, M.D. (Univ. of Heidelberg, 1999); Jill Gronowski, M.D. (Med. Coll. of Wisconsin, 1999); Yolanda O. Johnson, M.D. (Emory, 1999); Matthias Karajannis, M.D. (Free Univ. of Berlin, 1997); Carrie Kitko, M.D. (Ohio State, 1999); James Lin, M.D. (Univ. of Iowa, 1999); Susan Manning, M.D. (Dartmouth, 1999); Sandra Moreira, M.D. (Duke, 1999); John Ogle, M.D. (East Carolina, 1999); Sara Page, M.D. (Loyola, 1999); Jennifer Peterson, M.D. (Univ. of Iowa, 1999); Martha A. Snyder, M.D. (Med. Coll. of Virginia, 1999).

First Year Residents: Bridget Degele, M.D. (Duke, 2000); Jeffrey Ferranti, M.D. (McGill, 2000); Kristi Gordin, M.D. (Morehouse School of Medicine, 2000); Christine Hale, M.D. (Johns Hopkins, 2000); Olga Hardy, M.D. (Univ. of 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 School of Medicine, 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. (Univ. of Arkansas, 2000); Erin J. Staples, M.D. (SUNY at Syracuse, 2000).

Medicine/Pediatrics Fourth Year Residents: Cynthia Brown, M.D. (Med. Coll. of Georgia, 1997);

Alexander Chen, M.D. (SUNY at Buffalo, 1997); Wayne Franklin, M.D. (UCLA, 1997); Keri Livingston, M.D. (Univ. of Miami, 1997); Michael Mullowney, M.D. (Georgetown, 1997); Lisa R. Young, M.D. (Duke, 1997).

Medicine/Pediatrics Third Year Residents: Adam Bressler, M.D. (Med. Coll. of Georgia, 1998); Edward Evans, M.D. (UMDNJ-New Jersey, 1998); Karen Kiang, M.D. (Yale, 1997); Danielle Scheurer, M.D. (Univ. of Tennessee, 1998); Mark Scheurer, M.D. (Univ. of Tennessee, 1998); Jennifer Taylor, M.D. (Duke, 1998).

Medicine/Pediatrics Second Year Residents: James Fox, M.D. (Univ. of Cincinnati, 1999); Kristin Ito, M.D. (Harvard, 1999); Cynthia Johnson, M.D. (Univ. of Rochester, 1999); Jason Lang, M.D. (Duke, 1999); Scott Robert, M.D. (Univ. of Pennsylvania, 1999); Anita K. Ying, M.D. (Duke, 1999).

Medicine/Pediatrics First Year Residents: Neal R. Axon, M.D. (UAB, 2000); Matthew Gadbow, M.D. (Univ. of Washington, 2000); Laura Helton, M.D. (Emory, 2000); Erica Peterson, M.D. (Duke, 2000); Judd Walson, M.D. (Tufts, 2000); Steven Yukl, M.D. (Univ. of Michigan, 2000).

Fellows: Mohamed Ahmed, M.D. (Suez Canal Univ., 1987); Amal Al-Seraihy, MB, Ch.B. (King Abdulagig Univ. Coll. of Medicine, 1990); Mohammed Aldosari, M.D. (King Faisal Hospital, 1993); Sherri S. Baker, M.D. (Univ. of Oklahoma Health Sciences Center, 1995); Sherry L. Bayliff, M.D. (Med. Coll. of Ohio, Toledo, 1995); Kristi L. Bengtson, M.D. (Univ. of Illinois, 1997); Danny Benjamin, M.D. (Univ. of Virginia, 1995); Michael Camitta, M.D. (Univ. of Texas Health Science Center, San Antonio, 1996); J. Chad Davis, M.D. (Univ. of Texas Medical Branch, Galveston, 1994); Bassem El-Nabbout, M.D. (American Univ. of Beirut, 1997); David Hugh Frazer, M.D. (Alabama, Birmingham, 1996); Brenda Louise Giles, M.D. (Univ. of Western Ontario, 1991) Annmarie Golioto, M.D. (New Jersey Medical School, 1996); Sanjeev Grover, M.B., B.S. (MS Univ. of Baroda, 1986); Scott Hagen, M.D. (Wisconsin, 1987); Matthew Heeney, M.D. (Calgary, 1995); Salim Idriss, M.D. (Duke, 1996); Theodosia A. Kalfa, M.D. (Aristotle Univ. Medical School, 1990); Andrew L. Katz, Ph.D. (Duke, 1993), M.D. (North Carolina at Chapel Hill, 1997); Gary Kleiner, M.D., Ph.D. (SUNY, Brooklyn, 1995); John T. Koepke, M.D. (Rush, 1990); Majed Koleilat, M.D. (Charles Univ., 1996); Stephen Leinenweber, M.D. (Rush Presbyterian-St. Lukes, Chicago, 1995); Corinne Linardic, M.D. (Duke, 1995); Maricarmen Lopez-Peña, M.D. (Universidad Central de Caribe, Bayamon, 1996); David Lowe, M.D. (Baylor, 1990), Ph.D. (Univ. of California Davis, 1994); Jessica McAdoo, M.D. (North Carolina at Chapel Hill, 1997); Kathleen McKenna, M.D. (Jefferson Med. Coll., 1995); Angelo Milazzo, M.D. (SUNY at Stony Brook, 1996); Martin Moya, M.D. (National Univ. of Cordoba, 1992); Peter Mustillo, M.D. (Univ. of Medicine & Dentistry of New Jersey-Robert Wood Johnson Medical School, 1996); Jon Oden, M.D. (Texas Univ. Health Science Center Medical School, 1997); Rebecca Piltch, M.D. (Washington Univ. School of Medicine, 1997); Jose Pineda, M.D. (Francisco Marroquin, 1993); Santi Punnahitananda, M.D. (Chulalongkorn Univ. Hospital, 1988); Robb Romp, M.D. (Duke, 1995); Stephen Shaw, M.D. (Univ. of Mississippi, Jackson, 1994); Rolla Shbarou, M.D. (American Univ. of Beirut, 1994); Susan Staba, M.D. (Florida, 1997); Jennifer Turi, M.D. (Univ. of Massachusetts, 1995); Rebecca Uram, M.D. (Wright State Univ. School of Medicine, 1997); Michael Vozzelli, M.D. (Temple Univ., 1996); Eric A. Williams, M.D. (Duke, 1996); Dan Wray, M.D. (Duke, 1993).

Psychiatry

Chief Residents: Jude Alexander, M.D. (Univ. of Miami, 1996); Eric Christopher, M.D. (Med. Coll. of Wisconsin, 1996); Charles Cloutier, M.D. (Wayne State Univ., 1997); Gregory Luceford, M.D. (Univ. of Chicago, 1996). Omar Manejwala, M.D. (Univ. of Maryland, 1997); Richard McColl, M.D. (Univ. of Virginia, 1997); Hank Radziewicz, M.D. (SUNY at Brooklyn, 1996).

Fourth Year Residents: Drew Barzman, M.D. (SUNY at Buffalo, 1997); Cherry Chevy, M.D. (West Virginia, 1997); Mary Edmondson, M.D. (North Carolina at Chapel Hill, 1985); Anna Gonzaga, M.D. (Med. Coll. of Ohio, 1997); Myleme Ojinga Harrison, M.D. (Univ. of Tennessee, 1997); George Jackson, M.D. (Drew/UCLA Med. Edu. Program, 1995); Wei Jiang, M.D. (Binzhou Med. Coll., 1982); Robert Nelson, M.D. (Duke, 1997); Pritham Raj, M.D. (Univ. of Maryland, 1997).

Third Year Residents: Jane Gagliardi, M.D. (Duke, 1998); John-Paul Gomez, M.D. (Temple, 1998); Kathleen Lapp, M.D. (Med. Univ. of South Carolina, 1998); Jonathan Leinbach, M.D. (Louisiana State at New Orleans, 1998); Mehul Mankad, M.D. (Northwestern, 1998); Eric Park, M.D. (Univ. of Maryland, 1998); Thomas Patamia, M.D. (Georgetown, 1998); Alexandra Powell, M.D. (Jefferson Med. Coll., 1998); Darren Rothschild, M.D. (Univ. of South Florida, 1998); Erin Silvertooth, M.D. (Univ. of Texas Medical Branch, 1998); Mugdha Thakur, M.D. (Seth G.S. Med. Coll., 1994).

Second Year Residents: Christopher Aiken, M.D. (Yale, 1999); Jonathan Halford, M.D. (Med. Univ. of South Carolina, 1996); Charles Hargett, M.D. (Univ. of Virginia, 1999); Heidi Johnson, M.D. (Med. Coll. of Ohio, 1999); Patrick Keenan, M.D. (Univ. of Kansas, 1995); Anne Lin, M.D. (Univ. of Utah, 1999); Edward McGonigle, M.D. (Temple, 1998); Carolyn Oates, M.D. (Vanderbilt, 1999); Susan Padrino, M.D. (Univ. of Maryland, 1999); Victoria Payne, M.D. (Wake Forest, 1999); Juandalynn Peters, M.D. (Univ. of Miami, 1999); Joseph Sharpe, M.D. (Univ. of Tennessee, 1999); Michael Slifer, M.D. (UTHSCA, 1999); Lihui Tang, M.D. (Harbin Med., 1984), Ph.D. (Univ. of Windsor, 1993); Wei Zhang, M.D. (Shanghai Med., 1990), Ph.D. (Indiana, 1996).

First Year Residents: Leslie Bronner, Ph.D. (Harvard, 1995), M.D. (Duke, 1999); Sandra Carty, M.D. (Med. Coll. of Virginia, 2000); Kelly Clouse, M.D. (Univ. of Iowa, 2000); Robert Guerrero, M.D. (Univ. of Bologna, 1995); Elizabeth Kelly, M.D. (Univ. of South Alabama, 2000); Danya Lewis, M.D. (Albany

Med. Coll., 2000); Michelle Scargle, M.D. (Univ. of Florida, 2000); Hansen Su, M.D. (UMDNJ-Robert Wood Johnson, 2000); William Trost, M.D. (Med. Coll. of Wisconsin, 2000), Eve Wolinsky, Ph.D. (Harvard, 1984), M.D. (SUNY at Stony Brook, 2000).

Child Psychiatry Chief Resident: Thomas McCormack, M.D. (Emory, 1996).

Geriatric Psychiatry Residents: Warren Taylor, M.D. (Univ. of South Florida, 1996); Warachal Faison, M.D. (North Carolina at Chapel Hill, 1995).

Substance Abuse Fellow: Susan Taccheri, M.D. (Chicago Med. Sch., 1987).

Forensic Psychiatry Resident: Ajay Makhija, M.D. (Univ. of South Alabama, 1996).

Radiation Oncology

Chief Resident: Brian Quaranta, M.D. (New Jersey, 1998).

Residents: Bobby Harrison, M.D. (East Carolina, 1997); Song Kang, M.D. (Howard, 1998); John Kirkpatrick, M.D. (Texas, 1999); Nicole Larrier, M.D. (Johns Hopkins, 1999); Keith Miller, M.D. (Florida, 1985).

Radiology

Residents: Andrew Adamson, M.D. (Med. Coll. of Wisconsin, 1998); Todd Aho, M.D. (Wayne State, 1997); Matthew Banks, M.D. (Pennsylvania State, 1998); L. Neal Beard, M.D. (Virginia, 1997); Jeffrey Behar, M.D. (Tulane, 1996); S. Douglas Brown, M.D. (Utah, 1996); Taylor Chen, M.D. (Southern California, 1996); Steven Crawford, M.D. (Indiana, 1996); David Fiorella, M.D. (SUNY-Buffalo, 1996); Tasha Foushee, M.D. (Med. Coll. of Georgia, 1998); Christopher Gaskin, M.D. (Florida-Gainesville, 1997); Carmelo Gullotto, M.D. (Duke, 1998); Paul Haugan, M.D. (Minnesota-Minneapolis, 1998); J. Joseph Hewett, M.D. (California-San Francisco, 1996); Lynne Hurwitz, M.D. (Duke, 1997); John Jackson, M.D. (Utah, 1997); M. Todd Jacobs, M.D. (Duke, 1996); Christopher Lascola, M.D. (Chicago, 1998); H. Stanley Lambert, M.D. (North Carolina-Chapel Hill, 1997); Ellie Lee, M.D. (Emory, 1996); Melissa Lipton, M.D. (Texas-Houston, 1997); John Pappas, M.D. (Albert Einstein, 1996); Ana Quinones, M.D. (Tufts, 1997); John Rampton, M.D. (Utah, 1998); Duncan Rougier-Chapman, M.D. (Duke, 1998); Eric Rohren, M.D. (Mayo, 1996); Brandt Schraner, M.D. (George Washington, 1995); Bertram Stemmler, M.D. (Texas-Southwestern, 1997); William Taylor, M.D. (New York Med. Coll., 1998); Shannon Turner, M.D. (Arkansas, 1997); Matthew Wagner, M.D. (Ohio State, 1996); Carolyn Weaver, M.D. (Duke, 1998); Zenon Zarewych, M.D. (Wayne State, 1996).

Surgery

DIVISION OF CARDIOTHORACIC SURGERY

Instructors and Teaching Scholars: R. Eric Lilly, M.D. (Duke, 1992); Jeff L. Myers, M.D. (Oklahoma, 1991); John S. Sapirstein, M.D. (Boston University, 1990); James D. St. Louis, M.D. (Georgetown, 1992).

Cardiothoracic Fellows: Larkin Daniels, M.D. (Alabama, 1992); Kimberly L. Gandy, M.D. (Northwestern, 1990); Alan P. Kypson, M.D. (Columbia, 1993); Cleveland W. Lewis, Jr., M.D. (Duke, 1993); Andrew Lodge, M.D. (Duke, 1993).

DIVISION OF GENERAL SURGERY

Instructors and Chief Residents: William R. Burfeind, M.D. (Columbia, 1994); Paul Chai, M.D. (Duke, 1994); Lisa Clark, M.D. (Harvard, 1994); Pierre Dematos, M.D. (Johns Hopkins, 1994); Thomas Z. Hayward, M.D. (Northwestern, 1994); Shu S. Lin, M.D. (Duke, 1992); John Maurice, M.D. (California, San Francisco, 1994); Kirsten B. Wilkins, M.D. (Johns Hopkins, 1994).

Senior Assistant Residents: Thomas A. Aloia, M.D. (California-Los Angeles, 1996); B. Zane Atkins, M.D. (Duke, 1995); Shankha Biswas, M.D. (Duke, 1996); Cynthia Bowers, M.D. (Med. Coll. of Ohio, 1998); Michael Davidson, M.D. (Yale, 1996); Denis L. Gonyon, M.D. (Michigan, 1998); Gonzalo Gonzalez-Stawinski, M.D. (Ponce School of Medicine, 1994); G. Chad Hughes, M.D. (Duke, 1995); Christine Lau, M.D. (Dartmouth, 1995); Kendra Merine, M.D. (Washington, 1993); Paul Mosca, M.D. (Virginia, 1995); Aurora D. Pryor, M.D. (Duke, 1995); Shawn D. Safford, M.D. (Duke, 1992); Ashish S. Shah, M.D. (Pittsburgh, 1995); G. Robert Stephenson, M.D. (Johns Hopkins, 1996); David C. White, M.D. (Virginia, 1996).

Research Fellows: Rolf N. Barth, M.D. (Duke, 1997); Patrick W. Domkowski, M.D. (Georgetown, 1997); Sitaram M. Emani, M.D. (Harvard, 1997); Jeffrey G. Gaca, M.D. (Columbia, 1998); Matthew F. Kalady, M.D. (Duke, 1998); William Kendall, M.D. (Michigan, 1995); Jaimie Nathan, M.D. (Yale, 1998); Mark W. Onaitis, M.D. (Duke, 1997); Gretchen P. Purcell, M.D. (Stanford, 1997); John E. Scarborough, M.D. (Duke, 1998); Rebekah R. White, M.D. (Duke, 1997).

Junior Assistant Residents: Kelli R. Brooks, M.D. (Duke, 1999); Fernando C. Delvecchio, M.D. (University of Buenos Aires, 1990); Elizabeth S. Grubbs, M.D. (Duke, 1999); Aftab R. Kherani, M.D. (Duke, 1999); Ricardo A. Meade, M.D. (ITESM, 1997); Jason A. Petrofski, M.D. (Johns Hopkins, 1999); Shiva Sarraf-Yazdi, M.D. (Duke, 1999); Ari D. Silverstein, M.D. (Emory, 1999); Tracey H. Stokes, M.D. (Cornell, 1999); Richard B. Thompson, M.D. (Columbia, 1999); Alon Z. Weizer, M.D. (Baylor, 1999); Alan Ying, M.D. (Ohio, 1999).

First Year Residents: Raj Ahluwalia, M.D. (Temple, 2000); Edward Cantu, M.D. (Columbia, 2000); Christopher Chang, M.D. (Yale, 2000); C. Denise Ching, M.D. (Duke, 2000); Andy T. A. Chung, M.D. (Loma Linda, 2000); Brian R. Evans, M.D. (Med. Coll. of Ohio, 2000); Jennifer G. Hall, M.D. (East Carolina, 2000); Steven Hanish, M.D. (Indiana, 2000); Jonathan A. Hata, M.D. (Duke, 2000); J. Stewart

Humphrey, M.D. (Tulane, 2000); William Lawson, M.D. (Duke, 2000); Melissa M. Poh, M.D. (Georgetown, 2000); Katherine E. Posther, M.D. (Duke, 2000); Ashutosh A. Pradham, M.D. (Duke, 2000); Adam Ravin, M.D. (Duke, 2000); Jose J. Valle, M.D. (Wake Forest, 2000); Matthew D. Young, M.D. (North Carolina, 2000); Charles W. Yowell, M.D. (Duke, 2000); Ming M. Zhang, M.D. (Duke, 2000); Ali Zomorodi, M.D. (Duke, 2000).

DIVISION OF NEUROSURGERY

Chief Residents: Alan T. Villavicencio, M.D. (Harvard, 1995); John C. Wellons, III, M.D. (Univ. Mississippi, 1995).

Residents: David Cory Adamson, M.D., Ph.D., M.L.A. (Johns Hopkins, 1998); Ketan R. Bulsara, M.D., (Duke, 1996); Dragan F. Dimitrov, M.D., (New York Univ., 1996); Amy B. Heimberger, M.D. (Tulane Washington, 1995); Kenneth M. Little, M.D. (Vanderbilt, 1998); Russell R. Margraf, M.D., Ph.D. (Albany, 1996); Kent C. New, M.D., Ph.D. (Georgetown, 1998); Parag G. Patil, M.D., Ph.D. (Johns Hopkins, 1999); John B. Pracyk, M.D., Ph.D. (Duke, 1992).

DIVISION OF ORTHOPAEDIC SURGERY

Chief Residents: Diane M. Allen, M.D. (Duke, 1995); Hussein A. Elkousy, M.D. (Duke, 1995); Forest T. Heis, M.D. (Cincinnati, 1995); Thomas F. Holovacs, M.D. (Columbia, 1995); Timothy J. Kinkead, M.D. (Yale, 1996); Daniel T. Kuesis, M.D. (Northwestern, 1996); Marco Rizzo, M.D. (Temple, 1996); Douglas J. Wyland, M.D. (North Carolina, 1995).

Residents: Mark J. Albritton, M.D. (Finch, 1999); Julian "Mack" Aldridge, III, M.D. (Bowman Gray, 1998); Todd S. Atkinson, M.D. (Yale, 1998); Christopher J. Barnes, M.D. (Ohio State, 1997); Keith R. Berend, M.D. (Duke, 1997); Michael P. Bolognesi, M.D. (Duke, 1998); James R. Bowers, M.D. (Wisconsin, 1999); Christopher R. Brown, M.D. (Med. Coll. of Virginia, 2000); Matthew J. Garberina, M.D. (Temple, 1997); Michelle A. Ghert, M.D. (Vanderbilt, 1996); Robert D. Graham, M.D. (Duke, 1997); Gregory V. Green, M.D. (Baylor, 1998); Jon D. Hernandez, M.D., Ph.D. (UCLA, 1998); John D. Hewitt, M.D. (Duke, 1999); Shawn B. Hocker, M.D. (North Carolina, 2000); Andrew S. Holmes, M.D. (Thomas Jefferson, 1997); Elizabeth S. Joneschild, M.D. (Duke, 1997); Michael W. Kadrmaz, M.D. (Washington, 1994); Robert A. Malinzak, M.D. (Duke, 1999); Matthew D. Olin, M.D. (Bowman Gray, 1998); Christopher A. Radkowski, M.D. (Duke, 2000); Anthony S. Rhorer, M.D. (Duke, 1999); James J. Rubano, M.D. (Hahnemann, 1998); Roy M. Rubin, M.D. (Temple, 1997); J. A. Alexander Seldomridge, III, M.D. (Columbia, 1999); William P. Silver, M.D. (Bowman Gray, 1997); Ryan W. Simovitch, M.D. (Finch, 2000); Hardayal Singh, M.D. (Gov't Med. Coll., Patiala, 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: Brett E. Dorfman, M.D. (Emory, 1996); Thomas Y.L. Hung, M.D. (Massachusetts, 1996).

Assistant Residents: Raymond Cook, M.D. (North Carolina, 1997); Morris Gottlieb, M.D. (Johns Hopkins, 1998); Shannon E. Hunter, M.D. (North Carolina, 1998); Christopher Lansford, M.D. (Michigan, 1999); Peter Van Der Riet, M.D. (Leiden, 1992); Adrian Varela, M.D. (Florida, 1999).

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Instructors and Chief Residents: Gregory J. Moorman, M.D. (Univ. of Texas Health Science Ctr., 1993); Kenneth O. Phillips, M.D. (Univ. of Nebraska, 1995); Ramon A. Robles, M.D. (Univ. of Arizona, 1993).

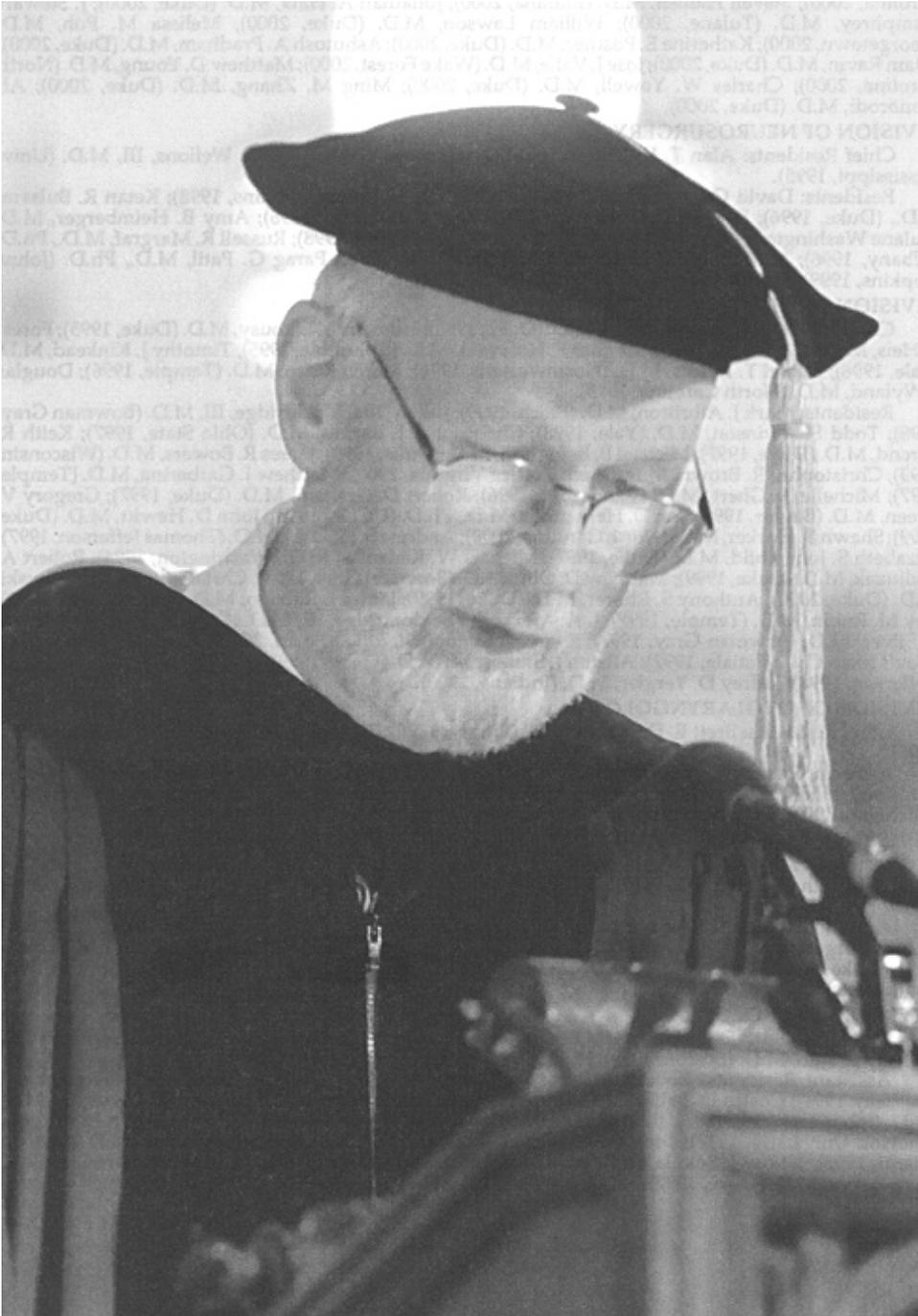
Assistant Residents: Gunnar E.O. Bergqvist, M.D. (Univ. of Pittsburgh, 1994); John A. Millard, M.D. (Georgetown, 1989); Kenneth J. Moquin, M.D. (Chicago Medical School, 1994); Burton M. Sundin, M.D. (Duke University, 1997); Michael S. Wong, M.D. (Tufts, 1992); Henry Young, M.D. (Univ. of Texas Southwestern Med. Ctr., 1995).

DIVISION OF UROLOGY

Chief Residents: Dieter Bruno, M.D. (Duke, 1995); Gerard D. Henry, M.D. (North Carolina, 1995); Ramsay L. Kuo, M.D. (Boston, 1994); Mark J. Makhuli, M.D. (New York, 1995).

Assistant Residents: Robert R. Byrne, M.D. (Baylor, 1996); Philipp Dahm, M.D. (Heidelberg, Germany 1994); Costas D. Lallas, M.D. (Jefferson Medical College, 1998); Bertram A. Lewis, Jr., M.D., Ph.D. (Johns Hopkins, 1997); Ravi Munver, M.D. (Cornell, 1996); Ganesh V. Raj, M.D., Ph.D. (Thomas Jefferson University, 1997); Dinesh S. Rao, M.D. (Duke, 1997); Robert W. Santa-Cruz, M.D. (Univ. of Miami, 1998); Jeffrey J. Sekula, M.D. (UMDNJ, 1996); Chris B. Threatt, M.D. (California-Irvine, 1996); Ning Z. Wu, M.D. (Duke, 1997).

Postgraduate Education



Postgraduate Education

Continuing Medical Education

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