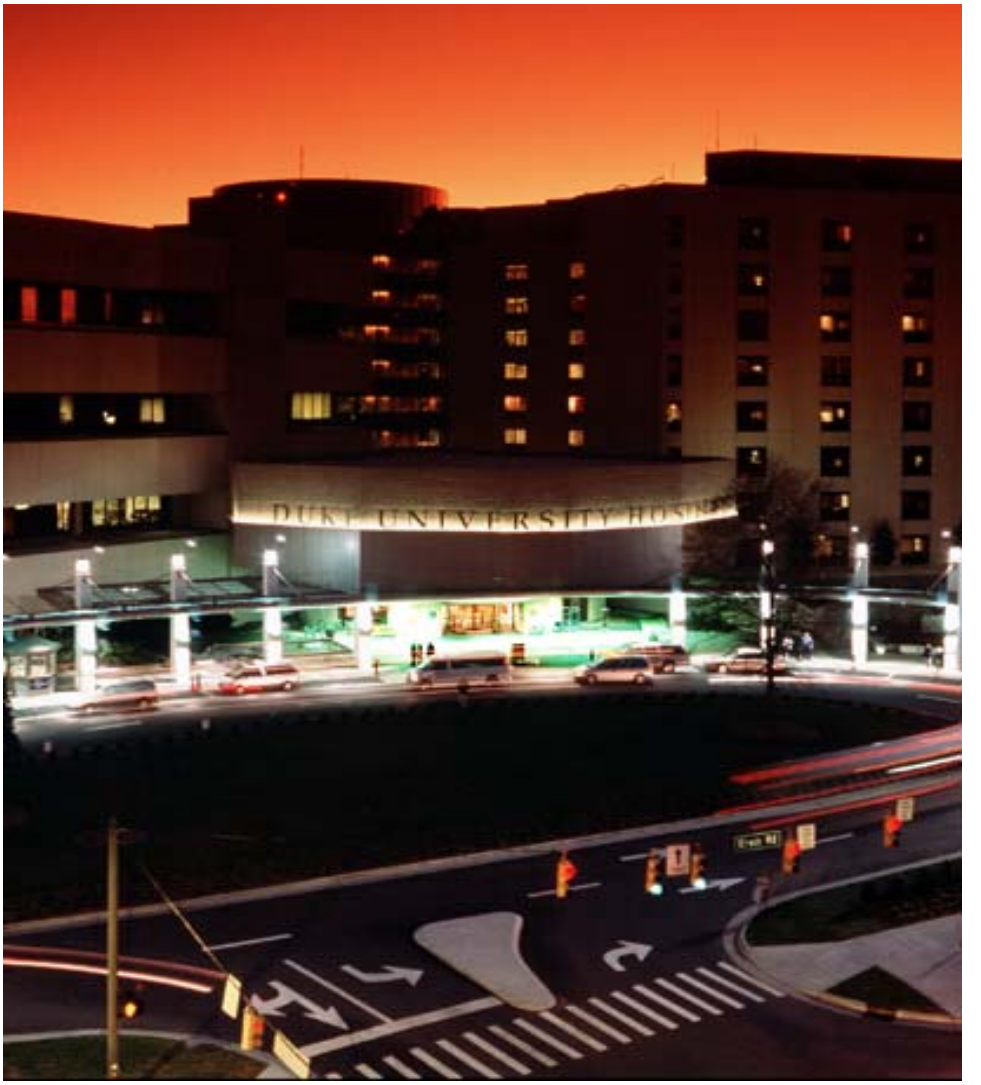
bulletin of

Duke University 2005-2006

School of Medicine



The Mission of Duke University

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

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

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

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

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The information in the bulletin applies to the academic year 2005-2006 and is accurate and current, to the best of our knowledge, as of May 2004. The university reserves the right to change programs of study, academic requirements, lecturers, teaching staffs, the announced university calendar, and other matters described in the bulletin without prior notice, in accordance with established procedures.

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

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

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

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

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

Contents

School of Medicine Academic Calendar 2005-2006[1]

M.D. Program

FIRST YEAR

Fall Term 2005

August	
1-5	Monday-Friday – Introductory orientation to 1st year
5	Friday, AOA Day
8	Monday – Begin classes, Molecules & Cells, section 61
September	
20	Tuesday, 5:00 p.m. - End classes, Molecules & Cells, section 61
22	Thursday - Begin classes, Normal Body, section 16
27	Friday, Deadline for Molecules and Cells grade submission to Registrar's Office
November	
14-18	Monday - Friday - Registration period for spring 2005 term
22	*Tuesday, 6:00 p.m. – Begin Thanksgiving holiday*
28	Monday - Resume Normal Body, section 16
December	
5-9	Monday - Friday, 8:30 a.m. - 4:00 p.m. Late Reg/Drop/Add period, spring 2005 term
16	*Friday, Noon, classes end and Winter Break Begins for 1st Year Medical Students*
January	
4	Wednesday, - Resume Normal Body, section 16
16	*Monday - Martin Luther King, Jr. holiday*
27	Friday, End Normal Body, section 16

Spring Term 2006

January	
30	Monday, - Physical Exam week (Intensive Learning Period)
February	
3	Friday, 5:00 p.m. - End Physical Exam week(Intensive Learning Period)
3	Friday, Deadline for Normal Body grades submission to the Registrar's Office
TBA	Class of 2003 Promotions Committee Meeting - (date, time & location TBA)
6	Monday, - Begin Body & Disease, section 16
March	
TBD	Friday-Saturday - Medical Families Weekend
TBD	Friday, 8:00 p.m. - Student/Faculty Show
27	Monday, Mid-term exam due at noon, Spring break for 1st Year Medical Students commences
April	
3	Monday, Resume Body & Disease, section 16
TBA	Monday-Friday, 8:30 a.m. - 4:00 p.m. - Registration for 2nd year
June	
30	Friday, 5:00 p.m. – End classes, Body & Disease, section 16
July	
8	Friday, Deadline for Body and Disease grades submission to the Registrar's Office

SECOND YEAR

Fall Term 2005

July	
TBA	Class of 2003 Promotions Committee Meeting – mid-July (date, time, and location TBA

1.(Calendar subject to change)

*25 -**Aug.** 6*	*Monday-Saturday, Classes begin at 8:00 a.m.- Intensive learning period (OCY) – **2 weeks***
August	
5	*Friday, AOA day*
6	*Saturday, Classes end - Intensive learning period (OCY)*
8 - 12	*Monday-Friday, Classes begin at 8:00 a.m. - 1st Intersession, section 11- **1 week***
15	Monday - 8:00 a.m. - Begin classes in sections 81,41
September	
5	*Monday, Labor Day holiday*
9	Friday, 6:00 p.m. – End classes in section 41
12	Monday - Begin classes in section 42
23	Friday, noon deadline for section 41 grade submission to Registrar's Office
October	
7	Friday, 6:00 p.m. - End classes in sections 81, 42
10-14	*Monday-Friday, 8:00 a.m. - 5:00 p.m. - 2nd Intersession, section 12 - **1 week***
17	Monday - Begin classes in sections 82,43
21	Friday, noon deadline for section 81, 42 grade submission to Registrar's Office
November	
11	Friday, 6:00 p.m. - End classes in section 43
14	Monday - Begin classes in section 44
23	*Wednesday, 6:00 p.m. - Begin Thanksgiving holiday*
28	Monday - Classes Resume
December	
2	Friday, noon deadline for section 43 grade submission to Registrar's Office
10	Saturday, 6:00 p.m. - End classes in regular sections 82,44
12-16	*Monday-Friday, Classes begin at 8:00 a.m. – 3rd Intersession, section 13-**1 week***
16	*Friday, 5:00 p.m. Winter Break for 2nd year Med students begins.* Classes resume on Monday, January 9th, 2006

Schedule for 6 wk Clinical Clerkship plus 2 week Selective

16	OCY	July 25 - Aug 6
11	1st Intersession	Aug. 8 - Aug 12
61	Clin. Clerkship	Aug. 15 – Sept 23
21	Selective	Sept. 26 – Oct. 7
12	2nd Intersession	Oct. 10 - Oct.14
62	Clin. Clerkship	Oct. 17 – Nov. 23
22	Selective	Nov. 28 – Dec.10
13	3rd Intersession	Dec 12 -16

Spring Term 2006

January	
2	*Monday, New Year's Day Holiday Observed*
6	Friday, noon, Deadline, grade submission fall 2004 grades, sections 82, 44
9	Monday - Begin classes in sections 81,41
16	*Monday - Martin Luther King, Jr. holiday*
February	
	Friday, 6:00 p.m. - End classes in section 41
	Monday- Begin classes in section 42
	Friday, noon deadline for section 41 grade submission to Registrar's Office
March	
3	Friday, 6:00 p.m. - End classes in sections 81,42
6-10	*Monday - Friday, 8:00 a.m. - 5:00 p.m. - 4th Intersession, section 12 - **1 week***
13	Monday - Begin classes in sections 82, 43

17	Friday, noon, deadline, sections 81,42, grade submission to Registrar's Office
TBA	Registration for 2nd year Elective, summer term, section 41
April	
7	Friday, 6:00 p.m. End classes in section 43
TBA	Monday - Friday - 8:30 a.m. - 4:00 p.m. Notification to be sent out re: Registration for MS3, Fall 2005 and Spring 2006
10	Monday - Begin classes in section 44
21	Friday, noon, deadline, section 43, grade submission to Registrar's office
May	
5	Friday, 6:00 p.m. - End classes in sections 82, 44
6	Saturday, Spring Break begins (2nd year students)
TBA	Friday, 4:00 p.m. Third Year Registration Ends, Fall 2005 & Spring 2005

Schedule for 6 wk Clinical Clerkship plus 2 week Selective

61	Clin. Clerkship	Jan. 9 - Feb. 17
21	Selective	Feb. 20 – Mar. 3
12	4th Intersession	Mar. 6 - Mar. 10
62	Clin. Clerkship	Mar. 13 – Apr. 21
22	Selective	Apr. 24 – May 5

May	
15	Monday- Begin required elective classes in section 41 (all 2nd year med students)
19	Friday, noon deadline for sections 82,44 spring 2005 grade submission to Registrar's Office
June	
9	Friday, 6:00 p.m. - End 4 week elective, section 41
12-16	*Monday - Friday, 8:00 a.m. - 5:00 p.m. 5th Intersession, section 11 - 1 week*
19	Monday, 8:00 a.m. - Begin classes section 81, 42
30	Friday, noon, deadline for section 41 grade submission to Registrar's Office
July	
4	*Tuesday, Independence Day holiday*
14	Friday, 6:00 p.m. - End classes, section 42
17	Monday, - Begin classes section 43
August	
5	AOA Day
11	Friday, 6:00 p.m. - End classes in section 81, 43
14-18	Monday - Friday – Required Evaluation/Examination Period
25	Friday, noon deadline for grade submission to Registrar's Office for section 81

Schedule for 6 wk Clinical Clerkship plus 2 week Selective

41	4 wk Elective (All)	May 15 - June 9
11	5th Intersession	June 12 - June 16
61	Clin. Clerkship	June 19 - July 28
21	Selective	July 31 – Aug. 11

THIRD YEAR

Fall Term 2005

August	
5	Friday, AOA Day
September	
5	*Monday, Labor Day holiday*
6	Tuesday- Begin classes, section 16
9	Friday, noon, Deadline for MS2, sections 82,44 grade submission to Registrar's Office
November	
14-18	Monday-Friday, 8:30 a.m. - 4:00 p.m. Registration period for Spring 2005, (MS4), all sections

23	*Wednesday, 6:00 p.m. - Begin Thanksgiving holiday*
28	Monday- Resume Classes
December	
17	Saturday - 12:00 noon - End classes in sections 16
18	*Winter Break begins for 3rd year medical students (through Jan. 2nd)*

Spring Term 2006

January	
3	Tuesday- Begin Classes, section 16
6	Friday, noon deadline for section 16, fall 2004 grade submission to Registrar's Office
16	*Monday - Martin Luther King, Jr. holiday*
May	
5	TENTATIVE DATE – Friday, Noon, - Registration forms due to Registrar for Fall,Spr 2006/Sum2007– rising 3rd year
June	
23	Friday, 5:00 p.m. - End classes, section 16 - (10 month students)—**Thesis Due Date**
August	
18	Friday, 5:00 p.m. - End classes (12 month students)—**Thesis Due Date**

Mandated one-week vacation to be determined by student's individual mentors

FOURTH YEAR

Summer Term 2005

April	
13-18	Wednesday, 8:30 a.m. – Monday, 4:00 p.m. - Registration for Rising M4's, sum 2005, fall 2005
25	Monday – Begin classes in sections 81, 41
May	
21	Saturday - 12:00 noon - End classes in section 41
23	Monday - Begin classes in section 42
June	
3	Friday, deadline for section 41 grade submission to the Registrar's Office
8-10	Monday, 8:30 a.m. – Friday, 4:00 p.m., Drop/Add, summer 2005, sections 82,43,44 (MS4)
18	Saturday - 12:00 noon, End classes in sections 81,42
27	Monday - Begin classes in sections 82,43
July	
1	Friday, deadline for sections 82, 42 grade submission to the Registrar's Office
4	*Monday - Independence Day Holiday*
23	Saturday - 12:00 noon, End classes in section 43
25	Monday - Begin classes in section 44
August	
5	Friday, deadline for section 43 grade submission to the Registrar's Office
5	Friday, AOA Day
10-12	Wednesday, 8:30 a.m.- Friday, 4:00 p.m., Late Reg/Drop/Add, fall 05, all sections (M4)
20	Saturday, 12:00 noon, end classes in sections 82,44

Fall Term 2005

August	
22	Monday - Begin classes, sections 81, 41
September	
2	Friday, deadline for sections 82, 44 grade submission to the Registrar's Office
5	*Monday, Labor Day holiday*
17	Saturday, 12:00 noon - End classes in section 41
19	Monday- Begin classes in sections 42
October	
1	Friday, deadline for section 41 grade submission to the Registrar's Office
5-7	Wednesday, 8:30 a.m. - Friday, 4:00 p.m. - DROP/ADD, fall 2005, sections 82,43,44 (M4)

15	Saturday, 12:00 noon - End classes in sections 81,42
17	Monday – Begin classes in sections 82,43
29	Friday, deadline for sections 82, 42 grade submission to the Registrar's Office
November	
12	Saturday, 12:00 p.m. - End classes in section 43
14-18	Monday, 8:30 a.m. - Friday, 4:00 Registration, spring 2006 (M4), all sections
14	Monday – Begin classes in section 44
23	*Wednesday, 6:00 p.m. - Begin Thanksgiving holiday*
28	Monday - Resume classes
December	
2	Friday, Deadline, noon, grade submission for section 43 to Registrar's Office
7-9	Wednesday, 8:30 a.m.- Friday, 4:00 p.m. - Late Reg/Drop/Add period for spring 2005 (M4), all sections
10	Saturday, 12 noon, End classes, section 82, 44 and Winter break begins after Noon

Spring Term 2006

January	
6	Friday, noon, deadline, grade submission for sections 82, 44 fall term
9	Monday – Begin classes in sections 81,41
16	*Monday - Martin Luther King, Jr. holiday*
February	
4	Saturday, 12:00 noon – End classes, section 41
6	Monday -Begin classes, section 42
17	Friday, noon, Deadline for section 41 grade submission to Registrar's Office
22-23	Wednesday, 8:30 a.m.-Fri., 4:00 p.m.- Drop/Add period for spring 2006, sections 43,44 (MS4)*43 Capstone
March	
4	Saturday, 12:00 noon - End classes, sections 81,42
6	Monday - Begin capstone, in section 43 - ***Mandatory Attendance***
17	Friday, Deadline for sections 81,42 grade submission to Registrar's Office
April	
1	Saturday, 12:00 noon - End classes, section 43
3	Monday- Begin classes, section 44
TBA	Monday - Friday, Registration period for Sum 2006, Fall Term 2006 - (rising MS3's & MS4's)
29	Saturday, 12:00 noon, End classes, 82, 44
TBA	Monday-Friday, Drop/Add period for Summer 2005, all sections (rising MS3 & MS4's)
May	
5	Friday, noon, Deadline for sections 82,44 grade submission to Registrar's Office
11-14	*Thursday-Sunday – Graduation activities*

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Basic Science Appointments, Promotion, and Tenure

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

Basic Science Faculty Steering

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

Brain Death

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Clinical Sciences Appointments, Promotions, and Tenure

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

Clinical Science Faculty Council on Academic Affairs

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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*
John Norton, DVM, *Director, Division of Laboratory Animal Resources*
Emil R. Petrusa, Jr., Ph.D., *Associate Dean for Curriculum Evaluation and Assessment*
Mark W. Sebastian, M.D., *Associate Dean for Medical Education*
Juliann Tenney, JD, *Assistant Dean and Compliance Officer, School of Medicine*
Patricia L. Thibodeau, M.L.S, M.B.A., *Associate Dean for Library Sciences*
John L. Weinerth, M.D., *Associate Dean and Director for Graduate Medical Education*
Delbert R. Wigfall, M.D., *Associate Dean for Medical Education and Faculty Director, Multicultural Resource Center*
Colleen Grochowski, Ph.D., *Assistant Dean for Curriculum Development*
Stacey R. McCorison, M.B.A., *Assistant Dean for Medical Education Administration, Director of Financial Aid and Registrar*
Barbara L. Sheline, M.D., M.P.H., *Assistant Dean for Primary Care*
Jeff Taekman, M.D., *Assistant Dean for Education Technology*
Carol G. Reilly, B.S., *Administrative Director for Office of Curriculum*
Jan K. Richardson, Ph.D., P.T., O.C.S., *Chief, Doctor of Physical Therapy Program*
Justine Strand, M.P.H., PA-C, *Division Chief and Director, Physician Assistant Education*

Whelen Schaffer, Susan DO; Williams, Larry MD; Wolfe, Walter MD; Wright, Jr., Hugh K. (Jim) MDiv., MSW; Zaas, Aimee MD; Zimmerman, Sherri MD.

Library

Patricia L. Thibodeau, M.L.S., M.B.A., *Chair;* Drs. Eck, Erickson, Gwyer, McCusker, Rajagopalan, and Turner; Mses. Kahn and Ryan; Mr. Jones, MHA, MBA; Mr. Peterson, M.S.L.S., *ex officio;* Ms. Murphy, M.L.S., *ex officio.*

Medical Center Awards

Drs. Anderson, Bollinger, Casey, Cullen, Dawson, Epstein, Greenberg, Hertzberg, Parkerson, Perfect, Pisetsky, Pizzo, Schwab, Williams, and Whorton. R. Sanders Williams, M.D., *Chair;* Drs. A. Brown, H. Brown, Califf, Casey, Champagne, Cohen, Corless, Epstein, Frank, Fulkerson, Goldschmidt, Halperin, Haynes, Heitman, Hogan, Jacobs, Kay, Krishnan, Lyerly, Mark, McCarthy, McKinney, McNamara, Means, Michener, Nevins, Newgard, Newman, Pericak-Vance, Pizzo, Raetz, Ravin, Simon, Snyderman, Sugarman, Tedder, Telen, Wigfall, Wilkinson, Willard, and Wright; Messrs. Gibson, Rum, and G. Williams; Mses. Saito and Tenney.

Medical Center Safety Committee

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

Medical Radiation Control and Radioactive Drug Research Committee

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

Merit Awards

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

Minority Affairs Committee for Undergraduate Medical Education

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

Misconduct in Research

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

North Carolina Residence

Marcie Ellis, *Chair;* Mr. Wallace; Ms. McCorison.

Pharmacy and Therapeutics

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

Promotions Committee, Entering Class of 2001

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

Promotions Committee, Entering Class of 2002

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

Promotions Committee, Entering Class of 2003

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

Promotions Committee, Entering Class of 2004

Kathryn Andolsek, *M.D.,M.P.H., Chair;* Drs. Dawson, Guilak, King, Muir, Sheline and Stein; Mses. McCorison and Senter.

Scholarship Committee

William D. Bradford, M.D., *Chair;* Drs. Dawson, and Weinberg; Mses. McCorison and Tuck.

Second Year Course Directors Committee

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

Senior Scholarships

Lori A. Bastian, M.D., *Chair*; Drs. Brown, Drucker, Haynes, Krystal, Pendergast, Sebastian, and Wigfall; Mses. Ellis and McCorison.

Study Away

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

Third Year Committee

Debra A. Schwinn, M.D., *Chair;* Daniel Laskowitz, *Vice-chair;* Drs. Andolsek, Blobe, Bowes Rickman, Buckley, Dawson, English,Freedman, Gromeier, Guilak, Hauser, Humphreys, King, Klitzman, Krystal, Lo, Matchar, Mitchell, Moon, O'Connor, Scott and Wagner. Official liaisons: Drs. Drucker, Grochowski, and Schulman; Mses. Berke, Ellis, McCorison, Reilly, and Shuping; Mr. Schneider; Student Representatives: Messrs. Goswami and George, Mses. DeSimone and Donnelly

Undergraduate Medical Education - Curriculum

Edward Buckley, M.D. *Chair*; Drs. Baker, Bollinger, Cartmill, Dawson, English, Gaudet, Govert, Grochowski, Haynes, Heflin, Hershfield, Kaprielian, King, Major, Mark, Marks, Michener, Nadler, Neelon, Petrusa, Promes, Raetz, Schwinn, Sheline, Stolp, Swartz, and Taekman; Messrs. Boas, Floyd, Goswami, Karra, Langheier, Lee, MixcoMohanty and Nosnik. Mses. Butler, DeSimone, Donnelly Haefelle, Schroeder, Dzau, McCorison, Reilly and Thibodeau.

Veterans Administration Research and Development

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

Veteran's Administration, Dean's

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

History

History

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

James Buchanan Duke, Indenture of the Duke Endowment, 1924

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

One of Mr. Duke's primary motivations in establishing the Endowment and the School of Medicine was the improvement of health care in the Carolinas. At a time when medicine in the region 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 soon opened the first major outpatient clinics in the region. The Private Diagnostic Clinic, opened in 1931, 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. Duke University Hospital, now located in facilities opened in 1980 and since expanded several times, draws patients from across the Carolinas, the United States, and the world 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.

In recent years, Duke University Medical Center has evolved into an even broader health care institution, one poised to meet the challenges of health care delivery in the twenty-first century. No longer solely a traditional academic medical center where patients are referred almost exclusively for specialty care, Duke has expanded to include an integrated system of health care providers and facilities across the region. The Duke University Health System is composed of Duke University Hospital; Durham Regional Hospital; Duke Health Raleigh Hospital; Duke Health Community Care; and Duke University Affiliated Physicians; and encompasses many other strategic relationships and programs.

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

The University

Duke University, located in Durham, North Carolina, has an enrollment of almost 12,000 students from all 50 states and from many foreign countries. The university's schools and colleges include Trinity College of Arts and Sciences, the Graduate School, and the Schools of Business, Divinity, Engineering, Environment and Earth Sciences, Law, Medicine, and Nursing. Durham, with a population of 223,000, is in the Piedmont region of North Carolina and has easy access to the sea coast and mountains. It is one of the three cities bounding the Research Triangle Park where numerous private research laboratories and governmental agencies are located. Duke University is 25 miles from North Carolina State University in Raleigh, eight miles from the University of North Carolina at Chapel Hill, and is in the same city as North Carolina Central University.

Doctor of Medicine Program

Doctor of Medicine Program

Mission Statement and the Medical Curriculum

The mission of the Duke University School of Medicine is:

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

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

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

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

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

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

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

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

Features of the four-year curriculum include:

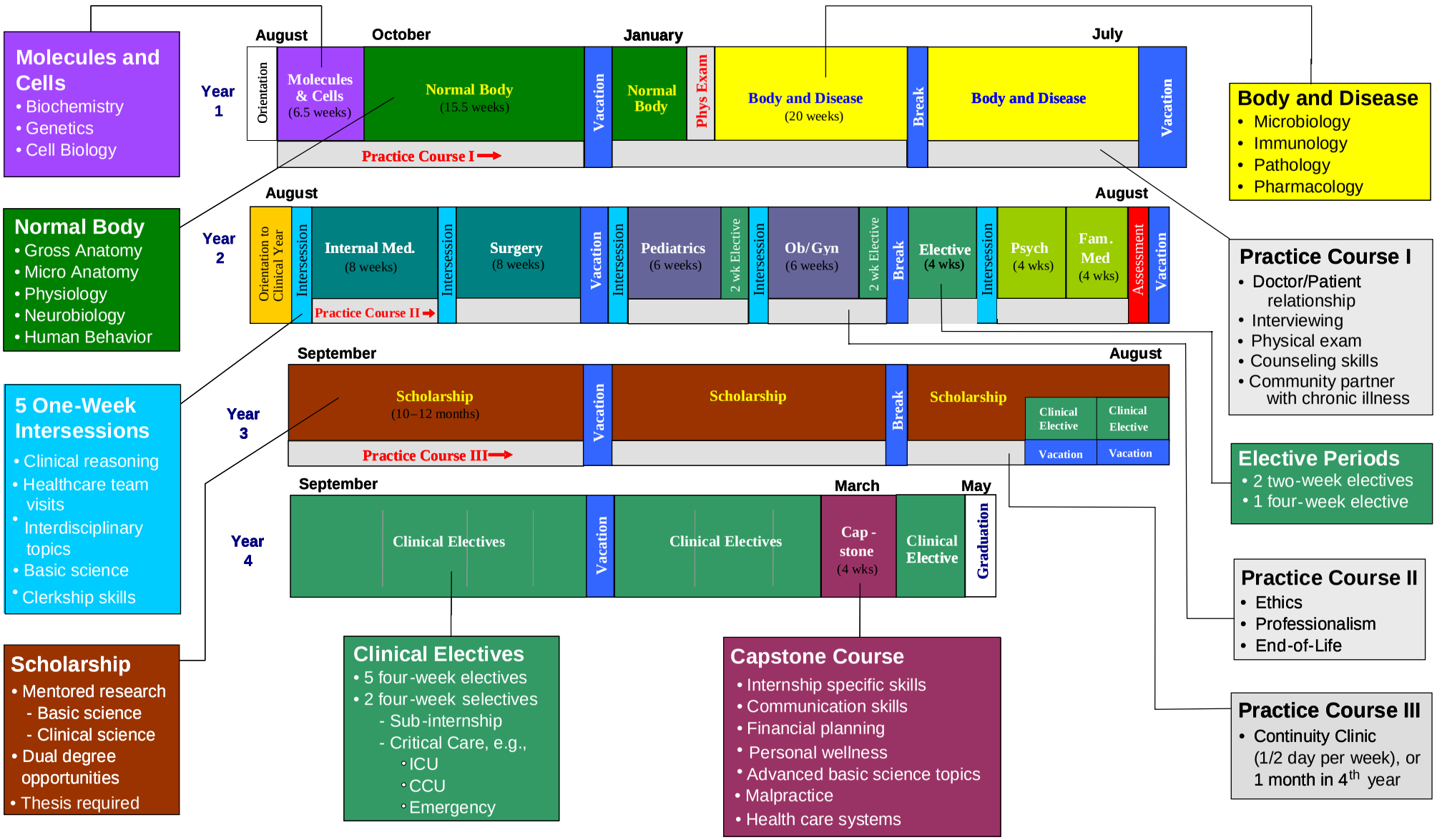
- Development of a core medical curriculum that is rigorous, efficient, integrative, and forms a realistic base of knowledge for a physician;
- Integration of basic, clinical, psychosocial, and population information and skills throughout the four years of medical education;
- General introduction to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

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

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

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

THE DUKE CURRICULUM: FOUNDATION FOR EXCELLENCE



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, professional, and technical competencies to function as skilled physicians; and demonstrated their fitness to practice medicine by adherence to a high standard of ethical and moral behavior.

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

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

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

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

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

The first year consists of instruction in the following:

Semester 1

INTERDIS 105B -Practice

INTERDIS 100B -Molecules and Cells

INTERDIS 101B - Normal Body

Semester 2

Intro to Physical Examination — (Intensive Learning Period)

INTERDIS 102B - Body & Disease

INTERDIS 105B - Practice

Year 1 consists of three integrated basis science courses and the Practice course:

- **Molecules and Cells** (integration of Biochemistry, Genetics, and Cell Biology) – 6.5 weeks
- **Normal Body** (integration of Gross Anatomy, Micro Anatomy, Physiology, Neurobiology, and Human Behavior) – 15.5 weeks
- **Body and Disease** (integration of Microbiology, Immunology, Pathology, and Pharmacology) – 20 weeks
- **Practice –** Doctor/patient relationships, interviewing, physical exam, basic counseling skills (4 hours/week for entire year)

Guiding Principles for Year 1:

- Integrate material within and between courses

- Include time for independent learning (generally one-half day of unstructured time per week)
- Incorporate more small group and active learning opportunities

As a result of the changes in the curriculum, individual courses in the basic sciences will not be offered and no enrollments honored.

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

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

The second year consists of an Orientation to the Clinical Year (OCY), six core clerkship rotations, five Intersessions, three elective periods, (two 2 weeks in duration and one four weeks) the Practice course, and a final week for assessment.

The goals of the core clerkships include developing students' skills in accurate patient-based problem-solving and appropriate use of resources to diagnose and treat patients. The **core clerkship** rotations include:

- Medicine (8 weeks)
- Surgery (8 weeks)
- Obstetrics and Gynecology (6 weeks)
- Pediatrics (6 weeks)
- Family Medicine (4 weeks)
- Psychiatry (4 weeks)
- Practice (4 hours every other week for entire year) – Advanced clinical themes (ethics, professionalism, end-of-life, etc.)

Five one-week **Intersessions** occur between clerkship rotations. Each week has an interdisciplinary theme. The goals of the Intersessions are to:

- Learn and practice clinical reasoning skills
- Understand the role of other healthcare providers and their interaction with physicians
- Apply advanced basic science principles to clinical medicine
- Debrief Community Partners visit with chronically ill patients
- Perform clerkship specific skills and techniques prior to the beginning of the rotation
- Discuss other interdisciplinary topics and their relevance to clinical practice (e.g., ethics, cultural competence, alternative medicine)

Elective periods include one four-week Elective and two two-week Selectives. Selectives provide an opportunity before the fourth year for students to learn about clinical subspecialties that are not covered by clerkships and offer career exploration.

In addition, after completing second-year clerkships, all students must take and pass the Clinical Performance Examination (CPX). The CPX is a standardized test of clinical performance that was developed by faculty from all four medical schools in North

Carolina and is now administered at all schools. Duke students will take the CPX during the Assessment week. 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 8 different patients.

Course Requirements—Third and Fourth Years. Satisfactory completion of the second year curriculum is a prerequisite to the elective curriculum. Third year is 10 months with an optional two months. The fourth (elective) year of undergraduate medical education builds upon the experiences in basic science and clinical medicine gained in the earlier years. Fourth year is two 16 week terms with an optional two month term. Successful completion of 68 elective credits (36 basic science credits during the third year and 32 clinical science credits during the fourth) is required for graduation. Course offerings are described in the different departmental sections in this Bulletin. The wide selection affords an opportunity for the student, with guidance from advisers, to design a program that best satisfies her or his needs.

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

Two different avenues to satisfying third year requirements are available. The first, which is most commonly followed, requires the student to select a home base study program for the basic science elective experience. With the aid of advisers, the individual elective program is devised to include an area of scholarly work to pursue which may or may not be an independent research project. A combination of a research preceptorship, tutorials, and a thesis will comprise the overall basic science elective experience. The second path open to students is participation in a combined M.D./master's degree program in clinical research, public health, business administration, public policy, law, library science, information science and clinical psychology (proposed). With rare exception, the elective experience should be taken as a block. During the third year, students are required to complete 36 basic science credits including three clinical science credits for the required Practice Year 3. The students must also complete a quantitative thesis for three credits. Specific requirements related to the thesis and third year components can be found on the third year Blackboard site.

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.

Students must complete clinical electives including several **required rotations** designed to enhance students' preparation for their internships and residencies:

- Subinternship
- Critical care/Anesthesiology/ER rotation
- Continuity clinic (if not completed in the third year)

Additionally, students participate in a four-week required **Capstone** course in March that coincides with Match Day. The Capstone course provides an opportunity to bring the whole class together to cover topics such as:

- Clinical skills for internship
- Ethical issues

- Professionalism
- Doctor/patient communication
- Medical/legal issues
- Health systems
- Patient Safety
- Self-care
- Advanced basic science principles

Doctor of Medicine Program Policies

Academic Calendar. An academic calendar is prepared by the School of Medicine Registrar's Office and approved by the Curriculum Committee on an annual basis. Every effort is made to include as many academic events and details as possible.

Academic Dismissal Policy of the Duke University School of Medicine. Accepted by Duke University School of Medicine Curriculum Committee, August 6, 2003, *Approved by Duke University Medical Center Executive Committee, October 7, 2003.* Any student who fails a for-credit course, whether offered by Duke University School of Medicine or by another school where enrollment in a course is intended for credit toward graduation from Duke University School of Medicine or a joint degree program, in any of the years of the curriculum, shall be deemed to be on "academic warning." The vice-dean or his/her designee will notify the student in writing of the status. The student's transcript will reflect the status. The student shall remain on academic warning until a passing grade is achieved for the course. At such time, the warning will be removed from his/her record.

Any student who fails a for-credit course while on academic warning shall be deemed to be on "academic probation" and will be notified of such in writing. The students' transcript will reflect the status. The student remains on academic probation until a passing grade is achieved for the course, at which time the probation will be removed from the transcript.

Any student who fails a for-credit course while on academic probation shall be dismissed from medical school on academic grounds and shall not be allowed to remediate the third course. The student will be notified in writing of the dismissal, which will be reflected on the student's transcript.

A student on academic warning or academic probation may be prohibited from progressing to a subsequent academic year or may be prevented by the Promotions Committee from taking other courses until the student achieves a passing grade for the failed course(s).

The procedure and requirements for achieving a passing grade for a failed course are to be determined by the course director or his/her designee and the Promotions Committee.

Consistent with the Duke University School of Medicine Doctor of Medicine Program guidelines, if a student fails a course, the grade of Fail is recorded on the student's permanent record and cannot be removed, even after successful remediation.

A student on academic warning or probation may withdraw from the school under the Leave of Absence policy in an attempt to remediate the underlying problem(s) producing poor academic performance. He/she may re-enter the school in accordance with the dictates of the Leave of Absence policy.

Students may appeal their academic warning, academic probation, or notification of dismissal according to the Promotions Committee policies outlined in the Duke University School of Medicine Doctor of Medicine Bulletin.

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

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

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

Approved School of Medicine Holidays for Medical Students (Subject to Change).

Labor Day	2nd, 3rd, and 4th year
Thanksgiving Day (and the day after Thanksgiving)	All
Christmas Day (and additional days as outlined on school academic calendar)	All
New Year's Day	All
Independence Day	2nd, 3rd, and 4th year (does not apply to first year since they typically finish prior to Independence Day)

Attendance Requirements for Medical Students – Holidays. Students in the School of Medicine are to observe approved holidays as outlined on the School of Medicine Academic Calendar. Holidays that occur on a Saturday may officially be observed on the preceding Friday. Official School of Medicine holidays occurring on Sundays will be observed on the following Monday. Second and fourth year medical students that are completing clinical rotations and scheduled for the weekend or evening shifts (or call) prior to the scheduled and approved holiday, must complete their scheduled shift. For example, a holiday observed on the Monday after the actual holiday, a course instructor and/or department may schedule the student to be on the wards until the end of their shift.

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.

Compact Between Teachers and Learners of Medicine. Accepted by Duke University School of Medicine Curriculum Committee May 1, 2002; Approved by Duke University Medical Center Executive Committee October 7, 2003

Preparation for a career in medicine demands the acquisition of a large fund of knowledge and a host of special skills. It also demands the strengthening of those virtues that under gird the doctor/patient relationship and that sustain the profession of medicine as a moral enterprise. This Compact serves both as a pledge and as a reminder to teachers and learners that their conduct in fulfilling their mutual obligations are the medium through which the profession inculcates its ethical values. *In this document, the resident is considered a teacher as well as a learner.*

GUIDING PRINCIPLES

Duty. Medical educators have a duty, not only to convey the knowledge and skills required for delivering the profession's contemporary standard of care, but also to inculcate the values and attitudes required for preserving the medical profession's social contract across generations.

Integrity. The learning environments conducive to conveying professional values must be suffused with integrity. Students learn enduring lessons of professionalism by observing and emulating role models who epitomize authentic professional values and attitudes.

Respect. Fundamental to the ethic of medicine is respect for every individual. Mutual respect between learners, as novice members of the medical profession, and their teachers, as experienced and esteemed professionals, is essential for nurturing the ethic. Given the inherently hierarchical nature of the teacher/learner relationship, teachers have a special obligation to ensure that students and residents are always treated respectfully.

Commitments of Faculty

- We pledge our utmost effort to ensure that all components of the educational program for students and residents are of high quality.
- As mentors for our students and resident colleagues, we maintain high professional standards in all of our interactions with patients, colleagues, and staff.
- We respect all students and residents as individuals, without regard to gender, race, national origin, religion, or sexual orientation: we will not tolerate anyone who manifests disrespect or who expresses biased attitudes towards any student or resident.
- We pledge that students and residents will have sufficient time to fulfill personal and family obligations, to enjoy recreational activities, and to obtain adequate rest; we monitor and, when necessary, reduce the time required to fulfill educational objectives, including time required for "call" on clinical rotations, to ensure students' and residents' well being.
- In nurturing both the intellectual and the personal development of students and residents, we celebrate expressions of professional attitudes and behaviors, as well as achievement of academic excellence.
- We do not tolerate any abuse or exploitation of students and residents.
- We encourage any student or resident who experiences mistreatment or who witnesses unprofessional behavior to report the facts immediately to appropriate faculty or staff: we treat all such reports as confidential and do not tolerate reprisals or retaliations of any kind.

Commitments Of Students and Residents

- We pledge our utmost effort to acquire the knowledge, skills, attitudes, and behaviors required to fulfill all educational objectives established by the faculty.

- We cherish the professional virtues of honesty, compassion, integrity, fidelity, and dependability.
- We pledge to respect all faculty members and all students and residents as individuals, without regard to gender, race, national origin, religion, or sexual orientation.
- As physicians in training, we embrace the highest standards of the medical profession and pledge to conduct ourselves accordingly in all of our interactions with patients, colleagues, and staff.
- In fulfilling our own obligations as professionals, we pledge to assist our fellow students and residents in meeting their professional obligations, as well.

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

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

Duplicate Diplomas. In the event that a diploma is misplaced or damaged, the University Registrar's Office, 103 Allen Building, can replace the document for a nominal fee. The individual concerned must certify in writing that the diploma is truly lost and that if found in the future, the duplicate diploma will be returned to Duke University. Damaged diplomas must be submitted to the University before the duplicate can be issued.

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

1. The right to inspect her or his education records.
   - Education records include those records which contain information directly related to a student and are maintained as official working files by the university. They do not include records made by faculty and administrators for their own use and not shown to others; campus police records; employment records; records of physicians, psychologists, etc., made or

used only for treatment purposes; and records containing information relating to a person's activities after she or he graduates or withdraws from the university.

- Although FERPA regulations do not require institutions to provide copies of the education records, unless to do so would effectively prohibit an individual from viewing her or his records, it is the policy of Duke University Medical School to make such copies available. However, the Medical School may deny requests to release copies of the transcripts of those students in financial default. The Medical School also does not release copies of other schools' transcripts unless mandated by FERPA.

2. The right to amend the contents of the education record to ensure that they are not inaccurate, misleading, or otherwise in violation of the student's privacy or other rights.
3. The right to file a complaint with the U.S. Department of Education concerning perceived failure on the part of the school to satisfy the requirements of FERPA.

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

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

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

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

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

Grade Appeal Process. A student wishing to appeal an official grade or comment must present his/her appeal to the course director within two weeks of the grade being posted. If requested as part of the appeals process, a student should have access to the actual checklists or comments that have been compiled as part of the grade, though identity of the evaluators submitting these data may be kept confidential. If a satisfactory resolution cannot be accomplished, the student may appeal the grade to the Grade Review Panel within two weeks of the meeting with the course director by completing the “Request for Grade Review” form and submitting it to the Office of Curriculum. The Grade Review Panel, designated by the Curriculum Committee will consist of one basic science faculty, one clinical science faculty, and one advisory dean other than the student’s dean, and should be convened ad hoc within one

month of receiving the notification of appeal. Both the student and the course director will be asked to present information regarding the appeal.

The Grade Review Panel will review the data related to the student's performance in the course and the grading criteria for the course and will make a recommendation to the vice ean regarding preserving or changing the grade. At this time, the vice-dean will either uphold the decision of the Grade Review Panel or make his/her independent decision relative to the documentation submitted.

If the student is not satisfied with the outcome of the grade appeal process, s/he may appeal to the dean of the School of Medicine within two weeks of receiving the decision of the vice-dean. An appeal to the dean may be made only upon the grounds of improper procedures in the appeals process rather than continued disagreement about the outcome of the process. The dean will review the data related to the process of the appeal and determine whether the process was valid. If s/he finds the process valid, the decision is final and binding. At this time, the registrar's office will be notified of the final grade and it will be reflected on the student's permanent record. If the dean finds the process invalid, a new Grade Review Panel will be convened.

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*), High Pass (HP), or Pass with Honors (*H*). Pass with Honors is reserved for those students who have performed in an exemplary manner in the opinion of the faculty.

An Incomplete *(I*) grade is reserved for those students who have no 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.

Graduation from Degree Programs

Students may earn degrees on one of three different dates during the academic year: September 1, December 30, and in early May. Actual ceremonies are only held at the end of the spring term. Anyone who has a degree date of December or September is invited to participate in the May commencement program immediately following her or his actual graduation date.

During the spring semester prior to the senior year, a form letter is sent to each student inquiring as to when (e.g., semester and section - spring semester, section 43) he or she expects to fulfill degree requirements. Diploma forms requesting information such as current local address and how the name should be listed on the diploma are forwarded to prospective graduates as well.

Student records are reviewed by the Registrar's Office staff to ensure that, upon successful completion of the current courses, graduating seniors will fulfill degree requirements on schedule. Those students who are deficient are contacted by the Registrar's Office to inform them of the situation and to discover how they plan to rectify the problem, e.g., add a course, graduate in September instead, etc.

In mid-March, letters are sent to prospective May graduates asking them whether or not they plan to attend graduation exercises. It is extremely important that students wishing to be graduated *in absentia* inform the Registrar's Office of their intentions at this time. Diplomas are sent to such students at their permanent address.

Health Insurance Portability and Accountability Act (HIPAA). The Health Insurance Portability and Accountability Act, or HIPAA, requires health care professionals to protect privacy and create standards for electronic transfers of health data. The Office for Civil Rights at the Department of Health and Human Services will enforce the regulations and impose penalties on institutions that do not make a good-faith effort on privacy and security.

HIPAA came about because of the public's concern about how health care information is used. HIPAA gives patients more control over their own health information. All Duke University School of Medicine students are required to complete online HIPAA training on an annual basis. For more information about HIPAA, please refer to the following website, *http://www.dukehealth.org/Privacy/HIPAA.*

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

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

mentioned in this code can still be investigated. Specific incidents will be considered in the context in which they occur. In addition, the magnitude and chronicity of infractions will be taken into account.

To uphold the honor code, the student will:

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

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

Internship Interviews. A total of six working days may be taken by fourth year students for internship interviews. However, no more than three days can be missed during a four week rotation. The student must give the instructor of the affected course sufficient notice of his or her intention to be away for an interview so that a mutual determination can be made as to the best time to be absent. This ensures that the learning experience in that course is in no way jeopardized.

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

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

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

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

Medical Licensure. The United States Medical License Examination (USMLE) is a three-step examination for medical licensure in the United States. USMLE is sponsored by the Federation of State Medical Boards (FSMB) and the National Board of Medical Examiners (NBME) . It is governed through a jointly appointed composite committee consisting of representatives from the FSMB, the NBME, the Education Commission for Foreign Medical Graduates (ECFMG), and the public. Step 1 assesses how well a student can apply the knowledge and understanding of basic biomedical science, with an emphasis on principles and mechanisms of health, disease, and modes of therapy. There are two parts of Step 2. The first part, Step 2 CK (Clinical Knowledge) assesses how well a student can apply the medical knowledge and understanding of clinical science considered essential for the provision of patient care *under supervision*, including emphasis on health promotion and disease preven-

tion. the other part, called Step 2 CS (Clinical Skills) assesses clinical performance of candidates through encounters with a number of standardized patients. Candidates take a medical history and for some patients conduct a physical examination. There is also a clinical note that is written after seeing the patient. Steps 1, 2 and 2 CS must be passed to be eligible for Step 3. Step 3, typically taken in the first year of postgraduate training, assesses how well a resident can apply the medical knowledge and understanding of biomedical and clinical science considered essential for the *unsupervised practice* of medicine, with emphasis on patient management in ambulatory settings. Steps 1, 2 and 3 are computer-based and must be taken in certified Prometric testing centers. Centers closest to Durham are in Raleigh and Greensboro. Step 2 CS is taken at one of five specially designed testing centers around the country. More information can be obtained from the USMLE website *(http://www.usmle.org).*

Effective for all graduating classes of 2005 and beyond, Duke University medical students are required to take Steps 1, 2 CK and 2 CS prior to graduation. Students may take these examinations at any point throughout the curriculum nor is it a graduation requirement. Passing is not a requirement for progress through the curriculum. Duke Medical School considers licensure to be the responsibility of the individual, but each student must take Steps 1, 2 CK, and 2 CS before graduation. The Duke curriculum is not directed to prepare students specifically for licensure examinations; however, satisfactory performance in medical school should provide sufficient information and experience to pass these exams.

According to the NBME, "In order to be eligible to register for USMLE Step 3, students and graduates of LCME- or AOA-accredited medical schools will be required to not only meet current examination requirements (i.e., passing Step 1 and passing Step 2 CK) but also to pass Step 2 CS if they: (a) have graduation dates in 2005 or later, or (b) have graduation dates prior to 2005 and have not passed the CK component of Step 2 taken on or before June 30, 2005." More information is available at the USMLE website. Applications for Steps 1 and 2 are available on the National Board of Medical Examiners website *(http://www.nbme.org).* Applications for Step 3 for medical students must come from the North Carolina Board of Medical Examiners.

Medical Student Performance Evaluations (MSPE's). During the fall of the fourth year, the advisory deans write an evaluation for each of their advisees. The purpose of the Medical Student Performance Evaluation is to summarize the student's medical career and accomplishments and to give training programs some insight into a student's abilities and assets. Evaluations are submitted to residency programs on November 1. Detailed information concerning the evaluation is sent to the student by the Office of Student Affairs in early fall of the fourth year.

Missing Grades. The Curriculum Administrative Group passed a mandate that all grades must be supplied to the Registrar's Office prior to a student receiving their degree. Every effort will be made by the Registrar's Office to collect these grades. However, if within one month of graduation this does not occur, students will be requested to obtain the missing grades for their permanent records. Diplomas will be withheld until such time as all grades are submitted for the student.

Policy for Completion of Coursework in First Year

During the Term of the Course. The nature of the first year curriculum is rapid-paced and cumulative, such that each course is considered prerequisite for the successive courses. Efforts are made by course instructors, the Associate Dean for Basic Science, and advisory deans to proactively identify students who are having academic difficulty or who, for reasons of illness or other extenuating circumstances, are temporarily unable to attend class. In

these situations, the assistance of student tutors, special guidance by course directors, or other forms of academic or counseling support may be offered to help the student accomplish course goals. In extenuating circumstances and at the discretion of the course director(s), the student may negotiate to delay due dates, tests or presentations, or to retest or revise coursework during the term of the course(s).

Incomplete Grades. If completion of the course requirements results in a "Pass" or "Honors" grade, the "Incomplete" is not recorded on the transcript. If the student is unsuccessful in satisfactorily completing course requirements or does not enact the "Plan" by the agreed upon deadline, a grade of "Fail" is recorded. The "Plan for Course Completion" will become a part of the student's permanent record, and submission of the final grade for the course will constitute verification of completion.

If a student has multiple "Incomplete" grades and "Plans for Course Completion" that preclude completion of coursework in a timely manner, the Promotions Committee may recommend to the vice-dean a delay in further progression in the curriculum. If the Promotions Committee determines that, despite an approved "Plan for Course Completion", the student is not adequately prepared to continue in the curriculum, a delay in further progression may be recommended to the vice-dean, even though no "Fail" grade has been recorded.

Fail Grades. If a grade of "Fail" is received in a course, either because of major deficiencies in meeting course requirements or failure to clear an "Incomplete" grade as described, the "Fail" grade will become a permanent part of the student's transcript. With the course director's advice and consent, the Promotions Committee may recommend to the vice-dean that the student remediate the course prior to promotion to the next year. Remediation of failed courses may occur only while other courses are not in session in order to avoid further academic difficulty. When deficiencies in coursework are major or in multiple courses, the Promotions Committee may recommend that the student repeat the entire course(s) the following year.

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

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

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

The vice-dean, with the advice of the dean of the School of Medicine, reserves the right to require the withdrawal of any student at any time if, in his opinion, the student should not continue in the School of Medicine.

Reciprocal Agreements with Neighboring Medical Schools. Under a plan of cooperation between the Duke University School of Medicine, the Wake Forest School of Medicine, the East Carolina University's Brody School of Medicine, and the University of North Carolina-Chapel Hill School of Medicine, degree candidates of one institution may participate in elective courses for credit at one of the other schools. Courses taken usually are ones not available at the home institution or not offered at times that can be accommodated by the students' schedules. Enrollment in another institution is limited to one term and is contingent upon available space in the course(s). These courses are regarded as "in house" electives at Duke and, as such, appear on the transcript with the awarded grades. Students involved in this program are assessed the current Duke tuition and fees. Interinstitutional visitors to Duke are charged neither tuition nor student health fees for this type of enrollment.

Important Note: The amount of credit granted for an interinstitutional course is the same as that awarded for a comparable course at Duke unless the course concerned is (1) a sub-internship, or (2) offered for fewer credits and meets less often than its Duke counterpart. Students can earn a maximum of four credits for subinternships taken at any school other than Duke or UNC at Chapel Hill.

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

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

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

Refunds to Students Assessed Charges when Studying Away for Elective Credit. Students taking courses away from Duke are assessed the current tuition for those courses for which he or she earns credit at Duke. However, if the visited institution requires payment of any tuition or fees, the student can receive a refund from Duke for these expenses. To do so, the student must bring to the Medical School Registrar's Office after completion of the course(s): (a) a copy of an invoice or a letter from the institution outlining the fee requirements, and (b) a copy of her or his canceled payment check. Upon receipt of these items as

well as the official grade report, the Registrar's Office reimburses the student.

Duke does not refund students for fees/tuition paid for a study away experience that is terminated prior to its completion.

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

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

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

Third to Fourth Year. Completion of 36 basic science credits within ten months (12 months for master's or scholarship students).

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

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

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

School of Medicine Severe Weather Attendance Policy. The School of Medicine will handle the cancellation of classes in the following manner:

- The first and third year medical, the first year PA, all Path Asst. and Physical Therapy students will follow the Provost's decision about cancellation of classes. Course directors, mentors and faculty are aware of this policy so that individual decisions will not have to be made.
- For all second, fourth year medical and second year PA students, you will need to follow the assigned hospital decisions related to the severe weather policy. You are considered NON-ESSENTIAL personnel and should not report to work in severe weather. Please stay tuned to the DUMC severe weather policy alerts and act accordingly.

These decisions can be determined by calling 684-INFO (4636) or by visiting *www.duke.edu.* Students and faculty can also call the SOM registrar's office at 684-2304 or the Office of Curriculum at 684-5967 where this decision is echoed.

Students with prior graduate work culminating in a PhD: After acceptance to the School of Medicine, applicants who hold Ph.D. degrees, typically in the biomedical or preclinical sciences, may also 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 requirements in the final year. Students whose Ph.D.'s have not been awarded prior to expected Medical School matriculation are not eligible for this program. To apply for 3rd-year credit for the Ph.D., students must fill out an application available at the Medical School Admissions and Registrar's offices, and must submit this application to the registrar's office by the end of the first year of enrollment. The Registrar's Office will identify an appropriate 3rd-year study program director to review the nature and scope of the research, and present a recommendation to the 3rd-Year Committee. The 3rd-year Committee will review the request for 3rd-year credit, and make a recommendation to the vice-dean. The vice-dean will then make a final decision and inform the student, the 3rd-Year Committee and the Registrar's office. If graduate work is accepted for credit the

3rd-year thesis requirement will be waived. The student will not have the option to receive Honors for his/her thesis.

Study Away Policy. Students in the M.D. Program at Duke who have maintained a high level of academic performance throughout their first two to three years are eligible to study at another institution and receive academic credit at Duke for this experience. Students must have successfully completed all courses in the first two years at Duke before they are eligible to study away for credit. It is **unlikely** that students with any failures or marginal performances at Duke will receive permission. A student may not study away from Duke for credit during the four weeks prior to his or her graduation. Transfer students who are taking the two clinical years are not eligible to study away. Study Away applications are available either in the registrar's office or on the *http://registrar.mc.duke.edu* website. The applications for third year Study Away are forwarded to the Third Year Committee, which is notified by the Promotions Board if any second year students are ineligible, and to the Duke Risk Management Office for approval. **All Study Away for credit (including military rotations) must be approved in advance by these three entities.** Third year students who study away are liable to pay Duke's tuition as well as any tuition at the visited school. Fourth year Study Away must be approved by the student's advisory dean and the Duke Risk Management Office. Credit toward the Duke M.D. degree is not to exceed nine units of clinical elective credit unless recommended by the Committee (exceptions, military students).

To obtain approval for work taken away from Duke University, the student must first contact her or his advisory dean to determine if qualified. Transfer students and students receiving grades of "Fail" in any of the core basic or clinical science courses of the first and second years even after successful remediation are not eligible for this option. Application forms, as well as additional information, may be secured from the Medical School Registrar's Office for study away during the fourth year. Copies of the elective books of selected medical schools are kept in the Reserve Room at the Medical Center Library and are available for student usage.

Students must register for any study away experience during the regular web registration period and indicate the term (via section number) during which the experience is to occur. Clinical science courses are designated as STDYAWAY 410C, 411C (UNC), 421C (WFU), and 431C (ECU). **The amount of credit awarded for study away work is based upon that given for a comparable course at Duke. With the exception of those at UNC-Chapel Hill, subinternships taken extramurally can earn a maximum of four credits at Duke**. The current Duke tuition, rather than that of the visited institution, is assessed for extramural clinical science courses.

Fourth year students may usually only study away as visiting students at other institutions for one or two electives. Students must fill out an application from the Registrar's Office, get permission from the visited institution, and complete an evaluation at the end of their experience.

Technology Fee. Effective fall 2003, <u>all</u> matriculating first year and second year students in the School of Medicine will be assessed a mandatory technology fee. This includes students enrolled in the following programs: *Doctor of Medicine, Doctor of Physical Therapy, Physician Assistant, and Pathologist's Assistant*. The fee will not only cover hardware such as a laptop and handheld device, but service, software and technical updates to comply to all Duke Health System compliance guidelines.

Third Year Credit for Prior Graduate Work

MD/PhD Students: Students in the combined Duke MD/PhD program will automatically receive third-year credit upon successful completion and defense of their PhD. If stu-

dents do not complete their PhD, but complete requirements for a terminal Master's degree, they must prepare a written thesis in concordance with the School of Medicine guidelines, and identify an appropriate third-year Study Program Director who will review the thesis and scope and nature of the graduate work. The Study Program Director will present a recommendation to the Third Year Committee, which will make decisions regarding 3rd-year credit on a case-by-case basis. Students pursuing this option for 3rd-year can be evaluated for Pass or Honors.

Transcripts of Academic Record and MSPE's. A student may obtain a copy of her or his academic transcript by completing a transcript request form, or sending a letter or FAX to:

Office of the Registrar
Box 3878, DUMC
Durham, NC 27710
FAX: 919-684-2593 (Electronic requests must include facsimile of the original signature of the requestor.)

Transcripts are released at no charge only upon the written request of the student concerned.

After graduation from the School of Medicine, copies of the MSPE may be obtained from the Registrar's Office. (It should be noted, however, that the Medical School forwards copies of the MSPE directly to the institution to which an individual is applying. It is against the school's policy to release copies to the student.

Transcripts and records submitted from other schools that are on file at the Medical School cannot be duplicated and released from the Registrar's Office.

Visiting Students. The School of Medicine provides opportunities for visiting medical students to enroll in clinical elective courses for a maximum period of 8 weeks. Approved visiting students are permitted to enroll in courses only after the registration period for the applicable semester has concluded for Duke medical students, and are required to adhere to the Duke academic calendar. The School of Medicine does not offer long term or extensive clinical experience sufficient to satisfy the clinical educational requirements of other medical schools. Payment of a non-refundable application fee (currently $50, subject to change) must accompany all applications. If approved, a registration fee of $200 for students from LCME approved medical schools, $2000 for students from international medical schools, and a student health fee (currently $120, subject to change) are required. For information write to: Visiting Student Coordinator, Box 3878, Duke University Medical Center, Durham, North Carolina, 27710, or access the website for the Office of the Registrar, School of Medicine, http://registrar.mc.duke.edu.

Admission Procedures

Maturity, strong 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 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 begin by submitting the electronic AMCAS application. The application may be accessed at the following website: *http://www.aamc.org/students.*

Upon receipt of the application data from AMCAS, applicants receive a Duke University School of Medicine Supplemental Application. When the Supplemental Application and application fee are submitted, a favorable screen by the members of the admission screening committee of an applicant's AMCAS application and Supplemental Application materials generates an invitation for a personal interview. Applications should be submitted between June 1 and November 15, the deadline for all materials to be received by AMCAS. Applicants are urged to file their applications as early in the admission cycle as possible since interview slots fill quickly. Depending on the volume of applications, we cannot always guarantee an on-campus interview. Duke does offer regional interviews at various cities throughout the United States. These interviews are conducted by Duke Medical School Alumni carefully selected by the Committee on Admissions. Applicants who interview at a regional location are at no disadvantage and their applications are given the equal consideration. Supplemental applications should be completed and submitted within two weeks of receipt of notification to complete the supplemental application. The final deadline for receipt of the Supplemental Application is December 1 but it is not recommend that an applicant wait until the deadline to submit the application as interview slots can fill quickly.

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

Selection. The earliest date of notification of acceptance is in early March for applicants entering the following August. Those selected to interview are carefully evaluated by the Committee on Admissions. A personal interview is conducted at Duke for those applicants with competitive credentials. Candidates may have personal interviews with regional representatives of the Admissions Committee, who are Duke School of Medicine alumni. Those candidates who demonstrate the most promise for exceptional performance in their future practice of medicine are admitted on the basis of merit. In order to ensure enrollment, accepted candidates must return a signed agreement within three weeks after notification. Since admission is offered in advance of matriculation, it is provisional upon the successful completion of any incomplete, premedical, and required subjects as well as the continued demonstration of scholarship in college course work.

Transfer. Duke University School of Medicine does not accept transfer students.

Advanced Placement. After acceptance to the School of Medicine, applicants who hold Ph.D. degrees in biomedical or preclinical sciences may apply to be considered for a three-year, M.D. degree program. This program consists of the core basic science courses during the first year, the core clinical rotations during the second year, and clinical electives during the third year. Students whose Ph.D.'s have not been awarded prior to expected matriculation are not eligible for this program. Applications to receive credit for the Ph.D. can

be obtained at the Medical School admissions and registrar's offices, and must be submitted to the registrar's office by the end of the first year of enrollment. The Third Year Committee will review the request and make a recommendation to the vice-dean. The vice-dean will then make a final decision and inform the student, the Third Year Committee, and the registrar's office.

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

Immunization Requirements

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

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

Combined Degree Programs

Medical Scientist Training Program. The Medical Scientist Training Program is designed for highly qualified students strongly motivated toward a career in medical sciences and academic medicine. It provides an opportunity to integrate graduate education in one of the sciences basic to medicine with the full clinical curriculum of the School of Medicine. The program requires, on average, six to seven years of study and leads to both the M.D. and Ph.D. degrees. Although the special emphasis of this program is on basic medical science, the trainees, because of their education in clinical medicine, have a remarkable range of 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 $20,250 (including health insurance). Financial support from that award can be furnished for up to six years assuming normal progress. These six years need not be consecutive; this permits flexibility in funding in case more than six years are required for completion of the curriculum. Funding by the NIH is limited to citizens or permanent residents of the United States.

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

Year 1—Core Basic Science Year. This year consists of three basic science courses; Molecules and Cells, Normal Body and Body and Disease, please refer to M. D. requirements.

Year 2—Core Clinical Science Year. The second year consists of an Orientation to the Clinical Year (OCY), six core clerkship rotations, five Intersessions, three elective periods, the Practice course, and a final week for assessment. The goals of the core clerkships include developing students' skills in accurate patient-based problem-solving and appropriate use of resources to diagnose and treat patients. The **core clerkship** rotations include:

- Medicine (8 weeks)
- Surgery (8 weeks)
- Obstetrics and Gynecology (6 weeks)
- Pediatrics (6 weeks)
- Family Medicine (4 weeks)
- Psychiatry (4 weeks)
- Practice (4 hours every other week for entire year) – Advanced clinical themes (ethics, professionalism, end-of-life, etc.)

Five one-week **Intersessions** occur between clerkship rotations. Each week has an interdisciplinary theme.

Years 3, 4, 5, (6)—The Graduate Years. During the third, fourth, fifth and, if necessary, sixth year of the program, the trainee pursues graduate study to satisfy the requirements for the Ph.D. degree. These requirements include: (1) completion of necessary course work, (2) adequate performance in the preliminary examination, (3) original research suitable for a dissertation, and (4) successful defense of the thesis in the final examination. Detailed descriptions of the other general requirements for the Ph.D. degree are stated in the *Bulletin of the Graduate School.*

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

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

Final Year—An Elective Year in Clinical Science. In this year, which is entered only after completion of all requirements for the Ph.D. degree, the student and her or his Medical School advisory dean construct an individualized curriculum which often places major emphasis on one clinical area and minor emphasis on other fields. One aim is to integrate research interests and clinical experience in such a way that the student's research competence is facilitated; therefore, the year is planned with regard to the trainee's proposed career in research as well. This elective year provides further training in clinical medicine to complement the second (core) clinical year, so that the trainee's total clinical experience is the same as that given in the regular clinical years of medical school (the third and fourth years in the majority of schools). It should be noted that since students in the program receive the M.D. degree upon completion of the final year, great care is taken by the faculty to ensure that students are competent and knowledgeable in current concepts of patient care. It is hoped that the final year provides the student with an experience which is not repeated during the residency but serves to complement later phases of training. For example, future surgeons might be exposed to fields other than surgery, since they receive intensive training in that discipline during their residency programs. For more information on fourth year course requirements, please refer to page 7.

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

1. The application form for the Duke University School of Medicine should be completed and submitted as early as possible since acceptance into the Medical Scientist Training Program requires acceptance by both the Program Committee and the Medical School Admissions Committee. Applicants who cannot be accepted into the program are still fully eligible for acceptance to the Medical School if the Medical School Admissions Committee considers them qualified and desirable.
2. The application form for the Medical Scientist Training Program should be completed and submitted no later than December 1.
3. To facilitate review of this application, the Medical College Admission Test should be taken, if possible, in April of the year in which the application is submitted.
4. Only those applicants who are accepted for the program are requested to complete an application form for the Graduate School. The Graduate Record Examination is not required for this purpose.
5. Applicants are notified about acceptance into the program on or about February 28.

Additional information may be obtained by writing Salvatore V. Pizzo, M.D., Ph.D., Director, Medical Scientist Training Program, Box 3712, Duke University Medical Center,

Durham, North Carolina 27710 **or** by checking our website at *www.mstp.duke.edu* **or** emailing *burks003@mc.duke.edu.*

Primary Care Program. In September of 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. During third year, Primary Care Program students are encouraged to participate in either the Clinical Research Study Program or the Epidemiology and Public Health Study Program during the third year. These study programs provide an opportunity for dual degrees, such as M.D./M.B.A., M.D./M.H.S., M.D./M.P.P., or M.D./M.P.H. During the fourth year, students are encouraged to take a generalist subinternship, and at least one ambulatory care rotation in a generalist discipline such as community medicine or geriatric medicine. Throughout the four years, students are assigned a primary care mentor as well as an advisory dean. Students may join the program at any time during the first three years and may withdraw from the program at any time. Participation also does not necessitate a primary care career choice. The program is jointly sponsored by the Departments of Community and Family Medicine, Medicine, Obstetrics/Gynecology, and Pediatrics. Additional information may be obtained by contacting Barbara Sheline, M.D., M.P.H., Box 3886, Duke University Medical Center, Durham, NC 27710, *sheli002@mc.duke.edu.*

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

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

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

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

Master of Arts in Clinical Psychology – *Proposed program* (pending approval June 2005). After successful completion of the first two years in the School of Medicine at Duke, students may apply for a Masters in Clinical Psychology. Interested applicants must be second year medical school students with a demonstrated aptitude and established interest in Behavioral Medicine. Students enrolled in this program must complete a minimum of 30 credits which must include 24 credits of graded courses. This must be approved by the Psychology department and School of Medicine mentors and school administrators. The work will be reported in a document that will serve as a third year Thesis for the School of Medicine and Area Paper for the Department of Psychology. Students will be required to defend their Paper to a committee comprised of three members, which will include at least one individual from the School of Medicine and from the Department of Psychology. The members will be chosen by the Program Administrators. Students are required to meet all requirements of the Duke School of Medicine third year curriculum (e.g., completion of IRB modules).

Applications: All applications must be submitted to the Department of Psychology during the second year of medical school by December 1 (the year prior to beginning the program). Letter of intent recommended to be submitted by September 1.

Tuition: Students will be required to pay one year tuition to the Graduate school as well as their four years of Medical School tuition.

Master of Arts in Liberal Studies – MD/MALS

This joint degree option would begin in the 3rd year of a student's medical degree. It would be a two-year program in its first implementation. Options for creating a one-year program to be situated in the 3rd year of medical school will be explored after the initial implementation.

The foundation of the MALS program is the idea that liberal learning is central to an individual's continuing intellectual growth and capacity for critical thought. Because this sort of learning does not stop at the boundaries of a particular academic discipline, the MALS program offers a wide range of courses not available in traditional graduate programs. Using an interdisciplinary approach, students can explore diverse subjects and apply fresh perspectives from a variety of fields. The structure of the program is flexible enough to meet personal and professional goals.

The objectives of a MALS degree are to extend a student's intellectual resources and range, to promote openness to new ideas and appreciation of differences, to stimulate students to find connections between their studies and their professional lives, and to encourage a lifelong commitment to learning, free inquiry and the life of the mind.

MALS Degree Requirements

30 units in total

- Three courses in MALS (9 units)
- Six courses chosen from MALS courses or other graduate courses (18 units)
- Final project (3 units)

MALS Courses That Might be Appropriate to a Joint Degree:

The Animal–Human Boundary (Cartmill)

The Doctor's Dilemma: Disease, Drama and Medicine (Clum)

Death and Dying[*] (Gold)

*Adult Development and Aging** (Gold)

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[*]. Count as electives within the Health Policy Certificate

*Aging and Health** (Gold)

The Idea of Nature (Mauskopf)

The Origin and History of Life (McShea)

*Madness and Society in Historical Perspective** (Miller)

Science Technology and Social Change (O'Rand)

Vocation, Professionalism and the Conflicted Self (Pfau)

Science, Magic and Religion in the West (Robisheaux)

*Health Care, Narrative and Social Theory** (Rudy)

Ethics in America (Rudy)

The Darwinian Revolution (Shaw or Alberts)

The Biodiversity Crisis (Shaw)

Foundling, Orphans, Waifs and Strays: Homeless Children from Antiquity to the Present (Thorne)

All MD/MALS theses proposals also will require School of Medicine approval.

For more information, please contact Donna Zapf, Director, Box 90095, 919-684-3222, *dzapf@duke.edu;* OR Kathryn M. Andolsek, M.D., MPH; DUMC 3915, Durham, NC 27710; (919) 668-3883; *andol001@mc.duke.edu*

Master of Science of Library Science and Information Science

The proposed dual degree program would allow students interested in information management, information technology, and the development of evidence-based resources to further explore the role of information in the clinical setting. Through the dual-degree program, students would be able to integrate their clinical knowledge with the information skills and concepts found in the library and information sciences studies curricula. In the future these medical informationists will be able to contribute to the development, selection, and delivery of high quality information that is relevant to the clinical setting and patient care.

What you earn

MD/MSLS or MD/MSIS

What you earn

MD/MSLS or MD/MSIS

How long does it take?

Two years for MSLS or MSIS. Coursework for the program may be completed in less time (3 semesters and summer courses), but the expectation is that the students will complete the program and their research project within two years and will return to their fourth year medical school program by August, two years after starting their MSLS or MSIS.

The medical students will apply for acceptance to the UNC's School of Information and Library Sciences (SILS), and the UNC Graduate School, and if admitted will pursue the MSLS or MSIS degree over the next two years. Students will be expected to fully meet the SILS criteria for earning a degree in library science and information science.

The medical students will be also expected to follow the School of Medicine's registration procedures for the scholarly years and meet all criteria required by the Third Year Committee, including the submission of a thesis that meets Duke's requirements.

Applications. Students will follow the existing registration procedures at both schools. Students must register with Duke University School of Medicine for their third-year experience. In addition they must follow UNC SILS' registration process for enrolling in their masters courses.

The UNC Graduate School recommends **submission of all materials by December 1**, due to the volume of applications received.

UNC SILS recommends early submission due to the limited number of spaces in the program.

Required deadline dates for the fall semester are:

- To be considered for Graduate School financial assistance (all applicants)
- Jan. 1
- To be considered for SILS financial aid Feb. 15
- Financial assistance not requestedJune 15
- Duke medical school registrar should be notified that an application to this program has been submitted to UNC.

Early submission of application materials will enhance consideration for the limited number of spaces available in the program.

For more information, contact Patricia L. Thibodeau, MLS, MBA, Associate Dean for Library Services & Archives, DUMC 3702, Durham NC 27710; 919 660-1150; *thibo001@mc.duke.edu*; OR Kathryn M. Andolsek, MD, MPH DUMC 3915, Durham, NC 27710; (919) 668-3883; *andol001@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 vice-dean to receive transfer credit that can be applied to the medical school degree if the major subject area is one that is related to the discipline of medicine, health policy, or public health. The combined M.D./Ph.D. program typically extends for six years. Students complete the first two academic years in the School of Medicine (the required, core basic and clinical courses) prior to taking a leave of absence to enroll in the Graduate School. A range of appropriate courses is available there through the Department of History. Following the completion of the Ph.D. degree, the student resumes requirements for the M.D. degree.

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

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

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

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

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

Upon successful completion of the second year, the student takes a leave of absence from the Medical School and enters The Fuqua School of Business where the first-year

core course curriculum is the same as that of other M.B.A. students in The Fuqua Health Sector Management Program.

Upon completing the first year M.B.A. curriculum, the student returns (typically in May of their third year) to the School of Medicine to begin the first half of a 12-month scholarly experience required to fulfill the Duke Medical School third year requirement. The third year study track director of the Epidemiology and Public Health Study Program works with the students to ensure identification of an appropriate mentor and topic and thesis submission in a timely manner.

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

- complete all required Duke School of Medicine third year components (currently 5 research ethics internet modules and a statistics module).
- make an oral presentation to AOA day or some comparable group on their research topic.

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

Application Procedures. Applications for The Fuqua School of Business must be completed online from Fuqua's Admissions website: *www.fuqua.duke.edu/admin/daymba/admissions/appdown.html.* Applications for the School of Medicine must be made by utilizing the AMCAS procedure described in this Bulletin.

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

For additional information, contact the M.D./M.B.A. Program advisor, Dr. Kevin Schulman, Director, Center for Clinical and Genetic Economics, Duke Clinical Research Institute, DUMC, Box 17969, Durham, NC 27715, *schul012@mc.duke.edu* or Nichole Berke, The Fuqua School of Business, Assistant Director of the Health Sector Management Program, Box 90120, Duke University, Durham, NC 27708, *nbrke@mail.duke.edu,* and students must contact David B. Matchar, M.D.; Box 3896 Med Center, Durham, North Carolina 27710, (919) 286-3399, *david.matchar@duke.edu.*

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

Course of Study. The student in the M.D./J.D. Program generally begins her or his course of study in the School of Medicine. As in the regular M.D. Program, the first year is devoted to the basic medical sciences and the second year to the core clinical disciplines. The

completion of the first two years allows the individual to integrate the classroom with the clinical experience of patient care. At the time the Medical School curriculum starts a third year of research experience, the student enters the School of Law where the first-year curriculum is the same as that of other law students. During the next two years, the student takes electives in the law curriculum, including available health law courses. In addition, some students pursue legal clerkships during the two summers to gain experience in health care law or related areas. A total of 74 credits must be earned in the Law School. The final time is spent in the Medical School completing elective and required clinical science work that is tailored to the student's specialized needs and interests. Students are also required to write a quantitative thesis after their research year. In collaboration with the study track directors, students must also

- select a research mentor,
- write and submit a quantitative thesis after their research year as well;
- make an oral presentation on their research at AOA day or comparable forum;
- fulfill the other requirements of the Duke University School of Medicine (currently 5 internet modules on research ethics, statistics module)

The thesis and the other third year requirements must be completed prior to starting the 4th and final year in the School of Medicine.

Eligibility. Applicants for the M.D./J.D. Program must qualify for admission to both the School of Medicine and the School of Law. The usual approach is to apply for both schools simultaneously, thus reserving a place in the program prior to arrival. Applications are also accepted from members of the first and second year medical school class for admission to the School of Law and from the second year law school class for admission to the School of Medicine. Applicants should complete applications to each school separately. Neither school gives preference to joint degree candidates in the admissions process.

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

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

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

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

For additional information, contact the M.D./J.D. advisor, Paul Lee, M.D., J.D., Box 3802, Duke University Medical Center, Durham, North Carolina 27710, *lee00106@mc.duke.edu,* (919) 681-2793 and students must contact David B. Matchar, M.D.; Box 3896 Med Center, Durham, North Carolina 27710, (919) 286-3399, *david.matchar@duke.edu.*

You may find it most helpful to schedule a phone conversation to discuss your

interests and the appropriateness of this program at this number.

The Medicine and Public Health Program. Students enrolled in the School of Medicine, after satisfactory completion of the first two years of the regular curriculum, may request approval to seek a Master of Public Health degree at the University of North Carolina-Chapel Hill. Programs are to train physicians are

- epidemiology
- biostatistics
- maternal and child health
- health policy and administration
- environmental sciences
- evaluating health care delivery systems
- nutrition.

At the end of the students' third year, they are required to submit a quantitative thesis. Upon receipt of the M.P.H. degree and completion of a quantitative thesis, students are awarded a full year of basic science credit toward the M.D. degree.

Tuition: Effective for the 2004-2005 academic year, Duke will pay for a maximum of 9 tuitions at the "out of state" tuition rate. Eligible students are those Duke students accepted into the UNC MPH School of Public Health in one of the 4 study tracks currently approved by the Third Year Committee (Epidemiology, Maternal and Child Health, Health Leadership and Prevention and Nutrition).

The amount budgeted each year for tuition will be based on the UNC tuition rate for nine non-resident students ***assuming two full-time semesters and one three-quarter time semester (the maximum covered by Duke).*** Any tuition costs associated with additional time necessary to complete the MPH are the sole responsibility of the student. If more than 9 students are interested in this funding, they will be invited to submit a competitive application to have their tuition covered. The director of the EPH Study Program will convene an Advisory group to review the applications and to select students who will be offered the tuition benefit.

In the event that the estimated tuition for the enrolled students will exceed the amount budgeted, the director of the EPH Study Program will consult with the appropriate business manager to develop a solution that will enable the School of Medicine to Stay within the budgeted amount. The Director of the EPH Study Program will convene an Advisory group to review the applications and to select students who will be offered the tuition benefit. *This policy is subject to change.*

For additional information on the M.P.H. program, contact the Director of the M.D./ M.P.H. Program, Kathryn Andolsek, M.D., MPH; Associate Director Graduate Medical Education; Interim Associate Dean, Continuing Medical Education; DUMC Box 3190, Room M139, Green Zone, Davison, Durham,

North Carolina 27710, (919) 668-3883, *andol001@mc.duke.edu*. *Fax: 919-684-8565*.

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

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

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

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

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

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

Applications. Requests for applications and specific questions about the program should be addressed to the Director of Graduate Studies, Terry Sanford Institute of Public Policy, Box 90243, Duke University, Durham, North Carolina 27708-0243, *mpp@pps.duke.edu.* Inquiries and Medical School approval can be obtained from the Director of the M.D./M.P.P. Program, David B. Matchar, M.D.; Box 3896 Med Center, Durham, North Carolina 27710, (919) 286-3399, *david.matchar@duke.edu.*

Financial Information

TUITION AND FEES

Tuition Policy Statement. The Duke University School of Medicine's mission in medical education is to build upon our internationally-recognized tradition of excellence in training outstanding practitioners and physician-scientists who will be leaders in all fields of medicine. By selecting outstanding and dedicated students for matriculation, the school is committed to preparing physicians to respond to societal health needs. The School of Medicine has a policy of need-blind admission and adequate financial aid for those students with financial need. Tuition is set at a level that is competitive with schools of comparable quality and selectivity for admission. This tuition policy, plus a financial aid program which protects against excessive student indebtedness, permits the School of Medicine to attract the most qualified students nationally and regionally, regardless of the student applicant's personal or family financial status. It is important that tuition and financial aid are balanced to ensure that debt does not skew career choices of medical students once they graduate from the Medical School.

Tuition. The following table represents an estimate of a student's necessary expenses in the School of Medicine. The total of these figures suggests a basic minimum budget of approximately $52,150 for a fourth year student to $62,480 for a first year student. These are estimated figures only. Tuition and fees are subject to change without notice.

2005-2006 Cost of Education

Tuition	$34,842
Accident and sickness insurance* (subject to change)	$1,589
Technology fee	$2,112
First year fees† (includes microscope rental, first year only)	$1,024
Annual cost of books and supplies: first year	$2,554
Annual cost of books and supplies: second year	$1,730
Annual cost of books and supplies: third and fourth years	$767
Rent, board, and miscellaneous: first and third years (12 mos.)	$20,040
Rent, board, and miscellaneous: second year (13 mos.)	$21,710
Rent, board, and miscellaneous: fourth year (12 mos.)	$13,360
Continuation of Research Study Fee‡ (per semester)	$35
Motor vehicle registration: car	$600

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. Each student determines the number and types of courses taken with their advisory dean and, when applicable, one or more of the appropriate committees.

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

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

Advanced Standing Matriculants. Students who enter the M.D. degree program with previously earned doctorate degrees may petition the Third Year Committee and vice-dean to receive a maximum of 36 elective, basic science credits to be applied to the third year M.D. curriculum. Students granted 16 transfer credits are given allowance for one tuition payment. Those granted 36 transfer credits are given allowance for two tuition payments. Advanced

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*. Mandatory fees.

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

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

standing students who elect to register at Duke for the curricula for which they could have received transfer credit, forego the appropriate tuition waivers and are assessed tuition accordingly.

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

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

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

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

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

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

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

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

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

1. In the event of death a full refund of tuition and fees is granted.
2. Students who withdraw from the Medical School or are approved to take an official leave of absence before the end of the first week of classes (as determined by the

calendar corresponding to the student's curriculum) receive a full refund of tuition.

3. Students who withdraw or take leaves of absence after the first week of classes of their particular curricula receive no refund of tuition. However, if a student returns to the School of Medicine, that tuition payment is included in the total number required by the school.

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

Continuation of Research Study Option Fee. The School of Medicine encourages students to interrupt their studies to pursue approved research that is complementary to the medical curriculum either at Duke or elsewhere for no credit. Full-time student status can be retained for a maximum period of two years during these periods of study if approval is obtained from the appropriate officials and the student registers for and pays an enrollment fee of $35 for each semester or part of a semester away. No refund of any portion of the fee is allowed for students who subsequently withdraw from the School of Medicine. Students are not eligible for financial aid during this period.

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

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

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

Loans

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

The North Carolina Student Loan Program for Health, Science, and Mathematics. These loans provide financial assistance to North Carolina residents who demonstrate need as determined by the North Carolina State Education Assistance Authority. Loans are available for study in the medical fields, mathematics, and science programs that lead to a degree. The applicant must be a domiciliary of North Carolina and accepted as a full-time student in an accredited associate, baccalaureate, master's, or doctoral program leading to a degree. Loan recipients in some professional or allied health programs may cancel their loans through approved service in shortage areas, public institutions, or private practice. Medical students may receive up to $8,500 per year for each of the four years; master's degree students are eligible for two loans of up to $6,500 each; bachelor's degree students are eligible

for three loans of up to $5,000 each. For application forms and more information, write: Executive Secretary, North Carolina Student Loan Program for Health, Science, and Mathematics, P.O. Box 14223, Research Triangle Park, North Carolina 27709-4223, or telephone (919) 549-8614.

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

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

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

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

Awards and Prizes

American Medical Women's Awards. Glasgow-Rubin Memorial Award presented to a woman who graduated first in her class and Glasgow-Rubin Achievement Citation presented to women who graduate in the top 10 percent of their class, or area considered Honors graduates.

Andrew C. Puckett Essay Contest. In honor of Dr. Andrew C. Puckett, Associate Dean Emeritus of the School of Medicine. The topic is chosen each year by Dr. Puckett. The award is chosen by a committee with Dr. Puckett participating in the selection. Prize consists of a Certificate and award for $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.

Dean's Recognition Award. In recognition of contributions made to the school and the class in leadership and service as well as academic performance, this award is given to 4-6 graduating seniors which consists of a certificate and a monetary award.

Excellence in Emergency Medicine. Selected by the faculty in the division of Emergency Medicine to a student who has demonstrated outstanding proficiency in Emergency Medicine. One-year subscription to the Society for Academic Emergency Medicine journal, Academic Emergency Medicine, one-year subscription to *SAEM Newsletter*, one-year complimentary membership in the SAEM.

E.E. Owen Clinical Scholar Award. Given by the Watson Clinic Foundation, Inc. in Lakeland, Florida in memory of Dr. Owen who was a Duke Medical School graduate. Selection is made by the Associate Deans of Student Affairs, based on excellence in the clinical sciences in the second and fourth years. The award consists of a Certificate and a monetary award.

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.

Merck Manual Award. The latest edition of the *Merck Manual* is given to a graduating senior student based upon overall academic achievement.

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.

Phillips Medical Systems Award. Selected by the deans of Student Affairs. Gift of Stethoscope for the senior chosen for excellence in both basic and clinical science.

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

Third Year Credit for Prior Graduate Work. MD/PhD Students: Students in the combined Duke MD/PhD program will automatically receive third-year credit upon successful completion and defense of their PhD. If students do not complete their PhD, but complete requirements for a terminal Master's degree, they must prepare a written thesis in concordance with the School of Medicine guidelines, and identify an appropriate third-year Study Program Director who will review the thesis and scope and nature of the graduate work. The Study Program Director will present a recommendation to the Third Year Committee, which will make decisions regarding 3rd-year credit on a case-by-case basis. Students pursuing this option for 3rd-year can be evaluated for Pass or Honors.

Students with prior graduate work culminating in a PhD:

After acceptance to the School of Medicine, applicants who hold Ph.D. degrees, typically in the biomedical or preclinical sciences, may also 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 requirements in the final year. Students whose Ph.D.'s have not been awarded prior to expected Medical School matriculation are not eligible for this program. To apply for 3rd-year credit for the Ph.D., students must fill out an application available at the Medical School Admissions and Registrar's offices, and must submit this application to the Registrar's office by the end of the first year of enrollment. The Registrar's Office will identify an appropriate 3rd-year study program director to review the nature and scope of the research, and present a recommendation to the 3rd-Year Committee. The 3rd-year Committee will review the request for 3rd-year credit, and make a recommendation to the vice-dean. The vice-dean will then make a final decision and inform the student, the 3rd-Year Committee and the Registrar's office. If graduate work is accepted for credit the 3rd-year thesis requirement will be waived. The student will not have the option to receive Honors for his/her thesis.

Transcripts. Requests for transcripts of academic records should be directed to Duke University School of Medicine, Office of the Registrar, Box 3878, DUMC, Durham, NC 27710. Signed requests may be faxed to the registrar's office at (919) 684-2593. After graduation from the School of Medicine, transcripts may also be obtained from the Office of the Registrar. There is no charge for this service.

MERIT AWARDS FOR MEDICAL STUDENTS

Duke University School of Medicine has a nominal number of merit scholarships. Application and awarding of these scholarships are determined by individual committees. These scholarships are:

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. These funds support the Senior Scholarship program.

Financial need is not a criterion for selection; however, applicants who feel their financial need is greater than the merit award may apply for financial aid. Students who already have Duke-sponsored, full tuition scholarships are not eligible for funds from this scholarship.

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 in medicine 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.

MEDICAL STUDENT RESEARCH SCHOLARSHIPS

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

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

INTERNAL DUKE SCHOLARSHIPS

All Internal Duke Scholarships listed in this section should use the Internal Duke Scholarship Application form and submitted by email to Tami Tuck at *tuck0012@mc.duke.edu*

Donald B. Hackel Fellowship

The Donald B. Hackel Fellowship in Cardiovascular Pathology provides for biomedical research under the direction of a full-time faculty member whose primary appointment is in the Department of Pathology. This 12-month fellowship offers an annual stipend of $10,000.

Eugene A. Stead Student Research Scholarships

The Duke Department of Medicine sponsors the Eugene A. Stead Scholarship in honor of Eugene A. Stead, Jr., M.D., chairman of the Department of Medicine from 1947 to 1967. Three to four students are selected each year as Stead Scholars. Stead Scholars are expected to spend 12 months engaged in clinical or basic science research and to take a primary role in the development and performance of their research under the direction of the research mentor. The student's mentor should hold a primary appointment in the Department of Medicine at Duke University.

Ewald W. Busse NIMH Fellowship in Late Life Mood Disorders

The Department of Psychiatry and Behavioral is offering Ewald W Busse NIMH Fellowship in Late Life Mood Disorders under the direction of a full-time faculty member whose primary appointment is in the Department of Psychiatry. This twelve month Fellowship is sponsored by a training grant from the National Institute of Mental Health and carries an annual stipend of $19,968.

Medical Research Scholarships in General, Cardiac and Thoracic Surgery

The Divisions of General, Cardiac and Thoracic Surgery, Department of Surgery, are offering research scholarships in surgery for MS3 students at Duke University Medical Center. Scholars will be expected to complete a 12-month research project in one of the Surgical Research Laboratories. Students completing the research scholarship will be expected to publish their findings in peer-reviewed journals and to present their research at national and international scientific meetings. Available areas of research include surgical oncology, trauma and critical care, hemostasis and coagulation, sepsis, minimally invasive surgery, cardiac physiology, outcomes analysis, clinical research and physiology, and pathophysiology of surgical disease..

Medical Research Scholarships in Orthopaedic Surgery

The Division of Orthopaedic Surgery, Department of Surgery, offers research scholarships in Orthopaedic Surgery for MS3 students at Duke University Medical Center. Research scholars are expected to complete a 12-month research project in one of the Orthopaedic Research Laboratories. Students completing the research scholarship will be expected to publish their findings in peer-reviewed journals and to present their research at national and international scientific meetings. The areas of research in the Orthopaedic Research Laboratories include peripheral nerve repair, microsurgery in limb salvage, cartilage and bone tissue engineering, joint and tissue biomechanics, cell physiology, spine and intervertebral disc mechanics, gait and kinematic analysis in sports medicine, outcomes studies, and avascular necrosis of the human skeleton.

Ovarian Cancer Research

The Ovarian Cancer Research Fellowship in Gynecologic Oncology is offered to one third-year Duke University Medical Student annually. The broad aim of the laboratory group

in which the student will work is to elucidate the molecular pathogenesis of ovarian cancer and to translate this knowledge into prevention strategies. This ten-month fellowship carries an annual stipend of $7,000. Students who aspire to careers in Obstetrics and Gynecology will have the highest priority when being judged as applicants for this award, but this should not discourage others from applying.

EXTERNAL SCHOLARSHIPS

The CDC Experience: Applied Epidemiology Fellowship

The Applied Epidemiology Fellowship at CDC provides medical students with an applied hands-on training experience in epidemiology and public health. Eight competitively selected third- and fourth-year medical students from around the country will spend up to one full year at the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia. While at CDC, they will participate in an orientation to CDC, applied epidemiology, the national public health system, and the role of physicians in that system. With the guidance of experienced CDC epidemiologists, they will perform epidemiologic analyses and research, design public health interventions, and assist in field investigations. For more information visit their website at *http://www.cdcfoundation.org/pages.html?page=303.*

Doris Duke Clinical Research Fellowship Program

In 2000, the Doris Duke Charitable Foundation provided grants to seven medical schools to create Doris Duke Clinical Research Fellowship (CRF) Programs at their institutions. Each participating medical school established a CRF Program that awards a minimum of five fellowships each a year to medical students from any U.S. medical school. In November, 2001, three additional schools were added to the schools offering Doris Duke Clinical Research Fellowships. Each participating medical school's Doris Duke CRF Program (a) provides medical students with an outstanding one-year fellowship experience in clinical research that includes both didactic and research components; (b) solicits applications from students at any U.S. medical school; and (c) matches students to outstanding clinical research mentors. For more information and a list of participating schools, please visit the website at *http://ddcf.aibs.org*.

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

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

Hughes Medical Research Training Fellowships

This program selects 60 students from around the United States. Hughes fellows may work in any laboratory of their choice including those within their own medical school. The application, which includes a research plan and a letter from the mentor, must be submitted by January. No interview is required. There is an annual meeting at the NIH where the Hughes fellows present their work. For additional information and an application, please contact the website: *http://www.hhmi.org/fellowships*.

Intramural Research Program at the National Institute of Environmental Health Sciences

The NIEHS, a division of the National Institutes of Health (NIH), offers medical students the opportunity to pursue research activities focused on environmental-related diseases and dysfunctions in areas such as carcinogenesis, reproduction and development, pulmonary and neurological disorders, and epidemiology on the NIEHS campus at Research Triangle Park. Some of these experiences provide a stipend that is similar to that awarded through the Cloister Program (another program of the NIH). Interested students can obtain additional information by contacting William T. Schrader, Ph.D., Deputy Scientific Director, 919-541-3433 or *schrader@niehs.nih.gov*.

NIH Clinical Research Training Program

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

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

Sarnoff Society Endowment for Cardiovascular Science

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

North Carolina Board of Governors Medical Scholarships. (BGMS)

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

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

FINANCIAL AID

The Duke University School of Medicine makes financial assistance available to accepted students who due to economic circumstances could not otherwise attend the university. The school recognizes, however, the responsibility of the individual and the family to provide funds to achieve the objective of a medical education. Thus, the school does not consider parents to have discharged the full financial obligation for the continuing education of their sons or daughters upon the latter's completion of the undergraduate degree. When being considered for a Duke grant, it is the responsibility of the student to provide all parental information to the Financial Aid office. This information is in the form of parents' tax returns/

W2s from the most recent tax year and the Need Access, which the student fills out and submits either on-line or through the mail. It is important that the student submit their financial aid application as soon as possible in order to receive a financial aid notification prior to May 15th. It is Duke's policy to calculate and assess each family a parental contribution each year. By accepting the award, you understand that this assessment will take place each year of your medical education. Situations may change for students during medical school: marriage, birth of children, etc., but parental information is still required to be submitted for students to be considered for Duke grants. 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 academic work toward the medical degree. Less than half-time or special students are not eligible for financial aid.

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

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

The applicant's need is determined before an award is made. The Office of Financial Aid therefore requires the *Need Access* and the *Free Application for Federal Student Aid (FAFSA).* Copies of federal income tax returns with all supplemental schedules and W2s for both parent(s) and student are also required as part of the financial aid application. An official aid award notice is mailed to the accepted applicant after receipt of the required forms.

Financial Assistance to Upper-class Students. Annual reapplication is required of all need-based aid recipients. Typically, May 1 prior to the award year is the filing deadline.

Financial Aid When Studying Away. Need-based financial aid is available during fourth year clinical elective years. A student receiving a research scholarship may also qualify for need-based financial aid funds. External scholarships are used to replace the need-based portion of the loan package first.

Your new award will incorporate any research scholarship within your financial aid award in accordance with NIH, Duke SOM policies and federal financial aid regulations. Duke University School of Medicine policy dictates that all external scholarships replace need-based loans first. At such time that these loans are replaced, the grant portion of your aid award will be reduced. This includes any merit scholarships as well. Total aid from all sources cannot exceed the established and board approved cost of education. Whenever aid exceeds cost, there is an over-award situation which is a violation of federal

regulations (HEA section 673.5 (b) (2), 673.5 (d)). All effort has been made to ensure that you have all the financial aid to which you are entitled.

Need-based financial aid funds are not available for the added monthly cost at Study Away sites where cost is greater than if the student studies at Duke. Unsubsidized loans can be obtained for these additional expenses. Students are reminded that their refunds include any additional living allowances that may have been added to their budget. Every effort will be made to map refunds to expenses but students are expected to track their own spending habits to scheduled refunds.

External scholarship awards are typically disbursed in August and early January; however, students will want to verify with their scholarship source the actual disbursement calendar and make financial arrangements accordingly. The funds credited to the student account first go to pay any outstanding tuition or fees on the account. Any remaining balance will be refunded to the student. In the case of the Howard Hughes award, the research allowance is allocated to the individual lab and mentors through the Duke University Accounting system. They have fiscal responsibility for these funds, not the Financial Aid Office.

For additional information, please contact the Office of Financial Aid at 919-684-6649 or email at *financial_aid@mc.duke.edu*.

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.

Student and Professional Organizations

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

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

Davison Society. All medical students are dues-paying members of the Davison Society, named for the first dean of Duke University School of Medicine. The society is governed by the Davison Council which consists of elected officers (president, service vice-president, social vice-president, secretary, and treasurer) and elected representatives from each class. Primary responsibilities of the council include: chartering of medical student groups, budgeting funds for student groups and medical school activities, organization of medical school

service activities and social events, appointment of medical students to Medical Center and University committees, coordinating the selection of faculty and resident awards for excellence in teaching, and representing student views to pertinent faculty and administration. The Davison Council also coordinates medical student projects with community service groups such as Habitat for Humanity, Share Your Christmas, Durham Public Schools, Durham Community Kitchen, Adopt-A-Grandparent, Women's Health Focus Group, and Health Education in Durham Public Schools (HEY Durham).

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

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

President: Sujay Kansagra
Social Vice-President: David Garras
Service Vice-President: Josh Easter
Secretary: Melissa Chung
Treasurer: Asha Payne

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 12,000 Duke School of Medicine graduates and

former house staff members who live and work in every state across the nation and in 46 countries around the globe; encompasses future physician alumni, with a roster of some 400 current students and some 800 house staff officers; and seeks the involvement of nearly 1,000 faculty members at Duke University Medical Center. Each year the Duke Medical Alumni Association sponsors events and activities including the Duke Medical Alumni Association Fitness Center; the Student-Alumni Link program, Medical Families Weekend; the Davison Ball; programs during Medical Alumni Weekend, student orientation activities, including the annual Freshman Orientation Picnic as well as a copy of *Davison of Duke*, the memoirs of the Medical School's first dean; graduation gifts and distribution of the publications, *DukeMed Magazine and DukeMed Alumni News.*

President: J. Bancroft Lesesne, T '68, MD '76, Atlanta, GA
President-Elect: Roslyn B. Mannon, MD '85, HS '85 - '90, Chevy Chase, MD
Ellen R. Luken, Executive Director, Medical Alumni Affairs

Courses of Instruction

ANESTHESIOLOGY

Clinical Science Selectives – 2nd Year

ANESTH-220C. CLINICAL ANESTHESIOLOGY. (Operating Room). Students will participate in the pre-, intra-, and post-operative anesthetic management of patients while assigned 1:1 to an anesthesiologist. Clinical assignments will include the general and cardiothoracic Operating Rooms, as well as subspecialty areas and pain management. Additional hands-on practice will occur in the Patient Safety Center (human simulator). There will be problem-based learning sessions on pre-operative patient evaluation and perioperative risk, anesthetic techniques and monitoring, airway management, pharmacology, physiology, and anatomy; and procedures may include vascular access, airway management, and selected others; Grand Rounds; and other conferences. Max: 2, Min: 1; *Grant and Staff*

Clinical Science Electives – 2nd Year

ANESTH-250C. CLINICAL ANESTHESIOLOGY. The student will participate in the pre-, intra-, and post-operative anesthetic management of patients while assigned to an individual resident or attending anesthesiologist. Usually, (s)he will spend two weeks in the general Operating Rooms; one in the cardiothoracic Operating Rooms; and a fourth week in subspecialty areas including the Hyperbaric facility, the Acute Pain Service, and others. Learning opportunities will include pre-operative patient evaluation, anesthetic technique selection, airway management, pharmacology, physiology, and anatomy; and procedures such as vascular access, including central venous and arterial line placement, and patient monitoring. These areas will be reinforced by a lecture series, Grand Rounds, and other conferences. In the fall, priority in registration is given to students considering careers in Anesthesiology. Students are expected to attend the first day and are strongly advised not to miss any of the first week. More than 5 absences are not permitted. Max: Summer session 41 = 4. Credit: 4. *Dwane and Staff*

Clinical Science Electives – 4th Year

ANESTH-345B or C. PHYSIOLOGY AND MEDICINE OF EXTREME ENVIRONMENTS. Advanced topics in the physiology and medicine of ambient pressure, immersion, gravity, temperature, and gas composition. Environments considered include: diving and hyperbaric medicine; hot/cold terrestrial and water operations; microgravity and high-g acceleration; high altitude. Basic mechanisms and medical management of associated diseases are examined including: decompression sickness; altitude sickness; hypothermia and hyperthermia; hypoxia; carbon monoxide poisoning; oxygen toxicity. An optional laboratory includes topics in the design and operations of pressure vessels for human occupancy, life support equipment, and sham treatment of medical problems. Prerequisites: Human anatomy and physiology; and instructor permission. Credit: 3 without lab; 4 with lab. Enrollment: max 12. *Vann, Pollock, Thalmann, Stolp*

ANESTH-440C. CLINICAL ANESTHESIOLOGY. The student will participate in the pre-, intra-, and post-operative anesthetic management of patients while assigned to an individual resident or attending anesthesiologist. Usually, (s)he will spend two weeks in the general Operating Rooms; one in the cardiothoracic Operating Rooms; and a fourth week in subspecialty areas including the Hyperbaric facility, the Acute Pain Service, and others. Learning opportunities will include pre-operative patient evaluation, anesthetic technique selection, airway management, pharmacology, physiology, and anatomy; and procedures

such as vascular access, including central venous and arterial line placement, and patient monitoring. These areas will be reinforced by a lecture series, Grand Rounds, and other conferences. In the fall, priority in registration is given to students considering careers in Anesthesiology. Students are expected to attend the first day and are strongly advised not to miss any of the first week. More than 5 absences are not permitted. Max: Fall sessions 41=3; 42 = 2; 43 = 3; and 44 = 4. Spring sessions 41= 6; 42 = 4; 44 = 4. Summer sessions 41-42 = 4. (Not offered Summer 43-44.) Credit: 4. *Dwane and Staff*

ANESTH-441C. 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 441C. Credit: 5. Enrollment: max 2. *Young and staff*

ANESTH-446C. ACUTE AND CHRONIC PAIN MANAGEMENT. Students will participate in both acute and chronic pain management. Each student is assigned daily to an individual fellow or attending physician who supervises the student's active involvement. This evaluation and treatment emphasizes a multidisciplinary approach appropriate for the individual patient. The impact of pharmacotherapy including opioids, NSAID's, local anesthetics, adjuvant drugs; interventional procedures such epidural and regional catheter placement, nerve blocks, neurolytic procedures, as well as implatable devices; and physical and psychotherapy is stressed. Students will observe and/or participate in various interventional procedures. In addition to this clinical work, students attend weekly pain conference, journal club, and biweekly multidisciplinary pain conference. The course is offered monthly throughout the year. More than two absences must be made up, and if more than five absences are anticipated, the elective should be re-scheduled. Students with questions may contact the course director, Billy Huh, M.D., (beeper #7990). Credit: 4. Enrollment: max 2, min 1. *Huh, Fras, Ginsberg, Goldberg, King, Lindsay, and Scott*

BIOCHEMISTRY

Basic Science Electives

BIOCHEM-317B. 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-317B; Graduate School. Credit: 3. *Caron, Casey, and invited lecturers*

BIOCHEM-327B. 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-328B. 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*

BIOLOGICAL ANTHROPOLOGY AND ANATOMY

Basic Science Electives

BAA-314B. 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-321B. 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-324B. 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-331B. 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*

CELL BIOLOGY

Basic Science Electives

CELLBIO-312B. THE CELL AND MOLECULAR BIOLOGY OF REPRODUCTION. During the last decade, cell, molecular, and neurobiological investigations have dramatically advanced our understanding of reproduction. In this course, we aim to focus on these recent findings to present an integrated view of the reproductive process in males and females. The general areas to be covered include neuroendocrinology, reproductive endocrinology, gametogenesis, and fertilization, although recent studies in areas such as gene regulation; intercellular communication; hormones, growth factors and signaling; and early development and differentiation are emphasized. C-L: Graduate School. Credit: 3. Enrollment: min 6, max 20. *Saling and Schomberg.*

CELLBIO-317B. CELLULAR SIGNALING. Basic and current concepts of mechanism of action of hormones at the cellular level including hormone-receptor interactions, second messenger systems for hormones, plasma membrane receptor signaling (G protein-coupled receptors, receptor tyrosine kinases, phospholipid signaling, ion channels), intracellular signaling pathways (calcium, cyclic nucleotides, nuclear receptors, phosphatases), regulation of growth and differentiation and pathophysiology involving signaling pathways. Credit: 3. Spring. Enrollment: 50. *Caron, Casey, Pendergast, York, VanDongen, Heitman, McDonnell, Means, Shenolikar, and Kornbluth*

CELLBIO-340B. TUTORIAL IN CELL BIOLOGY/PHYSIOLOGY. Selected topics are chosen for intensive reading and discussion. Topics may be chosen relating to basic problems of cytology, growth and development, biophysics, endocrinological control, neuroanatomy, physiological differentiation, and evolutionary origins of functional microsystems. Prerequisites: permission of faculty preceptor. C-L: Graduate School. Credit: 1-3. Enrollment: max 8. *Staff*

CELLBIO-341B. MOLECULAR CELL BIOLOGY. Current research topics in cell biology presented in a lecture and discussion format based on recent research papers. Topics include: protein secretion and trafficking; the nucleus; cytoskeleton and cell motility; extracellular matrix and cell adhesion; growth factors and signaling; cell cycle. C-L: Graduate School. Credit: 4. *Bennett and staff*

COMMUNITY & FAMILY MEDICINE

Required Course

COMMFAM-205C. FAMILY MEDICINE. This basic course in family medicine consists of an four-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 midlevel practitioners in a team practice setting. Note: COMMFAM-205C is strongly recommended for all students in the primary care program. Changes in the rotation are not made less than 12 weeks prior to the start of the rotation. Credit: 4. *Copeland*

Basic Science Electives

COMMFAM-338B. TUTORIAL IN COMMUNITY AND FAMILY MEDICINE. An individually arranged experience in which the student participates in the research program of a faculty member. The subject matter, course credit, and meeting time 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. *Research Faculty* - All interested students contact the coordinator of Medical Student Programs at 681-3066.

Clinical Science Selectives – 2nd Year

COMMFAM-220C. OCCUPATIONAL MEDICINE: PREVENTION & POPULATIONS. This selective provides hands-on experiences in the broad, interdisciplinary field of Occupational Medicine. The focus is to apply key principles of Preventive Medicine, Population Health Management, and Prospective Health through participating in a broad range of occupational medicine activities. In clinic visits students will examine patients, interpret multiple types of information (beyond typical medical data), and communicate with key parties. Throughout the Durham area, they will assess worksite/environmental hazards and assist in reporting on them. . Working with Faculty mentors, they will find and draw upon information resources (many of which may be new to them) to address complex questions. All students will engage in interactive learning modules on prevention; attend didactic sessions on key aspects of Occupational Medicine, and perform problem/project-based learning. Students will complete their own health risk assessments, as well as helping with health promotion activities and health risk communications to patients. *Sam Moon and Carol Epling*

COMMFAM-221C. PRACTICAL CLINICAL NUTRITION. This course will cover the topics in clinical nutrition that will be of most use to medical students interested in primary care. Participants will have a chance to observe and practice interviewing and counseling skills. Topics will include weight management, eating disorders, diabetes, hypertension, cancer, pregnancy, middle age, elderly, and addictive behaviors, and population-based nutrition. *Murphy,G. and Alphin, F.*

COMMFAM-222C. PROSEPECTIVE HEALTH PLANNING AND INTEGRATIVE MEDICINE. This selective will provide an evidence-based and experiential understanding of prospective health planning using the Duke Center for integrative Medicine (DCIM), Domains of Health. Methods include literature reviews, clinic visits, practitioner and patient interviews, and observation of lifestyle programs at the Center for Living. Students will receive faculty mentoring, Mindfulness-Based Stress Reduction training, and health coaching. They will set personal health goals, develop their own health plans, and give presentations about their experiences. *Sam Moon and Tracy Gaudet*

Clinical Science Electives – 2nd Year

COMMFAM-252C. 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: 4. Enrollment: max 5. *Califf, Lee, Peterson, and Jollis*

COMMFAM-253C. OCCUPATIONAL AND ENVIRONMENTAL MEDICINE. This elective is designed to enhance the student's basic science skills in several important areas related to occupational medicine: occupational injury and illness prevention, and epidemiology, health management for employee populations, industrial toxicology, worksite wellness and prevention programs During this four week rotation, students will complete

readings related to these areas, observe surveillance exams and prospective health planning visits in clinics, participate in lectures and seminars, learn to conduct computerized database searches concerning industrial toxicology, and (as available) visit industrial sites as part of the experience. Students will also be given at least one project which will involve one of the topics described above. Upon completion of the rotation, students can expect to have practical and useful skills applicable to occupational medicine and worksite health programs. Credit: 4. Two months advance notice and permission from instructor is required. Enrollment: max 1 per month except can accept two in March. All interested students should contact the coordinator of Medical Student Programs at 681-3066, and call the course director, Dr. Epling at 286-1722, ext 279. *Epling, Darcey and Moon , MD and Sam Moon, MD MPH*

COMMFAM-263C. COMMUNITY HEALTH. This elective will introduce students to the concepts and practice of community-based and population-based health care. Population-based health care is becoming increasingly important in addressing the health care needs of this nation. This elective will help students understand how Duke serves communities through collaborative, innovative, interdisciplinary clinical services, educational programs, and applied research. By allowing students to participate in actual programs, role modeling and experiential learning are used to supplement and apply what is learned in the required text-based materials of the course. Because the specific course activities will depend upon the student's particular interests and the community health activities ongoing at the time of the elective, each student's experience will be individually designed. To participate in this course, students must contact Michelle J. Lyn, Director, Educational Programs, Division of Community Health at least six weeks prior to the start of the course. At that time, Ms. Lyn and the student, along with appropriate community programming faculty and staff, will plan the specific activities that will be undertaken by that student, and the requirements for the student's successful completion of the course. Credit: 4; Enrollment max: 1 *Lyn, Sheline, Yaggy*

COMMFAM-265C. HEALTH PROMOTION AND DISEASE PREVENTION. This elective is an intensive clinical experience in health promotion and disease prevention. Students see patients in the Duke Family Medicine Center and participate in a variety of activities designed to help them provide excellent health maintenance care. Specific content areas addressed include counseling skills in nutrition, safe sex practices, and smoking and alcohol cessation, as well as screening tests and immunizations. Prerequisite: permission of instructor. Two months advance notice. All interested students should contact the coordinator of Medical Student Programs at 681-3066 Credit: 4. Enrollment: min 1, max 2. *Yarnall and staff*

COMMFAM-269C. COMMUNITY AND FAMILY MEDICINE PRECEPTORSHIP. 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. Interested students should contact Carolyn Crank at 681-3066 to arrange a rotation in Lifestyle Management. A Lifestyle Management rotation is also available. Drops are not accepted. Prerequisites: permission of instructor and completion of COMMFAM 205C. Credit: 4. *Copeland and staff*

Clinical Science Electives – 4th Year

COMMFAM-401C. 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 pro-

vider for inpatients on the family medicine service at Duke Medical Center alongside Family Medicine House Officers and Physician Assistant students. The subintern will be a part of the inpatient call team and as such will have in-house call during the rotation. The student will also spend one-half day per week in the clinic at the Family Medicine Center or at the Just for Us clinic. The focus of this session will be post-discharge follow-up of patients hospitalized during the rotation. 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 by the supervising resident and by the attending faculty. Students are advised to contact the department as early as possible for course approval (at least eight weeks in advance). No drops are permitted within 60 days of the first day of the rotation. Prerequisite: permission of instructor and successful completion of the Family Medicine Clerkship and Internal Medicine Clerkship. Credit: 5. Enrollment: max 1. *Bonin and staff*

COMMFAM-415C. CLINICAL MANAGEMENT OF OBESITY. The epidemic of obesity in the United States demands a course for medical students that helps them understand the underlying biochemical, pathophysiology and treatment options for obesity management. This four-week interdisciplinary elective under the direction of the Stedman Center for Nutrition and Metabolism is a collaboration between the Departments of Medicine, Pediatrics, Family Medicine, and Surgery. This elective provides the students with an opportunity to learn about a clinical approach to obesity management, including metabolic and pathologic consequences of being overweight and the relationship to the following chronic disorders: hypertension, diabetes, and dyslipidemia. The student will learn about cellular signaling mechanisms that influence obesity by attendance at basic science seminars at the Stedman Nutrition Center. Students will learn to counsel/motivate patients to make informed nutritional decisions consistent with adopting and maintaining a healthy lifestyle and with establishing appropriate dietary, exercise and behavioral goals. The elective director will approve a student's choice of a mentor. This approval will be based on matching the student's interests with the primary focus of the mentor. The assigned mentor will coordinate the student's experiences throughout the four-week rotation with a focus on clinical applications of obesity management. The program includes the following components: 1. One day of outpatient clinics in the following clinics: Hypertension Clinic, Pediatric Clinic, Diabetes Clinic, Duke Weight Loss Surgery Center, and the Duke Diet and Fitness Center. The focus of the student's experience will be on learning to translate basic science information into clinically relevant principles that guide medical decision-making as they apply to obesity management. (Total clinical time--32 hours) 2. Research and departmental seminars sponsored by the Stedman Nutrition Center (1 hour per week). Students will be expected to participate in and present one seminar reviewing current research in a selected field of Obesity Research. 3. A review paper in a topic area designated by the mentor. (1-2 hours of mentoring time per week) Prerequisite: permission of instructor. C-L: MEDICINE 415C, PEDS 415C, SURGERY 415C. Credit: 4. Enrollment: max 1. *Westman*

COMMFAM-423C. OCCUPATIONAL AND ENVIRONMENTAL MEDICINE. This elective is designed to enhance the student's basic science skills in several important areas related to occupational medicine: occupational injury and illness prevention, and epidemiology, health management for employee populations, industrial toxicology, worksite wellness and prevention programs During this four week rotation, students will complete readings related to these areas, observe surveillance exams and prospective health planning visits in clinics, participate in lectures and seminars, learn to conduct computerized database

searches concerning industrial toxicology, and (as available) visit industrial sites as part of the experience. Students will also be given at least one project which will involve one of the topics described above. Upon completion of the rotation, students can expect to have practical and useful skills applicable to occupational medicine and worksite health programs. Credit: 4. Two months advance notice and permission from instructor is required. Enrollment: max 1 per month except can accept two in March. All interested students should contact the coordinator of Medical Student Programs at 681-3066, and call the course director, Dr. Epling at 286-1722, ext 279. *Epling, Darcey and Moon , MD and Sam Moon, MD MPH*

COMMFAM-432C. INTEGRATIVE MEDICINE AND PROSPECTIVE HEALTH. This month-long elective will provide an evidenced-based and experiential understanding of complementary and alternative medicine. There will be reviews of the literature by Duke faculty members and critiques of the best available randomized, controlled trials by the students. Credentialing and training issues will be discussed, as well as possible risks and hazards. Small groups of students will make visits to the offices of community practitioners. During these sessions, one of the students will undergo an evaluation and lifestyle assessment, while the other students act as observers. The students will give presentations about their experiences, and there will be a final exam. Two months advance notice All interested students should contact the coordinator of Medical Student Programs at 681-3066 Prerequisites: None. Credit: 4. Enrollment: min 2, max 5. *Tracy Gaudet and Sam Moon*

COMMFAM-433C. COMMUNITY HEALTH. This elective will introduce students to the concepts and practice of community-based and population-based health care. Population-based health care is becoming increasingly important in addressing the health care needs of this nation. This elective will help students understand how Duke serves communities through collaborative, innovative, interdisciplinary clinical services, educational programs, and applied research. By allowing students to participate in actual programs, role modeling and experiential learning are used to supplement and apply what is learned in the required text-based materials of the course. Because the specific course activities will depend upon the student's particular interests and the community health activities ongoing at the time of the elective, each student's experience will be individually designed. To participate in this course, students must contact Michelle J. Lyn, Director, Educational Programs, Division of Community Health at least six weeks prior to the start of the course. At that time, Ms. Lyn and the student, along with appropriate community programming faculty and staff, will plan the specific activities that will be undertaken by that student, and the requirements for the student's successful completion of the course. Credit: 4; Enrollment max: 2. *Lyn, Sheline, Yaggy*

COMMFAM-435C. HEALTH PROMOTION AND DISEASE PREVENTION. This elective is an intensive clinical experience in health promotion and disease prevention. Students see patients in the Duke Family Medicine Center and participate in a variety of activities designed to help them provide excellent health maintenance care. Specific content areas addressed include counseling skills in nutrition, safe sex practices, and smoking and alcohol cessation, as well as screening tests and immunizations. Prerequisite: permission of instructor. Two months advance notice. All interested students should contact the coordinator of Medical Student Programs at 681-3066 Credit: 4. Enrollment: min 1, max 4. *Yarnall and staff*

COMMFAM-436C. LEGAL AND ETHICAL ISSUES IN MEDICINE. This seminar examines legal and ethical questions raised by modern medical science and technology with special attention to their implications for clinicians and their patients. It includes legal, historical and philosophical analyses of these questions and focuses on their application to

selected practice-related issues (e.g., truth-telling, confidentiality, informed consent, refusal of treatment and reproductive issues). Credit: 1. Enrollment: min 6, max 12. *Angela Roddey Holder, LL.M.*

COMMFAM-439C. ADVANCED CLERKSHIP IN FAMILY MEDICINE. This course provides intensive instruction and practice in the care of primary care patients in the community setting. Students work at Duke Family Medicine Center. This course has an outpatient focus and is recommended for students who would like to improve their skills in the care of ambulatory patients. Students learn about quality of care and patient safety in this setting. They will develop skills in chronic disease management and prevention, as well as common outpatient problems. Students are involved with day to day patient care under the supervision of family physician faculty and residents. There are a limited number of students who can take this course at any given time and preference is given to those students entering Family Medicine Residencies. Students are advised to contact the department as early as possible for course approval (at least eight weeks in advance). No drops are permitted within 60 days of the first day of the rotation. Prerequisite: permission of instructor. Credit: 2-8. Enrollment: max 2. *Gradison and staff*

COMMFAM-441C. FAMILY MEDICINE CONTINUITY EXPERIENCE. Students manage a panel of patients over an extended period of time at the Duke Family Medicine Center under the supervision of one family physician faculty member. Patient care is scheduled for one to two half-days a week for two to four months. The rotation may be repeated to provide further continuity. With permission, this course can be audited; a project is required for course credit. Due to the need for clinic schedule arrangements, students are advised to contact the department as soon as possible for course approval (at least eight weeks in advance). Priority will be given to primary care track students. Prerequisite: permission of instructor. Credit: 2-8. *Copeland and staff*

COMMFAM-442C. THE COMPUTER TEXTBOOK OF MEDICINE. Students participate in the ongoing development of a computerized database in cardiovascular disease. They participate in research concerning the diagnosis, treatment, and prognosis of patients with coronary artery disease. And, they learn how to make predictions about outcome based on test results of patients on the cardiology service. Prerequisite: permission of instructor. Credit: 2-4. Enrollment: max 5. *Califf, Lee, Peterson, and Jollis*

COMMFAM-449C. COMMUNITY AND FAMILY MEDICINE PRECEPTORSHIP. 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: Sports Medicine, Jeff Bytomski, M.D. Andrew Bonin, M.D. ;Lifestyle Management, Howard Eisenson, M.D. Kathryn Andolsek, M.D., M.P.H. 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 three months prior to the desired rotation. Drops are not accepted. Prerequisites: permission of instructor. Credit: 4. *Copeland and staff*

DIVISION OF CLINICAL INFORMATICS

Basic Science Electives

MEDINFO-333B. 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-334B. ARTIFICAL 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-336B. CLINICAL INFORMATION MANAGEMENT. This course will include a look at computer-based patient records, including current state and direction of research; decision support and knowledge extraction; networking; the Internet and Web-based design; legislative issues relating to information management; and new concepts and direction in health information management. The course will also deal with such current topics as distance learning, telehealth, consumer informatics, and home health. Data warehousing and data sharing issues will also be discussed. Opportunity for some hands-on experience will be provided. Credit: 2. Enrollment: max 10, min 4. *Staff*

MEDINFO-339B. PRECEPTORSHIP IN MEDICAL INFORMATICS. An individualized research program under the direction and supervision of a member of the faculty of the Clinical Informatics Program. Credit: 1-16. *Staff*

FREE TIME

Clinical Science Elective

FREETIME-450C. FREE TIME. Students with no classes scheduled for a particular section must sign up for free time.

IMMUNOLOGY

Basic Science Electives

IMMUNOL-329B. PRECEPTORSHIP IN IMMUNOLOGY. An individual reading and/or laboratory course in specialty areas supervised by an individual faculty member. Acceptance, nature of topic, and amount of credit by individual arrangement with proposed faculty member. Prerequisites: to be determined by instructor. Credit: 1-16. *Staff*

IMMUNOL-330B. Medical Immunology. A brief review of basic concepts of immunology is followed by in-depth discussions of the role of immune mechanisms in the pathogenesis and treatment of human diseases. Principal emphasis is placed on immune deficiency diseases, hypersensitivity, transplantation, infectious diseases, autoimmunity, tumor immunology, and immunohematology. Applicable the classes include patient presentations and laboratory demonstrations. C-L: MIC 330B; Graduate School. Credit: 5. *F. Ward and Staff*

IMMUNOL-332B. GENERAL VIROLOGY AND VIRAL ONCOLOGY. The first half of the course is devoted to a discussion of the structure and replication of mammalian

and bacterial viruses. The second half deals specifically with tumor viruses which are discussed in terms of the virus-cell interaction, the relationship of virus infection to neoplasia, and the application of retroviruses in molecular and developmental biology. C-L: MICROBIO-252B; Graduate School. Credit: 3. Enrollment: min 5. *Keene and staff*

IMMUNOL-341B. COMPREHENSIVE IMMUNOLOGY. An intensive course in the biology of the immune system and the structure and function of its component parts. Major topics discussed are: properties of antigens; specificity of antibody molecules and their biologic functions; cells and organs of the lymphoid system; structure and function of complement; inflammation and non-specific effector mechanisms; cellular interactions and soluble mediators in lymphocyte activation, replication, and differentiation; regulation of immune responses, neoplasia and the immune system; molecular structure and genetic organization of immunoglobulins, histocompatibility antigens, and T cell receptor. C-L: MICROBIO-291B; Graduate School. Credit: 3. Enrollment: max 10. *Krangel and staff*

INTERDISCIPLINARY

Required Courses

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

INTERDIS-101B. NORMAL BODY. This core course of the preclinical curriculum is intended to present the scientific principles underlying the structure and function of the normal body, thereby providing the foundational knowledge for the practice of medicine and facilitating the incorporation of the new scientific knowledge thorough out the medical career. To accomplish this end, the goals of the Normal Body component are to ensure that all students possess a conceptual model of the structure and integrated function of the human body (as an intact organism) and each of its major organ systems, emphasizing their role in the maintenance of the body's homeostasis. Credit. TBD. *Cartmill*

INTERDIS-102B. BODY AND DISEASE. This core course is presented from February through June of the first year. The course begins with fundamental principles of the four basic sciences most directly related to human disease: immunology, microbiology, pathology and pharmacology. This component is followed by an integrated presentation of the most common human diseases organized sequentially by organ system. Teaching modes include lectures, a variety of small group activities guided by faculty, and clinically-oriented disease workshops. Credit: 20. *Nadler, Dawson, Hulette and Mitchell*

INTERDIS-105B. PRACTICE YEAR 1. The Practice courses are required in years one, two, and three. Practice emphasizes clinical skills development using lecture and small group teaching, and outpatient clinical work. In year one, Practice introduces students to interviewing and physical diagnosis skills with emphasis on the doctor/patient relationship. Practice uses written assignments, problem-based learning, video-taping, group discussion to meet course goals. Students practice interviewing and counseling on the wards and with standardized patients. In the spring of year 1, students work with preceptors in outpatient clinics and on the wards to practice their new skills. Fall, Credit: 1. Spring, Credit: 2. *Sheline, McLeod, and Dell*

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

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

Basic Science Electives

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

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

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

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

Clinical Science Electives – 4th Year

INTERDIS-422C. EXPLORING MEDICINE: CROSS-CULTURAL CHALLENGES TO MEDICINE IN THE 21ST CENTURY. The purpose of this course is to promote understanding the cultural background of the people of Honduras and how that impacts the delivery of medical care. The course content is designed to facilitate understanding how art, history, literature, music, geography, ethics and religion influence the reading of medicine in the Latin American Culture. The Classes will be given by multidisciplinary faculty from Duke and UNC. Medical Spanish will be taught after each class as a means of completing the understanding of the culture and facilitate encounters with Hispanic patients in our own environments. The course will be held as a 2 hour seminar for 10 weeks with the trip to Honduras as an optional laboratory experience. There will be approximately 20 hours of instruction. Credit: 1 Enrollment - up to 20 students. *Clements*

INTERDIS-423C. HONDURAS TRIP. A trip to Honduras is planned for March 30-April 9, 2005 with a limited number of students invited. Interdis 422C is a prerequisite for this trip. A certain number of students with Spanish fluency are needed for the trip. Those traveling to Honduras will meet Honduran students and faculty as well as provide medical care to patients during the visit. A trip to Copan and indigenous Mayan community is also planned. Permission of the instructor is required for the trip. Credit 1. Enrollment up to 15. Instructor - *Clements*

INTERDIS-424C. HEALING /DEVELOPING WORLD AND CARE OF THE UNDERSERVED. 'Healing in the developing world and care of the underserved' is a course that evolved out of a local community ministry called Family Health Ministries, Inc. (www.familyhm.org). In 1997, Duke Students asked members of Family Health Ministries to take them Haiti. Then they asked us to help them prepare for the trip and finally they asked to get course credit for the time that they spent preparing for the trip. Hence, faculty members from the medical and divinity schools are now involved and IND304C and WXTIAN211 were born. This course is part of the medicine & theology curriculum. Undergraduate, medical, PA, nursing and divinity students have all participated. This is a course that developed out of student interest and demand. What will you get out of this class if you participate? Our goal is the change the way you think. You might look at the world differently. You might have your life radically changed in a positive way? Have you ever had instructors that encouraged you to think outside of the box? For many of us, the course content has radically changed the way that we think and interact with others in our daily lives. The lessons taught in the course are those that we learned from the poorest, uneducated people in this half of the world. The course encourages students to put stereotypes aside and to find educational resources in places where resources are scarce. Education can occur in a classroom or on the street. Some of life's greatest lessons come from solving problems. People in developing countries deal with problems that we can not fathom. In this course, you will come in contact with those people and learn from them. Credit: 2. *Walmer (Med) and Berger (Divinity)*

INTERDIS-450C. CAPSTONE. This mandatory course for all fourth year medical students will provide important information and tools to prepare medical students for their first year of residency. Topics will address such issues as compassionate, appropriate, and effective patient care: medical knowledge about established and evolving biomedical and clinical, and cognate sciences as well as practical tips for when you are "on-call" as an intern;

interpersonal and communication skills that result in effective information exchange and teaming with patients, their families, and other health professionals; professionalism relative to responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population and systems-based practices that demonstrate one's awareness of and responsiveness to the larger context and system of health care. As part of this course, medical students will participate in a BLS and ACLS provider course. Credit: 4. Enrollment Max. 100. *Promes*

INTERDIS-475C. CLINICAL EXPERIENCE FOR STUDENTS IN THE MEDICAL SCIENTIST TRAINING PROGRAM. This course is designed for students in the Medical Scientist Training Program (MSTP) that elect to explore clinical experiences while enrolled in the MST program. *Staff*

INTERSESSION

Required Courses – 2nd Year

INTERSES-201C. INTERSESSION. These one-week mandatory sessions between clerkship rotations are designed to integrate basic science knowledge with clinical reasoning skills and to incorporate topics not offered in other areas of the curriculum such as interdisciplinary teamwork, integrative medicine, and palliative care. Major components of the program include clinical reasoning skills, health care team visits, and pre-clerkship activities that offer preparatory information for each student's upcoming clerkship rotation. Clinical reasoning skills are taught through patient cases that focus on different clinical topics for each Intersession (e.g., clinical oncology, geriatrics, critical care). In clinical reasoning activities students work in teams to gain an appreciation for the value of an interdisciplinary/ multidisciplinary approach to patient care. To further their appreciation for the health care team, students spend one half-day during each Intersession with a non-physician member of the team (e.g., nurses, social workers, pharmacists, physical therapists, etc.) Please contact Mary Sexton, Intersession Coordinator at 684-4340 for more information. *Kaprielian*

MEDICAL GENOMICS

Basic Science Elective

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

MEDICINE

Required Course

MEDICINE-205C. MEDICINE (DUKE/DURHAM REGIONAL/VAMC).. During the second year clerkship in medicine, students each will be assigned two four-week blocks to a team taking care of patients on the Internal Medicine Wards at Duke Hospital, Durham Regional Hospital or the Durham Veterans Administration Hospital. The Internal Medicine Clerkship is an opportunity for the student to consolidate knowledge from the first year and apply it to the study of his or her "own" patients. Functioning within teams consisting of an intern, a resident, and an attending allows students to observe, practice, acquire, and refine basic humanistic and clinical skills while acquiring some of the factual information used in the practice of medicine. Since it is not possible to systematically cover the vast body knowledge comprising Internal Medicine during an eight-week rotation, students are as-

signed patients to evaluate and follow; these patients become representative learning experiences in a case-study model. Goals of the Medicine clerkship are to teach a method of patient evaluation and care and to provide a firm foundation in medical problem-solving that will be helpful throughout the student's future career. Specifically, students are expected to: (1) Perform and record a complete history and physical examination on each patient they admit. (During the first four weeks, this should be a minimum of two patients per week; thereafter, at least three patients per week). (2) Discuss their plan(s) for the evaluation and care of the patient after the resident has also assessed the patient, with both returning to the bedside to resolve any discrepant historical or physical examination findings. (3) Place a complete written work-up including analysis of primary data (e.g. peripheral blood smear, urinalysis, sputum gram stain, ECG, etc.) on the chart by 8:00 a.m. the next day. It is important during the clerkship to learn to evaluate primary data in a timely fashion. (4) Take primary responsibility for the care of their patients, following them daily, writing progress notes in the chart, keeping track of what has happened to their patients since last seen, and having a good understanding of the rationale for and outcomes of all diagnostic tests and therapeutic interventions. (5) Participate in various diagnostic/therapeutic procedures (e.g., phlebotomy, lumbar puncture, thoracentesis, paracentesis, arthrocentesis, arterial blood gas drawing, placement of intravenous lines) and perform these procedures under appropriate supervision. (6) Preround, or see each of their patients on a daily basis before morning work rounds, review what has happened since last seen, formulate a preliminary plan of care and treatment for each patient and then present these formulations to their ward teams during morning work rounds. (7) Prepare for their bedside case presentations by reading, at a minimum, relevant sections in a standard textbook of medicine. (8) Present their patients to an attending physician within 24 hours of admission, knowing all pertinent medical information as well as the rationale for their ongoing plan(s) for care and evaluation. (9) Not miss any attending rounds without prior permission from their attending physician. (10) Attend all Chair's Conferences, Physical Diagnosis Teaching Rounds, Medical Grand Rounds, and the Student Lecture Series, and other site-assigned teaching activities/conferences unless urgent ward duties preclude doing so. Methods of evaluation: During week four and week eight, a grading committee composed of the resident(s) and the attending physician(s) with whom the student has worked, the Chief/Assistant Chief Medical Resident and the Course Director meet and evaluate each student based on the standard course evaluation form, a copy of which is posted on the Blackboard website and is distributed to each student during the initial orientation to the clerkship. At the end of the clerkship, students will take the NBME Medicine Clerkship written exam and a practical exam on focused problems using four standardized patients (mini-CPX exam). The final grade is a weighted average of the mid-term and end of clerkship grading sessions (80%), the NBME written exam (10%) and the mini CPX exam (10%). Weight: 8. *Gagliardi and staff*

Clinical Science Selective – 2nd Year

MEDICINE-221C. A TASTE OF PALLIATIVE CARE. Palliative care focuses on helping patients and their families achieve the best quality of life, regardless of the length of life. Attention to suffering, excellent symptom management, and compassionate communication skills are paramount. Students will have the opportunity to observe and work alongside various palliative care practitioners in community, inpatient, outpatient and hospice settings. The student will participate in anticipatory longitudinal care planning. The importance of multi-disciplinary teamwork will be emphasized. Concepts to be explored include common fears and challenges that terminally ill people face, biopsychosocial models of care, palliative care symptom management, the family interface, grief, and bereavement. *Abernethy*

Clinical Science Electives – 2nd Year

MEDICINE-252C. CLINICAL DERMATOLOGY. The elective in clinical dermatology is designed to prepare students to perform an accurate skin examination, formulate appropriate differential diagnoses, and choose relevant diagnostic or therapeutic interventions. This course is valuable to any student interested in improving their ability and confidence in the cutaneous exam. Students in the rotation spend two weeks working in the outpatient dermatology clinics, one week on the inpatient consult service at Duke, and one week at the Durham VA Medical Center. The outpatient clinical experience includes general dermatology clinics as well as a variety of specialty clinics such as pediatric dermatology, HIV dermatology, cutaneous oncology; 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. 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 and may be reached at 684-5146. Credit: 4. Enrollment: max 4. *Prose*

MEDICINE-253C. TUTORIAL IN MEDICAL PDC (Subspecialty Clinics). (1) Course Goals: Primary-To broaden student exposure to ambulatory care in internal medicine and allow students to work intensively with a single, seasoned medical practitioner. Students learn the informational content relevant to the discipline, but also have the opportunity to observe how one doctor goes about daily practice. (2) How Goals Are Achieved: Students work in a one-to-one relationship with a faculty member in the Department of Medicine who sees patients regularly in the Private Diagnostic Clinic. Students evaluate patients and develop plans for treatment and follow-up under the guidance of the preceptor. Students may follow patients admitted to the hospital. Students may select preceptors from any of the medical subspecialties. (3) Methods of Evaluation: On a regular basis, the preceptor will observe student interactions with patients noting the quality of that interaction as well as the resulting evaluation, including the assessment/differential diagnosis as well as plans for further evaluation, treatment, and follow-up. A copy of the evaluation form will be provided to students at the beginning of their tutorial. Prerequisites: Students must prearrange their elective with an individual preceptor and communicate the preceptor's approval to *Dr. Jane Gagliardi* (via email: Gagli001@mc.duke.edu) at least two weeks prior to the start date of the planned tutorial. At the end of the experience, the preceptor will then complete a standard evaluation form. Credits: 2 (complete a total of 80 hours Â¿ 20 hours/week for 4 weeks). 4 (complete a total of 160 - 20 hours/week for 8 weeks or 40 hours/week for 4 weeks). The minimum number of preceptors you may recruit will be two physicians. Students may not mix and match four or eight different physicians to come up with credits. Enrollment: max 4. *Gagliardi and Medical PDC staff*. Note: medical students seeking experiences in the PDC with preceptors MUST be explicit in making the preceptors aware that they are second year medical students, especially if they have not yet taken the clerkship in Internal Medicine.

MEDICINE-257C. 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 stu-

dent records the findings in the hospital charts and presents the findings at regular staff rounds. The student then participates with a clinical team of faculty and house officers in the hospital evaluation of the patients. The student is encouraged to participate in all diagnostic procedures such as lumbar puncture. The student has the opportunity to follow patients through neuro-radiological and neuro-surgical procedures forming part of evaluation and treatment. The specific expectations for the student are: (a) to perform and record a competent neurological and history examination on each admitted patient; (b) to be competent in the hospital management of neurological patients including diagnostic evaluations such as hematological and urine evaluations, lumbar puncture and appropriate electrical studies; (c) to assume responsibility as the primary care person for his or her patients; (d) to participate in daily work rounds with an assigned team of house officers and faculty; (e) to be sufficiently knowledgeable to participate in patient care decisions; (f) to attend faculty attending rounds and to present patients to faculty within 24 hours after admission; and (g) to participate in neurology service rounds and conferences during the course. The course includes faculty lectures. A written evaluation is provided to the students by faculty and house staff. There is an examination. Credit: 4. Enrollment: max 10. *Chilukuri and neurology staff*

MEDICINE-259C. GERIATRIC MEDICINE. Course Goals: Primary - To enable the student to become familiar with the principles of caring for the geriatric patient. Secondary - To familiarize the student with the physiology and diseases of aging. (2) How Goals Are Achieved: This elective is offered by the interdepartmental faculty of the Division of Geriatric Medicine. The student works with faculty, fellows, and housestaff in a number of settings involved in the care of the geriatric patient. These include the Geriatric Evaluation and Treatment Clinic (Duke), Geriatric Evaluation Unit Clinic (Durham VA), The Forest at Duke Clinic, Extended Care and Rehabilitation Center (Durham VA) and other subspecialty clinics. Principles to be stressed are biology and pathophysiology of aging, multiple clinical problems in the elderly, interdisciplinary team approach to evaluation, planning and treatment, goals of maximal functional achievement and independence for the elderly. Specific clinical problems that students encounter include cognitive disorders, gait instability and falls, urinary incontinence, pressure sores, and chronic pain. Students also learn about the management of common chronic diseases in the elderly, including diabetes mellitus, heart disease, and osteoarthritis. The student participates actively in the work-up and management of patients work-up in inpatient extended care and outpatient settings to become more familiar with the problems of the elderly in the community. Familiarity with the growing literature in geriatric medicine is encouraged. The student participates in seminars, lectures and team meetings at the appropriate sites. (3) Methods of Evaluation: Evaluation is by consensus of instructors and fellows at the various training sites. It is based on discussions and presentations throughout the course period. Credit: 4. Enrollment: max 1. *Cohen and staff*

MEDICINE-261C. INTRODUCTION TO ADVANCED GENERAL MEDICINE (DUKE, VA , DRH). (1) Course Goals: To gain additional knowledge regarding inpatient internal medicine. 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. (2) How Goals Are Achieved: Students are assigned to one of the general medical wards at Duke Hospital, Durham Regional Hospital or the Durham VA Medical Center. They are assigned patients on the service and are expected to perform and complete an initial evaluation, develop a care plan, formulate and write admission orders (to be countersigned by the intern), present the patient at teaching rounds, and follow the patient throughout the hospital course. Students are assigned two pa-

tients per call night and will follow up to six patients at a time. Students who have not yet rotated on General Medicine will start out admitting one patient per call night and will advance as the elective progresses. Outside reading on each patient is expected. Credit: 4 Enrollment: Max 16. *Gagliardi and Staff*

MEDICINE-265C. 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 30 days of the first day of classes unless the student finds her or his own replacement. MEDICINE 440C is a full-time experience. Also, it is offered as a sole-enrollment course and, as such, cannot be taken in conjunction with any other course without the permission of the advisory dean and the course director. Credit: 4. Enrollment: max 7. *Hamilton and infectious diseases staff.* Sole Enrollment

Clinical Science Electives – 4th Year

MEDICINE-401C. INTERNAL MEDICINE SUBINTERNSHIP (DUKE/VA). Course Goals: To provide an internal medicine inpatient care experience at the intern level. (2) How Goals Are Achieved: Students are assigned to an inpatient service at Duke or Durham Regional Hospital. These services include the general medicine services at both hospitals, and internal medicine residents supervise the students. Alternative services include the MICU, Cardiology, Hematology/Oncology, and Pulmonary. Internal medical residents and subspecialty fellows provide supervision on these services. The student functions as an intern on that service with the exception that orders must be countersigned by a medical house officer. A pager and sleep-in facilities are available. The supervising resident or fellow determines the number of patients assigned with anticipated increases over the four weeks. (3) Methods of Evaluation: Students are evaluated by their residents, fellows, and senior staff attending. The evaluation form is made available to each student at the beginning of the rotation. There is a formal evaluation at four weeks. No final exam is given. Prerequisites: permission of instructor. Credit: 5. Enrollment: max 17. *Muir and staff*

MEDICINE-402C. 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-403C. 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-404C. CARDIAC CARE UNIT SUBINTERNSHIP. (1) Course Goals: Primary - To provide an in-depth experience in the evaluation and care of inpatients with various cardiovascular problems. Secondary -To refine student understanding of the cardiovascular history, physical examination and non-invasive and invasive laboratory testing in evaluating and managing patients with known or suspected cardiovascular disease. (2) How Goals Are Achieved: Students are assigned to the Duke CCU, the VA CCU, or to a cardiology inpatient service at Duke, and, in concert with the house staff, cardiology fellows, and senior staff attendings, work up and manage patients admitted to these various services. They also participate in a core curriculum experience, including individually assigned times to work with HARVEY, the cardiology patient simulator, and various computer assisted instruction programs. (3) Methods of Evaluation: Students are evaluated by all resident, fellow, and senior staff with whom they work. The evaluation form is available at the beginning of the elective. Depending on circumstances, students may also be evaluated by written and practical examinations at the beginning and/or end of the elective. Prerequisite: none. Credit: 5. Enrollment: max 3. *Waugh and cardiology staff*

MEDICINE-405C. INTENSIVE CARE MEDICINE SUBINTERNSHIP (DUKE). Course Goals: (1) Primary - To introduce the student to a pathophysiologic approach to critically ill adults. Secondary - To provide an opportunity for students to perform selected procedures. (2) How Goals Are Achieved: Students function as subinterns in a very active intensive care unit. Patient evaluations, procedures, diagnostic planning and treatment planning are performed by students under the direct supervision of the junior assistant

resident, critical care fellow, and attending physician. Night call occurs every third night. Regular didactic lectures on topics related to the diagnosis and treatment of the critically ill are given by the attending staff. The physiological and biochemical approach to critical care medicine is stressed. A syllabus of selected reprints from the critical care literature is provided to each student. Emphasis is placed on access to attending physicians and critical care fellows for the discussion of specific patient oriented questions. Preferences for the month of rotation are honored, if possible. Questions should be directed to Dr. Govert, 681-5919. (3) Methods of Evaluation: Each student's performance is assessed by the unit director through direct observation of the student in the clinical and didactic environments. Input from the residents, fellows, and other attending physicians is also obtained. Prerequisites: permission of instructor for all summer sections and fall sections 41 and 42. Credit: 5. Enrollment: max 3. *Govert and critical care staff*

MEDICINE-406C. INTENSIVE CARE MEDICINE SUBINTERNSHIP (DURHAM VA HOSPITAL). (1) Course Goals: Primary - To provide training in clinical physiologic and pharmacologic principles of the care of the critically ill. Secondary - To develop students' skills in performance and interpretation of diagnostic procedures. (2) How Goals Are Achieved: Under the supervision of senior assistant residents, the pulmonary fellow and the critical care attending physician, students function as subinterns and are responsible for patient work-ups and daily bedside presentations. Students are given responsibilities for procedures and decision-making in direct proportion to the development of their patient management skills. Daily radiology and bedside attending rounds stress an integrated physiologic approach to the management of critically ill patients with emphasis on acute respiratory care, hemodynamic monitoring, acid-base balance and nutritional support. Each student is provided a handout of selected readings that supplements the didactic sessions on diagnosis, pathophysiology, and management of critical illness. The student on call schedule is every third night for the duration of this four-week course. The student registered for MEDICINE 406C may drop the course up to one month before the start date. After that time, the student must arrange for a replacement if he/she subsequently drops the course. (3) Methods of Evaluation: Student evaluations are done by the fellows and faculty attending on the MICU and are based on observed performance. Credit: 5. Enrollment: max 3. *Welty-Wolf and critical care staff*

MEDICINE-413C. TUTORIAL IN MEDICAL PDC (Subspecialty Clinics). (1) Course Goals: Primary-To broaden student exposure to ambulatory care in internal medicine and allow students to work intensively with a single, seasoned medical practitioner. Students learn the informational content relevant to the discipline, but also have the opportunity to observe how one doctor goes about daily practice. (2) How Goals Are Achieved: Students work in a one-to-one relationship with a faculty member in the Department of Medicine who sees patients regularly in the Private Diagnostic Clinic. Students evaluate patients and develop plans for treatment and follow-up under the guidance of the preceptor. Students may follow patients admitted to the hospital. Students may select preceptors from any of the medical subspecialties. (3) Methods of Evaluation: On a regular basis, the preceptor will observe student interactions with patients noting the quality of that interaction as well as the resulting evaluation, including the assessment/differential diagnosis as well as plans for further evaluation, treatment, and follow-up. A copy of the evaluation form will be provided to students at the beginning of their tutorial. Prerequisites: Students must prearrange their elective with an individual preceptor and communicate the preceptor's approval to Dr. Jane Gagliardi (via email: Gagli001@mc.duke.edu) at least two weeks prior to the start date of the planned tutorial. At the end of the experience, the preceptor will then complete a standard evaluation

form. Credits: 2 (complete a total of 80 hours Â¿ 20 hours/week for 4 weeks). 4 (complete a total of 160 - 20 hours/week for 8 weeks or 40 hours/week for 4 weeks). The minimum number of preceptors you may recruit will be two physicians. Students may not mix and match four or eight different physicians to come up with credits. Enrollment: max 4. *Gagliardi and Medical PDC staff* .

MEDICINE-414C. 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 preceptors within the Division of General Internal Medicine spending one or more days per week seeing patients at the Duke Health Centers and/or Lincoln Community Health Center and the Durham VA Medical Center. A highly diverse mix of patients is seen and might include persons with diabetes, heart disease, orthopedic conditions, skin disease, common mental health problems, or neurologic disease. Patients also present for preventive health services. In the DGIM practice, patients routinely present with symptoms that have not been previously evaluated or diagnosed, allowing students to truly sharpen their clinical skills. In all cases, the student sees the patient first then discusses the case with the attending. The student must outline in writing five goals that he or she wishes to accomplish during this rotation. The student's goals should be delivered to Dr. Diana McNeill or course coordinator, Shelia Blackley at least three weeks before the rotation begins. Methods of Evaluation: The faculty preceptor 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 have successfully completed the second-year medicine clerkship. Credit: 1 (10 hrs/wk for 4 weeks) or 2 (20 hrs/wk for 4 weeks). Enrollment: max 2. (McNeill and general internal medicine staff). *For questions regarding this course, please contact Shelia Blackley at 681-4654 or black015@mc.duke.edu.*

MEDICINE-415C. CLINICAL MANAGEMENT OF OBESITY. The epidemic of obesity in the United States demands a course for medical students that helps them understand the underlying biochemical, pathophysiology and treatment options. Every physician who practices in the 21st century should have a basic knowledge of the principles of human nutrition and their application to a wide variety of clinical problems. This four-week interdisciplinary elective under the direction of the Stedman Nutrition Center is a collaboration between the Departments of Medicine, Pediatrics, Family Medicine, and Surgery. This elective provides the students with an opportunity to learn about a clinical approach to obesity management, including metabolic and pathologic consequences of being overweight and the relationship to the following chronic disorders: hypertension, insulin resistance, and dyslipidemia. The student will learn about cellular signaling mechanisms that influence obesity by attendance at basic science seminars at the Stedman Nutrition Center. Students will learn to counsel/motivate patients to make informed nutritional decisions consistent with adopting and maintaining a healthy lifestyle and with establishing appropriate dietary, exercise and behavioral goals. The elective director will approve a student's choice of a mentor. This approval will be based on matching the student's interests with the primary focus of the mentor. The assigned mentor will coordinate the student's experiences throughout the four-week ro-

tation with a focus on clinical applications of obesity management. The program includes the following components: 1. One day of outpatient clinics in the following clinics: Hypertension Clinic, Pediatric Clinic, Diabetes Clinic, Duke Weight Loss Surgery Center, and the Duke Diet and Fitness Center. The focus of the student's experience will be on learning to translate basic science information into clinically relevant principles that guide medical decision-making as they apply to obesity management. (Total clinical time--32 hours) 2. Research and departmental seminars sponsored by the Stedman Nutrition Center (1 hour per week). Students will be expected to participate in and present one seminar reviewing current research in a selected field of Obesity Research. 3. A review paper in a topic area designated by the mentor. Emphasis will be placed on developing skills required to formulate original research proposals in the area of applied clinical research. (1-2 hours of mentoring time per week) Prerequisite: permission of instructor. C-L: COMMFAM 465C, PEDS 465C, SURGERY 465C. Credit: 4. Enrollment: max 1. *Westman*

MEDICINE-417C. NEUROLOGY CLERKSHIP. This course is restricted to those students who did not take the Neurology rotation in their second year. It provides the student with a firm understanding of the neurological examination, formulation of clinical neurological problems, and practice with written and oral communications in a hospital setting. The student has the opportunity to apply the neuroanatomy, neurophysiology, neurochemistry, and neuropathology learned in the first year to the evaluation and care of his or her patients. The patients are drawn from the neurology services at Duke Hospital or the Durham VA Medical Center. The students elicit a history and perform a physical examination. The student records the findings in the hospital charts and presents the findings at regular staff rounds. The student then participates with a clinical team of faculty and house officers in the hospital evaluation of the patients. The student is encouraged to participate in all diagnostic procedures such as lumbar puncture. The student has the opportunity to follow patients through neuro-radiological and neuro-surgical procedures forming part of evaluation and treatment. The specific expectations for the student are: (a) to perform and record a competent neurological and history examination on each admitted patient; (b) to be competent in the hospital management of neurological patients including diagnostic evaluations such as hematological and urine evaluations, lumbar puncture and appropriate electrical studies; (c) to assume responsibility as the primary care person for his or her patients; (d) to participate in daily work rounds with an assigned team of house officers and faculty; (e) to be sufficiently knowledgeable to participate in patient care decisions; (f) to attend faculty attending rounds and to present patients to faculty within 24 hours after admission; and (g) to participate in neurology service rounds and conferences during the course. The course includes faculty lectures. A written evaluation is provided to the students by faculty and house staff. There is an examination. Credit: 4. Enrollment: max 1. *Chilukuri and neurology staff*

MEDICINE-418C. CLINICAL NEUROLOGY SUBSPECIALTIES. (1) Course Goals: To provide the student clinical exposure to a specific subspecialty in neurology. (2) How Goals Are Achieved: The student focuses on one specific subspecialty in neurology and attends clinic for 3-8 hours weekly. During that time the student participates in the clinical evaluation of patients with a member of the neurology faculty. Clinical experience in Neuromuscular Diseases, Epilepsy and Sleep Disorders, Cerebrovascular Disorders, Memory Disorders, or Neuro-oncology are available. Appropriate reading material is utilized to complement the clinical experience. MEDICINE 207C or MEDICINE 417C are prerequisites for this course. (3) Method of Evaluation: Standard written evaluation form by faculty supervisor. Approval by the course director in order to ensure access to the desired neurologic subspecialty is required. For permission information, please contact Virginia Chambers at

919-684-4454. Credit: 1-2. Enrollment: max 5 (if participating in different subspecialties). *Chilukuri and neurology staff*

MEDICINE-419C. 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 is required. Experience on an inpatient neurology service such as MEDICINE 207C or MEDICINE 417C is a prerequisite for this course. (3) Method of Evaluation: Standard written evaluation by faculty supervisor with house staff input. Credit: 4. Enrollment: max 2. *Chilukuri and neurology staff*

MEDICINE-420C. ADVANCED GENERAL MEDICINE (DUKE, VA , DRH). (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, the Durham VA Medical Center, or Durham Regional 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 initially assigned three to five patients per week and are expected to do outside reading on each. Students may be advanced to the sub internship level during the eight week period at the recommendation of their resident, attending, and chief medical resident. (3) Methods of Evaluation: The evaluation form is made available to each student at the beginning of the rotation. There are formal mid-term and final evaluations. No final exam is given. Prerequisite: permission of instructor. Credit: 10. Enrollment: max 6. *Muir and staff*

MEDICINE-421C. INTRODUCTION TO CLINICAL RHEUMATOLOGY. (1) Course Goals: An introductory course in Clinical Rheumatology designed to introduce students to the basics of differential diagnosis in the field of rheumatic disease; to provide more detailed knowledge of the most common, major groups of rheumatic disorders. (2) How Goals Are Achieved: Didactic and interactive lectures are the primary mode of teaching. Handouts and outlines on relevant topics and the Primer of Rheumatic Diseases are provided at the beginning of the course. One or more sessions(s) may be devoted to patient presentations, with several patients available for questioning and discussion. Basic pathophysiology, clinical features, laboratory studies, radiographic findings and pathology correlations are presented. (3) Methods of Evaluation: participation in class and discussion of subject matter in concluding session. Course director evaluates student with standard Duke Evaluation. If

permitted by the instructor, this clinical course can be audited. Credit: 1. Enrollment: min 3, max 20. *Criscione and rheumatology staff*

MEDICINE-422C. OUTPATIENT COMMUNITY RHEUMATOLOGY. The clerkship in clinical rheumatology in the community setting is based in the Danville, Virginia Rheumatology Outreach Clinic. Students travel with the attending physician to the outpatient site five days per month for two consecutive months, participating in the evaluation of patients with rheumatic disease. New and return patients are seen, averaging 8-10 patients per visit. The student is under the direct supervision of the attending physician, as no fellows or residents are involved in this particular clinic. The student is expected to learn extensively about the approach to patients with rheumatic complaints and also gain an understanding of therapeutic options in the management of such patients. Credit: 2. Enrollment: max 1. *Caldwell*

MEDICINE-423C. CLINICAL RHEUMATOLOGY. (1) Course Goals: Primary - To provide experience in the recognition and care of patients with rheumatic, chronic inflammatory, and immunological diseases, including the various forms of arthritis, connective tissue disease, vasculitis, and metabolic arthropathies. Secondary - To develop skills in the interpretation of specialized laboratory studies relating to the evaluation of patients with rheumatic, immunological, and metabolic disorders. Students are also exposed to joint aspiration and injection, synovial fluid analysis, bone and joint radiology, and histopathological analysis of tissue. (2) How Goals Are Achieved: Students evaluate patients at the Duke and Durham VA Hospitals. Daily rounds are held with faculty, house staff, and students that focus on oral presentation of patients with detailed review of pertinent laboratory, x-ray and pathological findings. Basic Science Conference; Bone and Joint Radiology Conference; Pathology Conference; and Rheumatology and 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/immunology staff.* Sole enrollment

MEDICINE-425C. 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 Coagulation lab rounds during which the student learns to interpret lab tests and review abnormal results. The student is expected to read standard texts regarding their patients' problems, as well as relevant reviews provided by the attending physician. The student may also interact with the Anticoagulation Management Service to gain a better understanding of various approaches to outpatient management of anticoagulant therapy. Students electing to do an eight week rotation have a more extensive laboratory and clinic research experience. (3) Methods of Evaluation: The student's performance is evalu-

ated 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-428C. METABOLISM AND ENDOCRINOLOGY. (1) Course Goals: Primary - The student has an in-depth experience in the evaluation and management of patients with endocrine disorders. Secondary - The student learns basic principles of hormone physiology and applies these concepts in clinical settings. (2) How Goals Are Achieved: Each student is introduced to patient problems by working with the Endocrine faculty (Drs. Brown, Burch, Feinglos, Guyton, Green, Jelesoff, Spratt, Weber, McNeill, Gesty-Palmer, Miranda, O'Connell). Prior arrangements may be made with a particular faculty member under the appropriate course number. The student is exposed to clinical endocrine disorders by seeing patients in endocrine outpatient clinics (Diabetes/ General Endocrine, and Durham VA General Endocrine Clinics), as well as experiencing the inpatient 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 2. *Weber and endocrinology staff*

MEDICINE-430C. PULMONARY MEDICINE. Course Goals: (1) Primary - To provide training in clinical aspects of pulmonary medicine. The primary diseases emphasized include asthma, chronic obstructive lung disease, pulmonary vascular diseases including pulmonary embolus, acute respiratory failure, hypersensitivity, interstitial and immunologic lung diseases and pulmonary manifestations of systemic illnesses, i.e., sarcoid, scleroderma, cystic fibrosis, etc. Secondary - To provide experience with pulmonary laboratory techniques including pulmonary function testing, cardio-pulmonary exercise testing, chest radiology, and bronchoscopy. (2) How Goals Are Achieved: Students assigned to the Pulmonary Consult Services at either the Durham VA or at Duke Hospital. They have primary responsibility for workup and presentation of selected patients on these services. All patients are presented and followed at daily rounds with fellows and faculty. Students also participate in a half-day outpatient clinic each week. Joint seminars and conferences involving both the Duke and Durham VA Consult Services are held each week to provide instruction in pulmonary function evaluation, pulmonary physiology, chest radiology, pulmonary pathology and clinical pulmonary medicine. (3) Methods of Evaluation: Student evaluations are done by fellows and faculty assigned to the Consult Services during the period of the course and are based on observed performance. Questions should be directed to Patti Streicher, 668-0380. Credit: 4. Enrollment: min 1, max 4. *MacIntyre and pulmonary staff*

MEDICINE-434C. 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 (anemia's, bleeding and clotting disorders, hematologic and solid tissue malignancies) are included. Issues such as quality of life and care of the geriatric oncology patient are addressed. (2) How Goals Are Achieved: The student is assigned a staff member as preceptor with whom to work in the Hematology/Oncology clinic one to three half- days per week in clinic, depending on the student's schedule and the availability of physicians in clinic. If desired, a preceptor who concentrates mainly on hematology or oncology may be arranged. This course is offered for eight or, preferably, 16 weeks. (3) Methods of Evaluation: Students are evaluated by their preceptors on the basis of their ability to obtain a history, perform a physical examination, evaluate hematologic and other laboratory data, and propose assessments and plans of action. Credit: 1-2. Enrollment: max 4. *Telen and hematology/oncology staff*

MEDICINE-435C. 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 evaluation and management of patients hospitalized at 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 will include performing and presenting an appropriate history, physical exam and assessment of patients referred to the Consult Service,. and, where appropriate, data from the relevant literature. Students will also participate in the activities of the GI endoscopy unit. 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, polypectomy, endoscopic ultrasound, laser photodynamic therapy, and endoscopic papillotomy of the ampulla of Vater. Data derived from these and other laboratory studies are discussed in the context of specific patient problems in weekly conference settings. Students have an opportunity to interact with members of the faculty of the Division at morning rounds and other conferences where patients from each 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. *Diehl and gastroenterology staff*

MEDICINE-436C. LEGAL AND ETHICAL ISSUES IN MEDICINE. This seminar examines legal and ethical questions raised by modern medical practice with special attention to their implications for clinicians and their patients. It includes historical and philosophical analysis of these questions as well as coverage of selected practice-related issues (e.g., truth-telling, confidentiality, informed consent, refusal of treatment, the rights of adolescent patients, and reproductive issues). C-L: COMMFAM-436C. Credit: 1. Enrollment: min 6, max 12. *Holder*

MEDICINE-438C. 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 (anemia's, 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-440C. 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 30 days of the first day of classes unless the student finds her or his own replacement. MEDICINE 440C is a full-time experience. Also, it is offered as a sole-enrollment course and, as such, cannot be taken in conjunction with any other course without the permission of the advisory dean and the course director. Credit: 4. Enrollment: max 7. *Hamilton and infectious diseases staff.* Sole Enrollment

MEDICINE-442C. 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 404C and 445C). 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. *Gilliam,Sorrentino, Grant, Greenfield, Bahnson, Al-Khatib, and Ashar.*

MEDICINE-443C. CARDIOLOGY SUBINTERNSHIP (ASHEVILLE VA). Course Goals: Primary - To provide experience in the assessment and management of patients with acquired heart disease. Secondary - To familiarize the student with both invasive and non-invasive procedures available at this medical center. (2) How Goals Are Achieved: The student is assigned to an attending cardiologist and is expected to work up patients presenting to both the coronary care unit and the cardiology nonacute ward. Daily work rounds commence at 7:30 a.m. with additional student teaching rounds occurring three times a week. In addition, daily interpretation of electrocardiograms, stress tests, Holter monitors, and echocardiograms focus on student teaching. Cardiac catheterization results also are reviewed on a daily basis. Night call is optional, but students may elect to take call with appropriate attendings. (3) Methods of Evaluation: The preceptor evaluates the student's ability to assess patient problems based on the history and physical and to formulate a plan to evaluate the problems. Furthermore, the preceptor assesses each student's ability to evaluate and act upon data derived from both invasive and non-invasive diagnostic methods. Credit: 4. Enrollment: max 2. *Carnendran and Sharma*

MEDICINE-445C. CONSULTATIVE CARDIOLOGY. (1) Course Goals: Primary - To refine and further develop the skills necessary for eliciting an accurate, complete CV history and for performing an accurate, complete CV physical examination: To refine student understanding of normal and pathologic cardiovascular physiology while functioning in the role of a consultant for inpatients and outpatients with various cardiovascular problems; Secondary - to develop the skills necessary to quickly and accurately interpret ECGs (both 12-lead ECGs and rhythm strips). (2) How Goals Are Achieved: Students are assigned to the consult service at either the VA Hospital or Duke, where, in concert with the resident, fellow and senior staff attending, they evaluate the operative risk for cardiac and non-cardiac surgery as well as make decisions concerning the evaluation and treatment of patients with a wide variety of heart diseases. Students participate in reading ECGs and a core curriculum experience including individually assigned times to work with HARVEY, the cardiology patient simulator, and various computer assisted instruction programs. (3) Methods of Evaluation: Students are evaluated by the resident, fellow, and senior staff with whom they work. The evaluation form is made available at the beginning of the elective. Depending on circumstances, students may also be evaluated by written and practical examinations at the beginning and/or end of the elective. Prerequisite: none. Credit: 4. Enrollment: max 7. *Waugh and cardiology staff*

MEDICINE-446C. NEPHROLOGY. (1) Course Goals: Primary: To provide clinical experience in the diagnosis and treatment of patients with kidney diseases, fluid and electrolyte disorders, and hypertension. Secondary: To integrate physiology, immunology, pathology, and biochemistry into the evaluation and management of patients with renal disease. (2) How Goals Are Achieved: The students are integrated into the patient care team consisting

of attending physician, nephrology fellows, and medical residents. They will participate in both inpatient and outpatient care of patients with a wide range of kidney diseases, fluid and electrolyte problems, and difficult to manage hypertension. Students may choose between the three major nephrology services: the Acute Service which cares for patients in the intensive care units at Duke, the Transplant Service which focuses on patients with kidney or combined kidney-pancreas transplants, and the Durham VA General Nephrology Service which provides balanced exposure to all facets of nephrology. The student participates in work rounds with the residents and fellows each day, daily rounds with the attending physician, and weekly nephrology conferences. These conferences include Journal Club where the latest clinical and basic science literature is reviewed, the weekly Nephrology Didactic Lecture Series focusing on pathophysiological principles of clinical nephrology, and Grand Rounds encompassing Pathology Conference, Clinical Case Conference, and seminars by fellows, faculty and/or visiting professors. This combination of broad-based clinical experience, coupled with formal didactics, provides the student with a comprehensive educational opportunity. (3) Methods of Evaluation: Written evaluation from faculty preceptor. Credit: 4. Enrollment: max 4. *Evans and nephrology staff*

MEDICINE-449C. GERIATRIC MEDICINE. 1) Course Goals: Primary - To enable the student to become familiar with the principles of caring for the geriatric patient. Secondary - To familiarize the student with the physiology and diseases of aging. (2) How Goals Are Achieved: This elective is offered by the interdepartmental faculty of the Division of Geriatric Medicine. The student works with faculty, fellows, and housestaff in a number of settings involved in the care of the geriatric patient. These include the Geriatric Evaluation and Treatment Clinic (Duke), Geriatric Evaluation Unit Clinic (Durham VA), The Forest at Duke Clinic, Extended Care and Rehabilitation Center (Durham VA) and other subspecialty clinics. Principles to be stressed are biology and pathophysiology of aging, multiple clinical problems in the elderly, interdisciplinary team approach to evaluation, planning and treatment, goals of maximal functional achievement and independence for the elderly. Specific clinical problems that students encounter include cognitive disorders, gait instability and falls, urinary incontinence, pressure sores, and chronic pain. Students also learn about the management of common chronic diseases in the elderly, including diabetes mellitus, heart disease, and osteoarthritis. The student participates actively in the work-up and management of patients work-up in inpatient extended care and outpatient settings to become more familiar with the problems of the elderly in the community. Familiarity with the growing literature in geriatric medicine is encouraged. The student participates in seminars, lectures and team meetings at the appropriate sites. (3) Methods of Evaluation: Evaluation is by consensus of instructors and fellows at the various training sites. It is based on discussions and presentations throughout the course period. Credit: 4. Enrollment: max 1. *Twersky and staff*

MEDICINE-450C. CLINICAL DERMATOLOGY. The elective in clinical dermatology is designed to prepare students to perform an accurate skin examination, formulate appropriate differential diagnoses, and choose relevant diagnostic or therapeutic interventions. This course is valuable to any student interested in improving their ability and confidence in the cutaneous exam. Students in the rotation spend two weeks working in the outpatient dermatology clinics, one week on the inpatient consult service at Duke, and one week at the Durham VA Medical Center. The outpatient clinical experience includes general dermatology clinics as well as a variety of specialty clinics such as pediatric dermatology, HIV dermatology, cutaneous oncology; 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. 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 and may be reached at 684-5146. Credit: 4. Enrollment: max 4. *Prose*

MOLECULAR GENETICS AND MICROBIOLOGY

Basic Science Electives

MGM-253B. 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, Vance, Pericak-Vance, Marchuk*

MGM-322B. GENERAL VIROLOGY AND VIRAL ONCOLOGY. The course is devoted to the molecular biology of mammalian viruses, with emphasis upon mechanisms of virus replication, virus-host interactions, viral pathogenicity, and the relationship of virus infection to neoplasia. C-L: IMMUNOL-252B; Graduate School. Credit: 3. Enrollment: min 5. *Keene, Alexander, Cullen, Nevins, and Pickup*

MGM-328B. MICROBIAL PATHOGENESIS. This is a graduate level course that primarily focuses on pathogenic bacteria and fungi. The course explores both the basic biology that underlies pathogenesis, as well as specific mechanisms of pathogenesis and virulence. Classes consist of a mixture of lectures, discussions of recent papers, and paper presentations. There are no exams, but instead, grades will be based on critiques of published papers and a research proposal due at the end of the course. C-L: Graduate School. Credit: 3. *Kreuzer and McCusker*

MGM-330B. MEDICAL IMMUNOLOGY. A brief review of basic concepts of immunology is followed by in-depth discussions of the role of immune mechanisms in the pathogenesis and treatment of human diseases. Principal emphasis is placed on immune deficiency diseases, hypersensitivity, alloimmunity, transplantation, infectious diseases, autoimmunity, tumor immunology, and immunohematology. When applicable the classes include patient presentations and laboratory demonstrations. C-L: IMM 330B; Graduate School. Credit: 5. *F. Ward and Staff*

MGM-331B. COMPREHENSIVE IMMUNOLOGY. An intensive course in the biology of the immune system and the structure and function of its component parts. Major topics discussed are: properties of antigens; specificity of antibody molecules and their biologic functions; cells and organs of the lymphoid system; structure and function of complement; inflammation and non-specific effector mechanisms; cellular interactions and soluble mediators in lymphocyte activation, replication, and differentiation; regulation of immune responses, neoplasia and the immune system; molecular structure and genetic organization of immunoglobulins, histocompatibility antigens, and T cell receptor. C-L: IMMUNOL-291B; Graduate School. Prerequisite: Permission of instructor. Credit: 3. Enrollment: max 10. *Krangel and staff*

MGM-339B. 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

Basic Science Elective

NEUROBIO-339B. 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

Required Course

OBGYN-205C. OBSTETRICS AND GYNECOLOGY. Required of all second-year students. Consists of six 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: 6. *Livingston*

Clinical Science Selectives – 2nd Year

OBGYN-220C. PERNATAL DIAGNOSIS. Students will spend 2 weeks in one of the prenatal diagnostic units within Duke. They will divide their time between diagnostic ultrasound and genetic counseling. Some time will also be allotted to lab time in the cytogenetics lab. The student will be expected to learn common fetal malformations, genetic disorders and syndromes and be able to discuss their etiologies and evaluation. The student will be expected to understand common screening techniques in the prenatal period including pedigree analysis and risk assessment. *Livingston*

OBGYN-221C. INTRODUCTION TO REPRODUCTIVE ENDOCRINOLOGY. Focused introduction to reproductive endocrinology for students interested in a career in reproductive medicine. Because of the short duration, each student must choose an area of focus (clinical or laboratory) and be approved by a faculty mentor. The student will research on focused question in reproductive endocrinology and submit a paper attempting to answer the question. Credit: 2. Walmer, Couchman, Price and Raburn

Clinical Science Electives – 2nd Year

OBGYN-260C. GYNECOLOGIC CANCER. This course presents a clinical experience in the management of patients with a gynecologic malignancy. This will include operating room, inpatient unit and clinic experiences. The student assumes the role of a subintern. Outpatient, inpatient, and operative exposure to these patients is extensive. Credit: 4. Enrollment: max 1. *Clarke-Pearson, Soper, Berchuck, Secord, Havrilesky, and gynecologic oncology fellows*

OBGYN-261C. CLINICAL REPRODUCTIVE ENDOCRINOLOGY AND INFERTILITY. Course for students who desire additional basic and clinical experience in examination, diagnosis, and treatment of obstetric and gynecologic patients with endocrinopathy and infertility. Course consists of clinical core of reproductive endocrine problems correlated with examination and treatment of patients both in the Endocrinology Outpatient Clinic, in surgery, and in the hospital. Exposure to assisted reproductive technologies is also available depending on the current clinical load. Credit: 4. Enrollment: max 1. *Couchman, Haney, Hammond, and reproductive endocrinology fellows*

OBGYN-263C. 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 426C. Prerequisites: must contact Dr. Murtha prior to registration. In order to get credit for the critical care requirement, documentation from the course director MUST be sent to the Registrar's Office. Credit: 4. Enrollment: max 2. *Heine, Livingston, Murtha, and maternal-fetal medicine fellows*

Clinical Science Electives – 4th Year

OBGYN-420C. GYNECOLOGIC CANCER. This course presents a clinical experience in the management of patients with a gynecologic malignancy. This will include operating room, inpatient unit and clinic experiences. The student assumes the role of a subintern. Outpatient, inpatient, and operative exposure to these patients is extensive. Credit: 4 or 8. Enrollment: max 1. *Clarke-Pearson, Soper, Berchuck, Secord, Havrilesky, and gynecologic oncology fellows*

OBGYN-423C. PREPARATION FOR PRACTICE, CAPE FEAR VALLEY HOSPITAL, FAYETTEVILLE AHEC. This is a unique opportunity to receive both didactic exposure and clinical experience in obstetrics and gynecology in Cape Fear Valley Hospital, a large community hospital in Fayetteville, North Carolina, where almost 4,000 patients are delivered each year. A student actively participates in the care of patients in the labor and delivery room, assists at surgery, and renders postoperative care. This is a community hospital experience rather heavily credited in clinical obstetrics. Students are exposed to a large volume of clinic opportunities. Three senior residents from Duke rotate through Cape Fear Valley Hospital. The students are directly supervised by three full-time Duke faculty at Cape Fear, in addition to Duke Ob-Gyn residents. Prerequisites: permission of Dr. Livengood prior to signing for the course. Check availability through Dr. Gooding's office. Credit: 4. Enrollment: max 1. *Livengood, Gooding, Richardson, Hardison, and staff of Cape Fear Valley Hospital*

OBGYN-431C. CLINICAL REPRODUCTIVE ENDOCRINOLOGY AND INFERTILITY. Course for students who desire additional basic and clinical experience in examination, diagnosis, and treatment of obstetric and gynecologic patients with endocrinopathy and infertility. Course consists of clinical core of reproductive endocrine problems correlated with examination and treatment of patients both in the Endocrinology Outpatient Clinic, in surgery, and in the hospital. Exposure to assisted reproductive technologies is also available depending on the current clinical load. Credit: 4. Enrollment: max 1. *Couchman, Haney, Hammond, and reproductive endocrinology fellows*

OBGYN-439C. 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 426C. Prerequisites: must contact Dr. Murtha prior to registration. In order to get credit for the critical care requirement, documentation form the course director MUST be sent to the Registrar's Office. Credit: 8. Enrollment: max 2. *Heine, Livingston, Murtha, and maternal-fetal medicine fellows*

OBGYN-447C. 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-449C. CLINICAL GYNECOLOGY AND UROGYNECOLOGY. For students preparing for obstetrics and gynecology, general practice, surgery, and urology. Emphasis is placed on the outpatient assessment and inpatient or ambulatory management of patients with acute and chronic gynecologic disorders including pelvic floor dysfunction, pelvic organ prolapse, urinary and fecal incontinence, and others. Students have the opportunity to work closely with faculty members in the Division of Gynecology. Participation in the operative care of gynecologic patients is desired. Time for independent study is planned. The student is expected to utilize this time to review and present a specific clinical problem with frequent guidance and input from a member of the Gynecology Division with similar interests. Credit: 4 or 8. Enrollment: max 1. *Weidner, Addison, Amundsen, and urogynecology fellows*

OPHTHALMOLOGY

Clinical Science Electives – 2nd Year

OPHTHAL-252C. GENERAL OPHTHALMOLOGY. A clinical preceptorship in which the student participates and observes the regular house staff activities including night call, conferences, lectures, patient care, and treatment including surgery. The use of specialized ophthalmic apparatus is emphasized. Prerequisites: OPHTHAL 420C recommended, but not required. Credit: 4. Enrollment: max 4. *Allingham*

OPHTHAL-255C. PEDIATRIC OPHTHALMOLOGY. A clinical preceptorship in which the student participates in the outpatient pediatric ophthalmology clinic. The student will encounter the more common ocular disorders of childhood including ocular motility disturbances, congenital cataracts and glaucoma,, and congenital genetic and metabolic disorders. In addition adult motility disorders and neuroophthalmic disease such as thyroid eye disease, cranial nerve palsies, and optic nerve abnormalities will be encountered. The diagnosis and treatment aspects are emphasized heavily and opportunities to observe surgery are provided. The course meets by arrangement and requires a minimum of 5 days per credit . Credit: 4. Enrollment: max 3. *Buckley, Enyedi, and Freedman*

Clinical Science Electives – 4th Year

OPHTHAL-420C. MEDICAL OPHTHALMOLOGY. Emphasis is placed on common ophthalmic conditions. The ophthalmic signs and symptoms of ocular and systemic diseases are presented in a lecture series. Oriented for those students interested primarily in family medicine, pediatrics, internal medicine, or ophthalmology. This clinical science course can be audited. Credit: 1. Enrollment: min 8, max 20. *Allingham*

OPHTHAL-422C. GENERAL OPHTHALMOLOGY. A clinical preceptorship in which the student participates and observes the regular house staff activities including night call, conferences, lectures, patient care, and treatment including surgery. The use of specialized ophthalmic apparatus is emphasized. Prerequisites: OPHTHAL 420C recommended, but not required. Credit: 4 or 8. Enrollment: max 4. *Allingham*

OPHTHAL-423C. 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-422C and OPHTHAL-420C recommended, but not required. Not available during the summer term. Credit: 1. *Proia and Klintworth*

OPHTHAL-425C. PEDIATRIC OPHTHALMOLOGY. A clinical preceptorship in which the student participates in the outpatient pediatric ophthalmology clinic. The student will encounter the more common ocular disorders of childhood including ocular motility disturbances, congenital cataracts and glaucoma, and congenital genetic and metabolic disorders. In addition adult motility disorders and neuro-ophthalmic disease such as thyroid eye disease, cranial nerve palsies, and optic nerve abnormalities will be encountered. The diagnosis and treatment aspects are emphasized heavily and opportunities to observe surgery are provided. The course meets by arrangement and requires a minimum of 5 days per credit . Credit: 1 or 2. Enrollment: max 3. *Buckley, Enyedi, and Freedman*

PATHOLOGY

Basic Science Electives

PATHOL-327B. 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 patient's samples. The results of these studies are correlated with both clinical and histopathologic findings to learn the utility and limitations of molecular biologic analysis in the assessment of human disease. Credit: 4. Enrollment: max 2. *Gong*

PATHOL-336B. 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-339B. 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-340B 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-344B. 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-345B. 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*

Clinical Science Selectives – 2nd Year

PATHOL-220C. WHAT DOES A PATHOLOGIST REALLY DO?. The major objective of this selective is to provide the student with answers to the following questions: a) What are the major areas that comprise the practice of pathology (Laboratory Medicine)? What is Anatomic Pathology? Clinical Pathology (Laboratory Medicine)? What are the recognized sub-specialties in pathology? b) How doe the pathologist function as part of the health care team? What role does a pathologist play in clinical decision making? c) If you practice Internal Medicine / Surgery / Pediatrics / Ob-Gyn / Primary Care, what can the pathologist do for you? d) What is the pathologist's role as a teacher? Students will participate in several learning experiences (2-3 days each) that involve working with faculty and residents in various sub-disciplines of pathology [e.g., autopsy, surgical pathology (frozen section diagnostic service, specimen accessioning/gross descriptions service, diagnostic services), hematopathology/flow cytometry, neuropathology, dermatopathology, cytopathology/fine needle aspiration service, molecular diagnostics, cytogenetics, immunopathology/transplantation pathology, transfusion medicine, and others]. The exact set of experiences will depend on student interests, faculty availability, and number of students on the service. In each case, every attempt will be made to give the student the types of experiences that allow for fulfillment of the course objectives. Students will attend selected conferences and seminars and will meet with the course director (or his representative) at least twice during the selective. The majority of learning experiences will be in the Dept. of Pathology at DUMC. A few are located at DVAMC and at the Franklin Park clinical Laboratories. *Buckley*

Clinical Science Electives – 2nd Year

PATHOL-240C. 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-339B suggested, but not required. Permission of instructor is required. Credit: 4. Enrollment: max 1. *Shelburne and Vollmer*

PATHOL-248C. 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. Enrollment: max 2. *Bentley and staff*

PATHOL-250C. MEDICAL MICROBIOLOGY. This is an introduction to medical microbiology (MM) 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 has access to appropriate bench experience in all sections (bacteriology, molecular microbiology, mycobacteriology, parasitology, serology, sexually transmitted infections, virology) of the Clinical Microbiology Laboratory. Permission of instructor is required. Credit: 4. Enrollment: max 1. *Reller, Alexander, Harrell, Henshaw, and staff*

PATHOL-251C. 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. Prerequisite: Permission of Instructor is Required. Credit: 4. Enrollment: max 1. *Jones, Dodd and cytopathology staff*

PATHOL-253C. AUTOPSY PATHOLOGY. The course is intended to introduce students to the autopsy as an investigative tool. Anatomic-clinical correlation is emphasized. Students work directly with one or more members of the pathology department. They first assist at autopsies and then perform autopsies under supervision. They work up these cases with particular attention to correlations with clinical and experimental medicine, prepare the final autopsy reports, and work essentially at the level of a house officer. Students are expected to present their findings at staff conferences. Preference given to Pathology Study Program students. Credit: 4. Enrollment: max 2. *DiBernando*

Clinical Science Electives – 4th Year

PATHOL-321B or 421C. CYTOPATHOLOGY PRECEPTORSHIP. This course consists of full-time rotation in the diagnostic cytopathology laboratories. By working with the laboratory staff, the student explores in detail the role played by diagnostic cytopathology in the diagnosis of disease. In addition to general cytology, the student has the opportunity to participate in the fine needle aspiration biopsy service. Although not a requirement, the student is encouraged to pursue special research projects. Preference given to Pathology Study Program students. Credit: 4 or 8. Enrollment: max 1. *Jones, Dodd and cytopathology staff*

PATHOL-323B or 423C. AUTOPSY PATHOLOGY. The course is intended to introduce students to the autopsy as an investigative tool. Anatomic-clinical correlation is emphasized. Students work directly with one or more members of the pathology department. They first assist at autopsies and then perform autopsies under supervision. They work up these cases with particular attention to correlations with clinical and experimental medicine, prepare the final autopsy reports, and work essentially at the level of a house officer. Students are expected to present their findings at staff conferences. Preference given to Pathology Study Program students. Credit: 4 or 8. Enrollment: max 2. *Proia*

PATHOL-348B or 448C. 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 450C. MEDICAL MICROBIOLOGY. This is an introduction to medical microbiology (MM) 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 has access to appropriate bench experience in all sections (bacteriology, molecular microbiology, mycobacteriology, parasitology, serology, sexually transmitted infections, virology) of the Clinical Microbiology Laboratory. Credit: 4. Enrollment: max 1. Reller, Alexander, Harrell, Henshaw, and staff

PEDIATRICS

Required Course

PEDS-205C. PEDIATRICS. The basic course in pediatrics for all students is a six-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 six weeks are divided to include time in several of the following settings: (a) Duke outpatient clinics and emergency room, (b) Duke inpatient, (c) Durham Regional Hospital, (d) Duke nursery, (e) Lincoln Community Health Center, and (f) community practices away from Durham. Credit: 6. *Drucker*

Clinical Science Electives – 2nd Year

PEDS-251C. 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. Prerequisite: PEDS 205C Credit: 4. Enrollment: max 2. *Cunningham, Gutman, Katz, Drucker, Clements, Alexander, McKinney, Jhaveri, Steinbach and Benjamin*

PEDS-253C. 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. Prerequisite: PEDS 205C Credit: 4. Enrollment: max 3. *Burks, Markert, Williams, Myers, and Robert*

PEDS-254C. 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, molecu-

lar), and reference materials (texts and computer programs) are covered. Students participate in weekly teaching and clinical conferences. Prerequisite: PEDS 205C Credit: 4. Enrollment: max 2. *McDonald*

PEDS-257C. PEDIATRIC HEMATOLOGY AND ONCOLOGY. Includes all aspects of clinical and laboratory hematology as well as the diagnostic evaluation, care, and treatment of patients with malignant diseases. Emphasis is placed on fundamental concepts. Students will accompany the inpatient team on the ward rounds for 2 weeks of the rotation with the remaining time spent in the clinic evaluating new patients and seeing established patients. Students also are expected to attend divisional teaching conferences. Students will be asked to research a specific topic and present a short presentation at the end of their rotation. Prerequisite: PEDS 205C contact instructor. Credit: 4. Enrollment: max 1. *Rosoff, Zimmerman, Kreissman, Breitfeld, Linardic, and Thornburg*

PEDS-261C. CLINICAL PEDIATRIC CARDIOLOGY. This Medical Student rotation provides an intensive learning experience in the clinical diagnosis and management of childhood heart disease. Emphasis is placed upon inpatient and outpatient management. The inpatient section includes a pre and post operative management of children with heart disease via a step-down/Ward environment. The outpatient section includes exposure to cardiovascular procedures including interventional techniques and echocardiography as well as management of children referred for a cardiology evaluation or follow-up via clinic or consultation. The Medical 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, out-patient clinics four days per week, and all clinical and didactic teaching conferences of the division. Prerequisite: PEDS 205C. Credit: 4. Enrollment: max 2. *Rhodes, Armstrong, Leonard, Herlong, Kanter, Camitta, Barker, Delaney and Carboni*

PEDS-265C. ENDOCRINE DISORDERS IN CHILDREN. Students attend in the Pediatric Endocrine, Diabetes, and Insulin Resistance/Obesity Clinics and assume active roles in the evaluation and management of in-patients admitted to the Endocrine Service. Emphasis is placed upon the evaluation of growth and sexual development as indices of endocrine status during childhood. Students also participate in a monthly endocrine journal club and in weekly intra- and interdepartmental endocrine clinical and research conferences. Students will make a presentation to the endocrine group at the end of the rotation. Prerequisite: PEDS 205C, contact instructors. Credit: 4 Enrollment: max 2. *Freemark and staff*

PEDS-266C. PEDIATRIC NEUROLOGY. Students will partake in the evaluation and management of both hospitalized and ambulatory pediatric patients with neurological disorders. Emphasis is placed on the neurodevelopmental history, neurological examination, the use of laboratory tests and radiological tools and pharmacotherapy in the diagnosis and management of childhood neurological disorders. Prerequisite: PEDS 205C contact Dr. Lewis. Credit: 4. Enrollment: max 2. *Lewis*

PEDS-270C. INTRODUCTION TO THE PEDIATRIC INTENSIVE CARE UNIT. This course is designed for second year medical students to allow students a four-week experience in the Pediatric Intensive Care Unit. Under supervision of faculty attendings and house staff, the student participates in the care of critically ill children admitted to 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. Prerequisite: PEDS 205C. Credit: 4. Enrollment: max 2. *Cheifetz, Faberowski, Kern, Schulman, Turi, and Weldon.*

PEDS-271C. PEDIATRIC NEPHROLOGY. The course is designed to provide experience in diagnosis, interpretations of laboratory tests, natural history, and treatment of acute and chronic disorders of the kidney in children. The student also is exposed to the management of fluid and electrolyte disorders in infants and children. Prerequisite: PEDS 205C prior approval of Dr. Wigfall. Credit: 4. Enrollment: max 1. *Foreman and Wigfall*

PEDS-290C. ADVANCED PEDIATRICS. This course permits the student to elect an in-depth experience within pediatrics. Each student has a specific faculty preceptor who develops and implements the curriculum tailored to the individual's needs. Listed below are the faculty representatives to contact. Arrangements for the elective must be made with these individuals prior to enrolling in the course. The name of the preceptor with whom a student is working must be designated during web registration. Drucker and selected departmental representatives. Division Faculty Telephone: Emergency Department Joseph Gunn, M.D. 684-5537* Gastroenterology Martin Ulshen, M.D. 681-4841 Pulmonary Richard Kravitz, M.D. 684-2289 Rheumatology Egla Rabinovich, M.D. 684-6575 Rural Health Clinics Robert Drucker, M.D. 684-2356** Sports Medicine Deborah Squire, M.D. 477-4297 * 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 are approximately two hours a day driving time, which allows for a one-on-one tutorial with the senior resident. Enrollment: max 1; Credits: 4 Prerequisite: PEDS 205C. *Contact Dr. Drucker before registering.*

Clinical Science Electives – 4th Year

PEDS-401C. ADVANCED CLERKSHIP IN PEDIATRICS. This course is designed to provide the student with an intensive, in-depth exposure to the diagnosis and management of pediatric patients hospitalized at Duke. Students are responsible for admission histories, physical examinations, and management throughout the hospitalization. The student serves as an acting intern throughout the rotation. Night call is expected every fourth night. This is a sole-enrollment course and cannot be taken in conjunction with any other course. Students must obtain the permission of Dr. Robert Drucker to register for or to drop this course. Credit: 5. Enrollment: max: 4. *Drucker and faculty*

PEDS-410C. ADVANCED PEDIATRICS. This course permits the student to elect an in-depth experience within pediatrics. Each student has a specific faculty preceptor who develops and implements the curriculum tailored to the individual's needs. Listed below are the faculty representatives to contact. Arrangements for the elective must be made with these individuals prior to enrolling in the course. The name of the preceptor with whom a student is working must be designated during web registration. Credit: 2 to 8. Enrollment: max 1. Drucker and selected departmental representatives. Division Faculty Telephone: Emergency Department Joseph Gunn, M.D. 684-5537* Gastroenterology Martin Ulshen, M.D. 681-4841 Pulmonary Richard Kravitz, M.D. 684-2289 Rheumatology Egla Rabinovich, M.D. 684-6575 Rural Health Clinics Robert Drucker, M.D. 684-2356** Sports Medicine Deborah Squire, M.D. 477-4297 * 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 are approximately two hours a day driving time, which allows for a one-on-one tutorial with the senior resident. This must be taken for a minimum of 2 credits and 4 is preferred. Prerequisite: *Contact Dr. Drucker before registering.*

PEDS-415C. CLINICAL MANAGEMENT OF OBESITY. The epidemic of obesity in the United States demands a course for medical students that helps them understand the underlying biochemical, pathophysiology and treatment options. Every physician who practices in the 21st century should have a basic knowledge of the principles of human nutrition and their application to a wide variety of clinical problems. This four-week interdisciplinary elective under the direction of the Stedman Nutrition Center is a collaboration between the Departments of Medicine, Pediatrics, Family Medicine, and Surgery. This elective provides the students with an opportunity to learn about a clinical approach to obesity management, including metabolic and pathologic consequences of being overweight and the relationship to the following chronic disorders: hypertension, insulin resistance, and dyslipidemia. The student will learn about cellular signaling mechanisms that influence obesity by attendance at basic science seminars at the Stedman Nutrition Center. Students will learn to counsel/motivate patients to make informed nutritional decisions consistent with adopting and maintaining a healthy lifestyle and with establishing appropriate dietary, exercise and behavioral goals. The elective director will approve a student's choice of a mentor. This approval will be based on matching the student's interests with the primary focus of the mentor. The assigned mentor will coordinate the student's experiences throughout the four-week rotation with a focus on clinical applications of obesity management. The program includes the following components: 1. One day of outpatient clinics in the following clinics: Hypertension Clinic, Pediatric Clinic, Diabetes Clinic, Duke Weight Loss Surgery Center, and the Duke Diet and Fitness Center. The focus of the student's experience will be on learning to translate basic science information into clinically relevant principles that guide medical decision-making as they apply to obesity management. (Total clinical time--32 hours) 2. Research and departmental seminars sponsored by the Stedman Nutrition Center (1 hour per week). Students will be expected to participate in and present one seminar reviewing current research in a selected field of Obesity Research. 3. A review paper in a topic area designated by the mentor. Emphasis will be placed on developing skills required to formulate original research proposals in the area of applied clinical research. (1-2 hours of mentoring time per week) Prerequisite: permission of instructor. C-L: MEDICINE 415C, COMMFAM 415C, SURGERY 415C. Credit: 4. Enrollment: max 1. *Westman*

PEDS-421C. 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. Students planning to enroll for fewer than 4 credits should contact Dr. Cunningham in advance. Credit: 1 to 8. Enrollment:

max 2. *Cunningham, Gutman, Katz, Drucker, Clements, Alexander, McKinney, Jhaveri, Steinbach and Benjamin*

PEDS-425C. ENDOCRINE DISORDERS IN CHILDREN. Students attend in the Pediatric Endocrine, Diabetes, and Insulin Resistance/Obesity Clinics and assume active roles in the evaluation and management of in-patients admitted to the Endocrine Service. Emphasis is placed upon the evaluation of growth and sexual development as indices of endocrine status during childhood. Students also participate in a monthly endocrine journal club and in weekly intra- and interdepartmental endocrine clinical and research conferences. Students will make a presentation to the endocrine group at the end of the rotation. Prerequisite: contact instructors. Credit: 1to 8. Enrollment: max 2. *Freemark and staff*

PEDS-426C. 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. Prerequisite: PEDS and contact Dr. Ronald Goldberg. Credit: 5. Enrollment: max 1. *Goldberg, Goldstein, Auten, Herrera, Tanaka, Meyers, Cotten, Bidegain, Izatt, and Malcolm*

PEDS-427C. PEDIATRIC HEMATOLOGY AND ONCOLOGY. Includes all aspects of clinical and laboratory hematology as well as the diagnostic evaluation, care, and treatment of patients with malignant diseases. Emphasis is placed on fundamental concepts. Students will accompany the inpatient team on the ward rounds for 2 weeks of the rotation with the remaining time spent in the clinic evaluating new patients and seeing established patients. Students also are expected to attend divisional teaching conferences. Students will be asked to research a specific topic and present a short presentation at the end of their rotation. Prerequisite: contact instructor. Credit: 4. Enrollment: max 1. *Rosoff, Zimmerman, Kreissman, Breitfeld, Linardic, and Thornburg*

PEDS-431C. CLINICAL PEDIATRIC CARDIOLOGY. This Medical Student rotation provides an intensive learning experience in the clinical diagnosis and management of childhood heart disease. Emphasis is placed upon inpatient and outpatient management. The inpatient section includes a pre and post operative management of children with heart disease via a step-down/Ward environment. The outpatient section includes exposure to cardiovascular procedures including interventional techniques and echocardiography as well as management of children referred for a cardiology evaluation or follow-up via clinic or consultation. The Medical 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, out-patient clinics four days per week, and all clinical and didactic teaching conferences of the division. Prerequisite: PEDS 205C. Credit: 1 to 4 (or 8 with special permission of the instructor). Enrollment: max 2. *Rhodes, Armstrong, Leonard, Herlong, Kanter, Camitta, Barker, Delaney and Carboni*

PEDS-433C. 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: 1 to 8. Enrollment: max 3. *Burks, Markert, Williams, Myers, and Robert*

PEDS-434C. CLINICAL GENETICS AND METABOLISM. The student becomes familiar with evaluation and management of various genetic disorders including malformation syndromes and biochemical disorders. History-taking, pedigree construction and analysis, specialized aspects of the dysmorphological physical examination, diagnostic techniques, routine and specialized laboratory methods (cytogenetic, biochemical, molecular), and reference materials (texts and computer programs) are covered. Students participate in weekly teaching and clinical conferences. Credit: 1 to 4. Enrollment: max 2. *McDonald*

PEDS-436C. PEDIATRIC NEUROLOGY. Students will partake in the evaluation and management of both hospitalized and ambulatory pediatric patients with neurological disorders. Emphasis is placed on the neurodevelopmental history, neurological examination, the use of laboratory tests and radiological tools and pharmacotherapy in the diagnosis and management of childhood neurological disorders. Prerequisite: contact Dr. Lewis. Credit: 1 to 8. Enrollment: max 2. *Lewis*

PEDS-440C. PEDIATRIC INTENSIVE CARE UNIT. This advanced course is designed to allow students a four-week experience as a subintern in the Pediatric Intensive Care Unit. Under supervision of faculty attendings and house staff, the senior student assumes responsibility for the care of critically ill children admitted to the Medicine and Surgery services in the Pediatric Intensive Care Unit. Emphasis is placed on the development of the pathophysiologic approach to the diagnosis and therapy of a broad spectrum of pediatric illnesses as they present in acute care settings. Advanced concepts in pediatric critical care are emphasized. Students rotate night call with pediatric house staff. Prerequisite: PEDS 205C. Credit: 5. Enrollment: max 2. *Cheifetz, Faberowski, Kern, Schulman, Turi, and Weldon*

PEDS-441C. PEDIATRIC NEPHROLOGY. The course is designed to provide experience in diagnosis, interpretations of laboratory tests, natural history, and treatment of acute and chronic disorders of the kidney in children. The student also is exposed to the management of fluid and electrolyte disorders in infants and children. Prerequisite: prior approval of Dr. Wigfall. Credit: 1 to 4. Enrollment: max 1. *Foreman and Wigfall*

PEDS-443C. ADOLESCENT MEDICINE. Students participate in a weekly seminar on Tuesday mornings with an emphasis on the behavioral and developmental aspects of adolescence, substance abuse, contraception, and eating disorders. Patient interactions are arranged at Duke Children's Primary Care on Monday and Friday afternoons. Optional clinic time may be arranged at Wake Teen Medical Services in Raleigh on Wednesday afternoons, or at the Sports Medicine Clinic on Friday afternoons. Tutorial and supervisory time to discuss specific patients and pertinent literature is arranged. A brief, informal presentation on the student's adolescent topic of choice is expected at the end of the clerkship. Credit: 2. Enrollment: max 1. *Bravender*

PEDS-445C. CLINICAL APPLICATION OF GENETICS. Genetics is no longer an isolated specialty of medicine dealing only with rare disorders of children and reproductive options for families. It has rapidly become an important aspect utilized by all areas of medicine. As such an understanding of the clinical applications and subsequent social and ethical implications of genetic science, as well as the ability to "translate" this complex information to their patients is relevant to all new and current physicians. This course is designed to expand the fundamentals of Interdis 100B focused on their utility within clinical situations. We will also explore current and future testing options, how to communicate risk information and anticipate ethical dilemmas. Class will meet Monday and Wednesday from 12:30 - 1:30 p.m. Credit: 1. Max: 30 Min: 4.*McConkie-Rosell and O'Daniel*

PHARMACOLOGY AND CANCER BIOLOGY

Basic Science Electives

PHARM-333B. 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-334B. INTERDISCIPLINARY APPROACH TO PHARMACOLOGY. Several model systems (cardiovascular, reproductive, neural, and cell cycle) are to be used to explore the molecular, biochemical, and physiologic basis of drug action. C-L: Graduate School. Credit: 3. Enrollment: max 20. *Whorton and staff*

PHARM-339B. RESEARCH IN PHARMACOLOGY. Laboratory investigation in various areas of pharmacology. C-L: Graduate School. Credit to be arranged. Credit: 1-16. *Staff*

PSYCHIATRY

Required Course

PSYCHTRY-205C. PSYCHIATRY. This course is a required four-week clerkship in clinical psychiatry for second year medical students. Students assume limited responsibility with supervision for the diagnosis and treatment of patients with common and severe psychiatric illnesses. Educational settings include inpatient psychiatry services at four different hospitals, psychiatry outpatient clinics, and the psychiatry emergency rooms of two hospitals. Students participate in a series of core didactic lectures and didactic modules which expose them to basic psychopathologic entities, differential diagnosis of psychiatric symptoms, practical application of treatment modalities, and issues of cost effectiveness in diagnosis and treatment. Students also participate in lectures, rounds, and clinical case conferences particular to their rotation site. Students are encouraged to observe psychotherapy and to participate in supervised psychological treatments wherever appropriate opportunities can be provided. Credit: 4. *Stein*

Basic Science Electives

PSYCHTRY-323B. NEUROBIOLOGICAL BASIS OF BEHAVIOR. The course surveys neuroanatomical, neurophysiological, neurochemical and neuropharmacological evidence of central nervous system function as it relates to normal and abnormal behavior. Clinical description, measurements of function and laboratory models of function as well as the biological substrates of affective disorders and psychoses are emphasized. Scientific bases of current therapeutic procedures, especially psychopharmacological, are examined. Course format consists of assigned readings, study questions, and lectures by faculty and other active researchers. Mid-term and final examinations are given. Each student is expected to critique a circumscribed area of research literature focusing on the appropriateness of conceptualizations and experimental methods. Additionally, students have an opportunity to become acquainted with, and to participate in, ongoing research. C-L Graduate School, PHARM 423. Credit: 4. Enrollment: min 1. *Krystal*

PSYCHTRY-327B. 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-339B. PRECEPTORSHIP IN BEHAVIORAL NEUROSCIENCES. This course provides an opportunity for the student to work closely with a member of the faculty in an area of mutual interest with emphasis upon research (see the website: http://third-year.mc.duke.edu, Behavioral Neurosciences Study Program section, for partial list of interest areas; more complete descriptions available). Credit: 1-16. *Krystal*

Clinical Science Selective – 2nd Year

PSYCHTRY-220C. ADDICTION PSYCHIATRY. Students are exposed to the multidisciplinary, biopsychosocial evaluation and treatment of individuals with substance use disorders, including abuse and dependence involving alcohol, tobacco, illicit drugs and prescription medications. Students encounter patients engaged in the process of active, ongoing recovery from addictions, employing individual and group therapies, pharmacotherapy, and self-help groups. They are exposed to the assessment and management of patients with comorbid psychiatric disorders and addiction. Assigned readings address epidemiology, neurobiology, and clinical management of addictions. *Stein*

PSYCHTRY-221C. CLINICAL INTRO TO CHILD PSYCHIATRY. This two-week course will be an opportunity to observe and learn about the specialty of child psychiatry. A series of clinical experiences with children and adolescents who are experiencing mental health problems and disorders will be offered in both an outpatient and inpatient setting. Medical Students will have opportunities to observe comprehensive evaluations, consultations, and treatments. Participation in a weekly Evidence Based Medicine seminar and didactic sessions in child psychopathology will be included. *Chrisman and Allsbrook*

PSYCHTRY-222C. GERIATRIC PSYCHIATRY. Objective: To provide exposure to the psychiatric care of geriatric patients. Students will rotate on an inpatient unit at John Umstead Hospital, and in a variety of outpatient/ consultation settings including the Neurodiagnostic Clinic, the GET clinic and the Forest at Duke Nursing Home. Students will learn about comprehensive psychiatric evaluation of older patients with a variety of psychiatric diagnoses including mood disorders, dementia, psychotic disorders, and personality disorders, usually in the context of significant medical co-morbidity. Students will also learn the bio-psycho-social approach to managing various disorders. Students will participate in ongoing weekly didactic seminars and journal club. *Thakur*

Clinical Science Electives – 2nd Year

PSYCHTRY-253C. 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 Jeff Georgi (for DAP) at least eight weeks prior to desired term in order to develop a plan appropriately tailored to the student's interests. Prerequisite: PSYCHTRY 205C Credit: 4. Enrollment: min 1, max 2. *Stein, Georgi*

PSYCHTRY-255C. MODERN PSYCHOTHERAPY: INTENSIVE CLINICAL INTRODUCTION. In this full-time (or near full-time) introduction, the student participates actively in assessment of outpatients for psychotherapy, short-term psychotherapy of inpatients, ongoing psychotherapy groups, and family therapy sessions. In addition he/she

attends seminars on the various psychotherapeutic approaches: psychoanalytically oriented, cognitive, behavioral, interpersonal, systemic, etc. Readings are assigned and discussed. The student may pursue an area of special interest in greater depth with a selected preceptor. Permission of instructor is required to elect the course at any time other than section 41 of the fall term. Prerequisite: PSYCHTRY 205C Credit: 4. Enrollment: min 1. *Kudler*

PSYCHTRY-265C. 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 depend on the availability and location of psychiatric consultants with those interests. The rotation is flexible. We try to match student interests with the interests of available consultants. Students need to check with Dr. Volow (VA) or Dr. Varia (Duke) four weeks in advance on the current availability on this rotation. Prerequisite: PSYCHTRY 205C Credit: 4. Enrollment: max 1. linical Science Electives – 4th Year

PSYCHTRY-401C. 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). Prerequisites: instructor approval and satisfactory completion of PSC-205C (or equivalent for visiting students).Credit: 4 or 8. Enrollment: max 1. *Raj*

PSYCHTRY-405C. SUBINTERNSHIP IN INTERNAL MEDICINE/PSYCHIATRY. This course is an intensive clinical experience in the diagnosis and treatment of severe and incapacitating co-morbid medical and psychiatric disorders requiring acute hospitalization. Students participating in this four-week elective based in Duke North Hospital are expected to function with intern-level responsibility, assuming complete care of assigned patients. The Medicine/Psychiatry faculty on the GenMed 12 service provides direct supervision. The goal of the elective is to refine and then clinically apply a basic knowledge base from the fields of Internal Medicine and Psychiatry. Participation at selected case conferences and didactic sessions is expected. Additionally, each student is required to present two patient case-based, critically appraised topics during the elective. Call is taken in both Medicine and Psychiatry in alternating fashion every fifth night. Prerequisite: permission of instructor and successful completion of PSC-205C and MD-205C. Credit: 5. Enrollment: max 1. *Raj, Christopher*

PSYCHTRY-430C. NEUROPSYCHIATRY. Neuropsychiatry is the study of how alterations in brain structure and function produce disturbances in human behavior. In this course, the student becomes familiar with the major neuropsychiatric syndromes: dementia, delirium, and selective organic mental syndromes such as organic personality syndrome (e.g., frontal lobe syndrome) and organic affective syndrome (e.g., post-stroke depression).

The student develops an understanding of diagnosis and treatment based upon a multidisciplinary clinical approach including specialized clinical neuropsychiatric exams. The patient population is drawn from the Duke Medical Center and Durham VA Hospital psychiatry, neurology, and neurosurgery services. Depending on the site, the student may also have an opportunity to become familiar with specialized neuropsychiatric approaches including psychometric testing and neural imaging techniques such as EEG and computerized EEG, CT scan, MRI, cerebral blood flow, and PET scan. Credit: 4. Enrollment: max 1. . Prerequisites: instructor approval and satisfactory completion of PSC-205C. *Steffens.*

PSYCHTRY-435C. MODERN PSYCHOTHERAPY: INTENSIVE CLINICAL INTRODUCTION. In this full-time (or near full-time) introduction, the student participates actively in assessment of outpatients for psychotherapy, short-term psychotherapy of inpatients, ongoing psychotherapy groups, and family therapy sessions. In addition he/she attends seminars on the various psychotherapeutic approaches: psychoanalytically oriented, cognitive, behavioral, interpersonal, systemic, etc. Readings are assigned and discussed. The student may pursue an area of special interest in greater depth with a selected preceptor. Permission of instructor is required to elect the course at any time other than section 41 of the fall term. Credit: 4. Enrollment: min 1. Prerequisites: instructor approval and satisfactory completion of PSC-205C. *Kudler*

PSYCHTRY-443C. CLINICAL ASPECTS OF ALCOHOL AND DRUG ABUSE. This course offers students experience in the outpatient treatment of patients with substance use disorders. Students are based at the Durham VAMC Substance Abuse Outpatient Program (VA-SAOP), with exposure at other Duke-affiliated treatment facilities. 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. Credit: 4. Enrollment max 1. Prerequisites: instructor approval and satisfactory completion of PSC-205C. *Stein.*

PSYCHTRY-445C. 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 depend on the availability and location of psychiatric consultants with those interests. The rotation is flexible. We try to match student interests with the interests of available consultants. Students need to check with Dr. Moore (VA) or Dr. Varia (Duke) four weeks in advance on the current availability on this rotation. Prerequisites: instructor approval and satisfactory completion of PSC-205C. Credit: 4. Enrollment: max 1. *Varia*

RADIATION ONCOLOGY

Basic Science Elective

RADONC-327B. 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 car-

cinogenesis; 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-labeled monoclonal antibodies; hyperthermia; radiation/drug and heat/drug interactions. See instructor for start date of class. Prerequisite: permission of instructor. Credit: 2. Enrollment: max 10. *Dewhirst*

Clinical Science Selective – 2nd Year

RADONC-220C. BRIEF EXP. IN CLINICAL RADIATION/ONCOLOGY. Radiation therapy plays an important role in the care of patients with cancer. Students will begin this course with an orientation lecture, review of an educational syllabus, and several audio-visual educational programs. This will be followed by clinical instruction in the ambulatory clinics of the radiation oncology department at Duke. Students will have an opportunity to observe/participate in the evaluation, treatment planning, and care of patients before, during, and after their radiation. *Marks*

Clinical Science Elective – 2nd Year

RADONC-255C. 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. Enrollment: max 2. *Marks and staff*

Clinical Science Elective – 4th Year

RADONC-415C. 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

Basic Science Electives

RADIOL-335B. INTRODUCTION TO DIAGNOSTIC ULTRASOUND. This elective is for medical students who wish to learn the use of sonography as a diagnostic skill with the goal of being able to employ sonography as a guide for simple procedures and as a supplement to the physical examination. Credit: 3. Enrollment: max 5, min 2. *Bowie*

RADIOL-339B. RESEARCH IN RADIOLOGY. Advanced Laboratory in Medical Imaging. The student will be paired with a faculty engineer or physicist and a practicing radiologist for a semester project focused on some current clinical physics question. Working with the technical and clinical mentors, the student will design a research project that will ex-

plore via phantom evaluation, simulation, or software modeling the impact of the choice of imaging parameters on clinical imaging. Clinical imaging protocols will be evaluated to determine where the medical physicist/biomedical engineer can provide useful insight in translating technical understanding to clinical protocols. The student will choose a project in CT, MRI conventional radiography, ultrasound, nuclear medicine, or advanced image processing. The course will include a weekly seminar on current imaging topics and will require a scholarly report which will be posted on the Imaging Physics web site for future reference. Credit: 1-16. Enrollment: max 10. *Johnson*

Clinical Selective – 2nd Year

RADIOL-221C. INTRODUCTION TO RADIOLOGY. This selective is designed to introduce students to the field of radiology. Students will be exposed to different imaging modalities in radiology. The goal is for students to understand when to use different modalities for patient care. While students will observe radiologist interpreting films, interpretation is not the focus of this selective. Please check in with Miss Cudic. Max 35, Min 1; *Nancy Major*

Clinical Science Electives – 2nd Year

RADIOL-250C. THORACIC IMAGING. This course will provide the ability to interpret chest radiographs and increase the student's confidence in diagnosing cardiac and pulmonary diseases from chest films. Through formal teaching sessions and case presentations, as well as daily interactions with surgical and medical clinical teams, the student will be exposed to the broad range of modalities and interventional procedures conducted by the thoracic imaging division. Opportunities exist to become involved in research projects. During the course of one month, the student will have interpreted or observed the reading of more than 1,000 chest radiographs. Credit: 4. Enrollment: max 1. *Goodman and staff*

RADIOL-251C. CLERKSHIP IN NEURORADIOLOGY. A specialized program of detailed instruction in neuroradiology. The program includes participation in many interdepartmental conferences and the performance and interpretation of a variety of examinations including cerebral angiography, computerized axial tomography, magnetic resonance images, and myelography. Credit: 4. Enrollment: max 2. *Provenzale and staff*

RADIOL-252C. PEDIATRIC RADIOLOGY. A specialized program of instruction and participation in the wide variety of radiographic examinations in the pediatric age group. Special correlation of these examinations to the problems of specific diagnosis and patient care is made. Credit: 4. Enrollment: max 2. *Frush and staff*

RADIOL-257C. MUSCULOSKELETAL IMAGING. During this four week elective, the student will be exposed to conventional x-rays in bone radiology, emergency room bone films, bone tumor films and musculoskeletal MRI. At the conclusion, the student will be able to identify fractures and have a working knowledge of musculoskeletal radiology. A case presentation will be required. Credit 4. Enrollment: max. 2. *Major*

Clinical Science Electives – 4th Year

RADIOL-420C. PEDIATRIC RADIOLOGY. A specialized program of instruction and participation in the wide variety of radiographic examinations in the pediatric age group. Special correlation of these examinations to the problems of specific diagnosis and patient care is made. Credit: 4 or 8. Enrollment: max 2. *Frush and staff*

RADIOL-421C. 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 examina-

tions including cerebral angiography, computerized axial tomography, magnetic resonance images, and myelography. Credit: 4 or 8. Enrollment: max 2. *Provenzale and staff*

RADIOL-429C. BASIC RADIOLOGY CLERKSHIP. This course is designed to provide an overview of the various imaging modalities of diagnostic radiology and their clinical utility. The elective consists of: (a) lectures and film interpretation sessions supplemented by student presentations; (b) assignment to a variety of diagnostic radiology services during which students observe the performance of diagnostic and interventional studies; and (c) use of a teaching file of radiographs and diagnostic images. One week is spent on the thoracic radiology service. Additional rotations may include the musculoskeletal, neuroradiology, mammography, vascular/interventional, pediatric, CT/abdominal imaging, ultrasound, nuclear medicine, gastrointestinal, and emergency radiology services. Credit: 4. Enrollment: min 4, max 12. *Major and staff*

RADIOL-430C. THORACIC IMAGING. This course will provide the ability to interpret chest radiographs and increase the student's confidence in diagnosing cardiac and pulmonary diseases from chest films. Through formal teaching sessions and case presentations, as well as daily interactions with surgical and medical clinical teams, the student will be exposed to the broad range of modalities and interventional procedures conducted by the thoracic imaging division. Opportunities exist to become involved in research projects. During the course of one month, the student will have interpreted or observed the reading of more than 1,000 chest radiographs. Prerequisite: Basic Radiology Clerkship elective preferred but not mandatory. Credit: 4. Enrollment: max 1. *Goodman and staff*

RADIOL-437C. MUSCULOSKELETAL IMAGING. During this four week elective, the student will be exposed to conventional x-rays in bone radiology, emergency room bone films, bone tumor films and musculoskeletal MRI. At the conclusion, the student will be able to identify fractures and have a working knowledge of musculoskeletal radiology. A case presentation will be required. Credit 4. Enrollment: max. 2. *Major*

STUDY AWAY

Clinical Science Elective– 2nd Year

STDYAWAY-251C. STUDY AWAY AT UNC. Second year study away

Clinical Science Elective – 4th Year

STDYAWAY-411C. STUDY AWAY AT UNC. Fourth year clinical elective at UNC.

STDYAWAY-421C. STUDY AWAY AT WAKE FOREST UNIVERSITY SCHOOL OF MEDICINE. Fourth year clinical elective at WFU.

STDYAWAY-431C. STUDY AWAY AT EAST CAROLINA UNIVERSITY SCHOOL OF MEDICINE. Fourth year clinical elective at ECU.

SURGERY

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*

Clinical Science Selective – 2nd year

SURGERY-220C. NEUROSURGICAL INTERVENTION IN THE MODERN ERA. This neurosurgery selective is designed to introduce the second year medical student to the medical and surgical aspects of comprehensive neurosurgery, including the subspecialties (cerebral aneurysm disease, intracranial malignancy in the adult, intracranial malignancy in the pediatric patient, benign intracranial tumors, peripheral nerve reconstruction, spinal surgery, traumatic brain injury, traumatic spinal cord injury). There will be didactic instruction with patient care exposure in the clinic setting, the Emergency Department, on the surgical wards and in the operating room. *Allan Friedman*

SURGERY-221C. SURGICAL TREATMENT OF HEARING PROBLEMS & DISEASES OF THE HEAD AND HECK, FROM INFANTS TO ELDERLY. This otolaryngology selective is designed to introduce the second year medical student to the medical and surgical aspects of comprehensive head and neck surgery, including the subspecialties (pediatric, cholesteatoma and hearing loss, benign disease of the upper aerodigestive tract, malignant disease of the upper aerodigestive tract, reconstruction after tumor surgery, craniomaxillofacial, trauma). There will be didactic instruction with patient care exposure in the clinic setting, emergency department, outpatient surgery center and the operating room. *Farmer*

SURGERY-222C. ORTHOPEDIC SURGERY: FROM ELECTIVE TO EMERGENT, RECONSTRUCTION AND REHABILITATION. This orthopedic surgery selective is designed to introduce the second year medical student to the medical and surgical aspects of comprehensive orthopedic surgery, including the subspecialties (hand, extremity salvage, soft tissue coverage, reconstructive microsurgery, sports medicine, benign and malignant bone tumors, trauma). There will be didactic instruction with patient care exposure in the clinic setting, outpatient surgery center and the operating room. *Levin*

SURGERY-223C. FROM COSMESIS TO RECONSTRUCTION, FROM INFANTS TO THE ELDERLY. This plastic surgery selective is designed to introduce the second year medical student to the medical and surgical aspects of comprehensive plastic surgery, including the subspecialties (hand, aesthetics, extremity salvage, soft tissue coverage, craniomaxillofacial, reconstructive microsurgery). There will be didactic instruction with patient care exposure in the clinic setting, outpatient surgery center and the operating room. *Levin*

SURGERY-224C. SURGICAL CRITICAL CARE IN THE MODERN ERA. The Surgical Critical Care Selective introduces the second year medical student to the comprehensive care of the critically ill surgical patient. Students participate in the care of: the postoperative patient, the septic patient, the patient after multiple trauma, the patient suffering from multi-system organ failure, and the patient with acute lung injury/acute respiratory distress syndrome. Students are part of the Surgical Critical Care team. Students present on

rounds, participate in didactic sessions, and experience direct patient care exposure in the Surgical Intensive Care Unit (SICU) setting. *Sebastian*

SURGERY-225C. MODERN THORACIC SURGERY: FROM RESECTION AND STAGING TO GENE THERAPY. This thoracic surgery selective is designed to introduce the second year medical student to the medical and surgical aspects of comprehensive thoracic surgery, including the subspecialties (benign and malignant thoracic tumors, trauma, disorders of the esophagus, tracheal reconstruction, thoracoscopic intervention, tumor staging and novel therapeutic strategies). There will be didactic instruction with patient care exposure in the clinic setting, outpatient surgery center and the operating room. *D'Amico*

SURGERY-226C. MODERN CARDIAC SURGERY: FROM CABG TO GENE THERAPY. This cardiothoracic surgery selective is designed to introduce the second year medical student to the medical and surgical aspects of comprehensive cardiac and thoracic surgery, including the subspecialties (adult ischemic Coronary Artery Bypass Grafting (CABG), adult valvular, minimally invasive CABG, congenital cardiac repair, redo surgery, robotic cardiac surgery). There will be didactic instruction with patient care exposure in the clinic setting, outpatient surgery center and the operating room. *Milano*

SURGERY-227C. UROLOGY: SURGICAL TRTMNT OF BENIGN UROGENITAL PROBS & MALIGNANT DISEASES IN UROGENITAL TRACT -. This urology selective is designed to introduce the second year medical student to the medical and surgical aspects of comprehensive urologic surgery, including the kidneys, ureters, bladder and male reproductive system and its subspecialties (pediatric, incontinence in the male and the female, sexual dysfunction, benign disease of the urogenital tract, malignant disease of the urogenital tract, reconstruction after tumor surgery, trauma). There will be didactic instruction with patient care exposure in the clinic setting, emergency department, outpatient surgery center and the operating room. *Murphy*

Clinical Science Electives – 2nd Year

SURGERY-250C. 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. *Tyler, Leight, Seigler, Lylerly, and Clary*

SURGERY-251C. INTRODUCTION TO THE SURGICAL INTENSIVE CARE UNIT. This course is designed for second year medical students to allow students a four-week elective experience in the Surgical Intensive Care Unit (SICU). Under supervision of a multidisciplinary Faculty consisting of Attendings from the Departments of Surgery, Medicine and Anesthesia, the student participates in the care of critically ill adult patients admitted to the SICU. Emphasis is placed on the development of the pathophysiologic approach to the diagnosis and therapy of a broad spectrum of patients admitted to the SICU for postoperative care, treatment of traumatic injury, and support of organ failure. Advanced concepts in adult critical care are emphasized, including the modern treatment of Acute Lung Injury (ALI), Multiple Organ Failure, and overwhelming infection. Prerequisite: SURG 205C. Credit: 4. Enrollment: max 2. *Sebastian, Tuttle, Vaslef, Govert, Knudsen, Moretti, Young.*

SURGERY-252C. EMERGENCY MEDICINE. Course Goals: 1) This elective will provide exposure to emergency clinical problems. 2) Students will see patients of all ages with the full range of chief complaints that present to the Duke University Emergency Department. 3) Students will gain experience in making initial evaluations as well as diagnostic and treatment plans with an emphasis on detecting and treating immediate life threatening conditions. 4) Their ability to rapidly obtain critical facets of a history and physical examination will improve. 5) Students will mature as clinical problem-solvers by seeing several patients per day with undifferentiated chief complaints. How Goals Are Achieved: 1) Students will present to attendings and residents during approximately 18 ten-hour shifts per month. A mixture of day, evening, and overnight shifts will be assigned. 2) Didactic sessions will be held weekly. 3) Students will present one 15-minute lecture per month on a case/topic of interest. 4) Students will shadow a Durham EMS paramedic team for one day. Methods of Evaluation: Attendings will give feedback to students. Prerequisites: none. Credit: 4. Enrollment: max 6. *Gerardo*

SURGERY-253C. TRAUMA SERVICE. This course is designed to provide students interested in trauma care with further experience both in the Emergency Department and on the Inpatient Trauma Service. The course emphasizes both triage and resuscitation for major and minor emergency problems in the Emergency Department and also pre- and postoperative care on the Inpatient Trauma Service. The student has a full-time experience by assuming duties and responsibilities similar to a junior intern. Emphasis is placed on developing skills in the care of patients with multi-system injuries in the Emergency Department, Inpatient Service, and Operating Room. Students work in conjunction with the attending staff and the residents on the Trauma Service. Credit: 4. Enrollment: max 2. *Vaslef, Georgiade, and Sebastian*

SURGERY-256C. 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. Prerequisite: brief pre-enrollment interview with Dr. Michael Skinner. Credit: 4. Enrollment: max 1. *Skinner*

SURGERY-257C. 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. Enrollment: max 3. *Preminger, Paulson, Albala, Anderson, Wiener, Webster, Donatucci, Walther, and Robertson*

SURGERY-258C. 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-263C. ADVANCED SURGERY-EMPHASIS CARDIOVASCULAR/THORACIC. Advanced concepts in surgery are presented in seminars and in ward, clinic, and operating room experiences. Fifty to 75 percent of the time is devoted to cardiovascular/thoracic surgery and related basic topics and the remainder to surgery generally. Credit: 4. Enrollment: min 2, max 5. *D'Amico, Wolfe, Anderson, Jones, Lowe, Smith, Young, Glower, Davis, Jaggers, and Harpole*

SURGERY-269C. 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. Enrollment: max: 2. *Farmer, Fisher, Scher, Witsell, Tucci, Hulka, and Hung*

SURGERY-279C. GENERAL PRINCIPLES OF ORTHOPAEDICS. A full experience on the Orthopaedic Service with duties and responsibilities similar to a first year resident. Inpatient care, outpatient examination, operating room experience, and emergency room call are included. Conference attendance is required. Individual or group discussions are conducted each day with attending staff/residents. The purpose of the course is to present broad concepts of orthopaedics to students planning general practice, pediatrics, allied surgical specialties, or orthopaedics. Credit: 4. Enrollment: max 4 for 4 weeks. *Nunley, orthopaedic staff and house staff.*

Clinical Science Electives – 4th Year

SURGERY-401C. ADVANCED SURGICAL CLERKSHIP. This course is structured to provide the student with a comprehensive approach to surgical disorders. Each student works in the clinics, on the wards, and in the operating rooms side by side with one senior surgeon to be selected from the approved list below. Credit: 5 or 10. *Pappas, Bollinger, Clary, Collins, D'Amico, Davis, Desai, Georgiade, Jones, Jaggers, Kuo, Leight, Lowe, Ludwig, Lyerly, Mantyh, Marroquin,McCann, Olson, Sebastian, Seigler, Smith, Tyler, Vaslef, and Wolfe*

SURGERY-412C. EMERGENCY MEDICINE. Course Goals: 1) This elective will provide exposure to emergency clinical problems. 2) Students will see patients of all ages with the full range of chief complaints that present to the Duke University Emergency Department. 3) Students will gain experience in making initial evaluations as well as diagnostic and treatment plans with an emphasis on detecting and treating immediate life threatening conditions. 4) Their ability to rapidly obtain critical facets of a history and physical examination will improve. 5) Students will mature as clinical problem-solvers by seeing several patients per day with undifferentiated chief complaints. How Goals Are Achieved: 1) Students will present to attendings and residents during approximately 18 ten-hour shifts per month. A mixture of day, evening, and overnight shifts will be assigned. 2) Didactic sessions will be held weekly. 3) Students will present one 15-minute lecture per month on a case/topic of interest. 4) Students will shadow a Durham EMS paramedic team for one day. Methods of Evaluation: Attendings will give feedback to students. Prerequisites: none. Credit: 4. Enrollment: max 6. *Gerardo*

SURGERY-415C. CLINICAL MANAGEMENT OF OBESITY. The epidemic of obesity in the United States demands a course for medical students that helps them understand the underlying biochemical, pathophysiology and treatment options. Every physician who practices in the 21st century should have a basic knowledge of the principles of human nutrition and their application to a wide variety of clinical problems. This four-week interdisciplinary elective under the direction of the Stedman Nutrition Center is a collaboration between the Departments of Medicine, Pediatrics, Family Medicine, and Surgery. This elective provides the students with an opportunity to learn about a clinical approach to obesity management, including metabolic and pathologic consequences of being overweight and the relationship to the following chronic disorders: hypertension, insulin resistance, and dyslipidemia. The student will learn about cellular signaling mechanisms that influence obesity by

attendance at basic science seminars at the Stedman Nutrition Center. Students will learn to counsel/motivate patients to make informed nutritional decisions consistent with adopting and maintaining a healthy lifestyle and with establishing appropriate dietary, exercise and behavioral goals. The elective director will approve a student's choice of a mentor. This approval will be based on matching the student's interests with the primary focus of the mentor. The assigned mentor will coordinate the student's experiences throughout the four-week rotation with a focus on clinical applications of obesity management. The program includes the following components: 1. One day of outpatient clinics in the following clinics: Hypertension Clinic, Pediatric Clinic, Diabetes Clinic, Duke Weight Loss Surgery Center, and the Duke Diet and Fitness Center. The focus of the student's experience will be on learning to translate basic science information into clinically relevant principles that guide medical decision-making as they apply to obesity management. (Total clinical time--32 hours) 2. Research and departmental seminars sponsored by the Stedman Nutrition Center (1 hour per week). Students will be expected to participate in and present one seminar reviewing current research in a selected field of Obesity Research. 3. A review paper in a topic area designated by the mentor. Emphasis will be placed on developing skills required to formulate original research proposals in the area of applied clinical research. (1-2 hours of mentoring time per week) Prerequisite: permission of instructor. C-L: MEDICINE 415C, PEDS 415C, SURGERY 415C. Credit: 4. Enrollment: max 1. *Westman*

SURGERY-420C. 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. *Tyler, Leight, Seigler, Lylerly, and Clary*

SURGERY-421C. INTRODUCTION TO FRACTURES AND MUSCULOSKELETAL TRAUMA. Students participate in the emergency management of patients through the Duke or Durham Regional Hospital Emergency Rooms. Principles of fractures and trauma are given during emergency room assignment. Requirements are: attendance at one outpatient clinic per week, two nights per week on call in the emergency room, and attendance at Grand Rounds Conf. on Wednesday at 7:00 a.m. and Fracture Conference on Saturdays at 7:30 a.m. Credit: 3. Enrollment: max 2 for four weeks. *Nunley, Duke orthopaedic staff, and Durham Regional Hospital orthopaedic staff*

SURGERY-423C. ADVANCED SURGERY-EMPHASIS CARDIOVASCULAR/THORACIC. Advanced concepts in surgery are presented in seminars and in ward, clinic, and operating room experiences. Fifty to 75 percent of the time is devoted to cardiovascular/thoracic surgery and related basic topics and the remainder to surgery generally. Credit: 8. Enrollment: min 2, max 5. *Wolfe, Anderson, Jones, Lowe, Smith, Young, Glower, Davis, Jaggers, D'Amico, and Harpole*

SURGERY-425C. 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 ab-

normal function, principles of evaluation, and management of disorders. Prerequisite: permission of instructor. Credit: 1. Enrollment: max 5. *DeRuyter*

SURGERY-426C. 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-401c or with four weeks of neonatology (PEDS-426C) or other courses depending on the interests of the student. Prerequisite: brief pre-enrollment interview with Dr. Michael Skinner. Credit: 4 or 8. Enrollment: max 1. *Skinner*

SURGERY-427C. 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. *Preminger, Paulson, Albala, Anderson, Wiener, Webster, Donatucci, Walther, and Robertson*

SURGERY-428C. 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-429C. GENERAL PRINCIPLES OF ORTHOPAEDICS. A full experience on the Orthopaedic Service with duties and responsibilities similar to a first year resident. Inpatient care, outpatient examination, operating room experience, and emergency room call are included. Conference attendance is required. Individual or group discussions are conducted each day with attending staff/residents. The purpose of the course is to present broad concepts of orthopaedics to students planning general practice, pediatrics, allied surgical specialties, or orthopaedics. Credit: 4. Enrollment: max 4 for 4 weeks. *Nunley, orthopaedic staff and house staff.*

SURGERY-430C. INTRODUCTORY CLINIC COURSE IN CHILDREN'S ORTHOPAEDICS. This introductory clinic course is arranged for those interested in pediatric orthopaedic problems, neurological disease, and related fields. The course gives the student a working experience in the examination and evaluation of clinical outpatients, inpatients, and surgical patients. It demonstrates both the individual and multidisciplined 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 for four weeks. *Fitch and Lenox Baker Children's Hospital staff*

SURGERY-435C. CLINICAL NEUROSURGERY. The course is designed for those students with a career interest in one of the neurological sciences. Duties include the work-up and care of inpatients, work-up of clinic patients, assistance in the operating room, daily rounds, and night call. Weekly conferences are held in neurosurgery, neurology, neuropathology, and neuroradiology. There are also special lectures. Credit: 4 or 8. Enrollment: max 4. *Friedman, Fuchs, Turner, Haglund, Sampson, Alexander, George, and Osenbach*

SURGERY-436C. INTERMEDIATE CLINICAL NEUROSURGERY. This elective, intended as an intermediate experience that focuses on the clinical presentation of common neurosurgical disorders, radiographic evaluation, and therapeutic options including the indications and contraindications for surgical intervention. The student works up one to three patients and assists at their operations the following day either once or twice per week, and attends the Saturday, neurosurgical conference. Credit: 1 or 2. Enrollment: max 1. *Friedman, Turner, Fuchs, Haglund, George, Sampson, Alexander, and Osenbach*

SURGERY-437C. 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-435C suggested. Credit: 8. Enrollment: max 2. *Friedman, Turner, Fuchs, Haglund, Sampson, and Alexander*

SURGERY-439C. CLINICAL OTOLARYNGOLOGY. This course provides the student with a comprehensive survey of clinical otolaryngology. Duties include participation in both outpatient clinic activities and inpatient care in addition to assisting in the operating room. The student participates in ward rounds and in various conferences held by the division. Credit: 4 or 8. Enrollment: max: 2. *Farmer, Fisher, Scher, Witsell, Tucci, Hulka, and Hung.*

SURGERY-441C. 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-441C. Credit: 5. Enrollment: max 2. *Sebastian, Vaslef, Tuttle-Newhall, and staff*

SURGERY-443C. TRAUMA SERVICE. This course is designed to provide students interested in trauma care with further experience both in the Emergency Department and on the Inpatient Trauma Service. The course emphasizes both triage and resuscitation for major and minor emergency problems in the Emergency Department and also pre- and postoperative care on the Inpatient Trauma Service. The student has a full-time experience by assuming duties and responsibilities similar to a junior intern. Emphasis is placed on developing skills in the care of patients with multi-system injuries in the Emergency Department, Inpatient Service, and Operating Room. Students work in conjunction with the attending staff and the residents on the Trauma Service. Credit: 4. Enrollment: max 2. *Vaslef, Georgiade, and Sebastian*

SURGERY-444C. INTRODUCTION TO PLASTIC, RECONSTRUCTIVE AND MAXILLOFACIAL SURGERY. This course is designed for students who may have a future interest in plastic surgery. Duties include the preoperative evaluation of patients, assisting in the operating room, making daily ward rounds, and participation in conferences. Credit: 4. Enrollment: max 5. *Levin, Georgiade, Zenn, Gunn, Marcus and Erdmann*

SURGERY-445C. 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-446C. CLERKSHIP IN PLASTIC AND RECONSTRUCTIVE SURGERY. The student participates in evaluation and management of plastic surgery patients including preoperative assessment, surgical assistance, and postoperative follow-up in a private office and at Durham Regional Hospital. Daily seminars cover core topics such as skin and surgical techniques, wound healing, and scars. Credit: 4. Enrollment: max 1. *Levin, Georgiade, Zenn, Gunn, Marcus and Erdmann*

THESIS

Required Course – 3rd Year

THESIS-301B. THESIS. Graduation from Duke School of Medicine (or continuation with fourth year rotations after completion of third year research) requires completion of an acceptable thesis describing quantitative research. The thesis is in the form of a manuscript of 15-20 double-spaced pages, in addition to any relevant figures. It should include an abstract, introduction with hypothesis, materials and methods, discussion, results and references. The cover page is signed by the student, the mentor and the study program director and must be submitted to the third year coordinator by mid-April for eight-month students and mid-August of the student's fourth year for 12-month students. In addition, students must post the thesis in its entirety on a pdf database for review by the study program directors. Instructions on posting theses and details on the formatting of the thesis are located on the Thesis Requirements tab of the third year website: http://thirdyear.mc.duke.edu. The thesis will receive a separate grade and number of credits from the research course. Credit: 3. *Staff*

Special Interdisciplinary Training Programs

Anesthesiology, Surgery & Environmental Physiology ASEP-301B. RESEARCH IN ASEP.

Program Directors: Kathryn P. King, M.D.(Coordinating Director); Richard Moon, M.D.; Bryant W. Stolp; M.D., Ph.D.; David S. Warner, M.D.

While the university offers a range of opportunities from biochemistry to organ physiology, anesthesiology, surgery and critical care integrates these multiple systems into a larger perspective of human pathophysiology and pharmacology. Students have opportunities for research in cardiovascular and respiratory physiology, molecular pharmacology, neurobiology, and environmental science. Regardless of ultimate career choice, investigation in anesthesiology, surgery and critical care medicine provides strong basic science grounding and application of research principles. An area of independent study is defined and a hypothesis proposed as part of an ongoing interaction between the student and the laboratory mentor. Necessary methodological skills are learned by the student early in the course of study to allow data acquisition for subsequent analysis and interpretation. As the year progresses, students participate in "work in progress" seminars that focus on the development of scientific information. Emphasis is placed on experimental design and statistical analysis. At the end of the year, each student is expected to have completed a project of sufficient merit to warrant presentation and publication. Further, the Department of Anesthesiology offers a unique opportunity for the students to present their projects in a formal setting moderated by an external reviewer of national stature. Additional courses in Physiology and Medicine of Extreme

Environments are available for interested students. Students meet periodically with the Coordinating Director individually to monitor progress in the laboratory and also during every two month ASEP group meetings, held over hosted lunches.

FACULTY: David L. Albala, M.D.; Richard L. Auten, Jr., M.D.; Yehia Daaka, Ph.D.; Tong J. Gan, M.D.; Hilary P. Grocott, M.D., F.R.C.P.C.; Elliott Bennett-Guerrero, M.D.; Kathryn P. King, M.D.; Stephen M. Klein, M.D.; Madan M. Kwatra, Ph.D.; Sandhya A. Lagoo-Deenadayalan, M.D.; Ph.D.; Jeffery H. Lawson, M.D., Ph.D.; Terri Monk, M.D.; Richard Moon, M.D.; David Needham, Ph.D.; Laura E. Niklason, M.D., Ph.D.; Claude A. Piantadosi, M.D.; Thomas Polascik, M.D.; Glenn M. Preminger, M.D.; James D. Reynolds, Ph.D.; Debra A. Schwinn, M.D.; Sidney A. Simon, Ph.D.; Mark Stafford-Smith, M.D.; Bryant W. Stolp, M.D.; Richard D. Vann, Ph.D.; David S. Warner, M.D.

Behavioral Neurosciences Study Program **BSP-301B. RESEARCH IN 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 recommended for 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.; Jeffrey R. Petrella, M.D.; Jed E. Rose, Ph.D.; Saul M. Schanberg, M.D., Ph.D.; Susan S. Schiffman, Ph.D.; Rochelle D. Schwartz-Bloom, Ph.D.; Andrew Sherwood, Ph.D.; David C. Steffens, M.D., M.H.S.; Kamaraju S. Sundar, Ph.D.; Richard S. Surwit, Ph.D.; Marvin S. Swartz, M.D.; Richard D. Weiner, M.D., Ph.D.; William C. Wetsel, Ph.D.; Redford B. Williams, M.D.

Biomedical Engineering Study Program BES-301B. RESEARCH IN BES.

Program Directors: Bruce M. Klitzman, Ph.D. (Coordinating Director), 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 cells, tissues,organs, and organ systems. The faculty have research laboratories that investigate these areas at the microscopic and macroscopic levels. The course of study usually emphasizes either the employment of whole animal models or in vitro simulation of disease states. The development and employment of new instrumentation may be a component of the research effort, but not its exclusive objective. Emphasis in the student experience is placed upon the teaching of the quantitative method of understanding biological systems. The student is expected to learn to formulate hypotheses, to develop appropriate methods totest such hypotheses and to use statistical methods to draw conclusions form their data. Each student selects a faculty preceptor in consultation with the study programdirector and an individual research plan is developed. Students who wish toenter this program are not required to have an engineering background.

FACULTY: Roger C. Barr, Ph.D; Robert D. Fitch, M.D.; Morton H. Friedman, Ph.D.; Farshid Guilak, Ph.D.; Craig S. Henriquez, Ph.D.; Lawrence Higgins, M.D.; Bruce M. Klitzman, Ph.D.; Andrew D. Krystal, M.D.; Jeffrey H. Lawson, M.D., Ph.D.; L. Scott Levin, M.D.; Roger L. Miller, Ph.D.; Barry S. Myers, M.D., Ph.D.; Laura E. Niklason, M.D., Ph.D.; James A. Nunley, M.D.; Steven Olson, M.D.; Ricardo Pietrobon, M.D.; Glenn Preminger, M.D.; Daniel Schmitt, M.D.; Debra A. Schwinn, M.D.; Lori A. Setton, Ph.D.; David W. Smith, Ph.D.; Peter K. Smith, M.D.; Gregg Trahey, Ph.D.; George A. Truskey, Ph.D.; Thomas P. Vail, M.D.; Olaf T. von Ramm, Ph.D.; Patrick D. Wolf, Ph.D.; Fan Yuan, Ph.D.

Biomedical Imaging and Medical Physics Study Program

BIMP-301B. RESEARCH IN BIMP.

Program Director: Joseph Y. Lo, Ph.D.

This program encourages medical students to explore many exciting research topics in radiology and imaging, such as magnetic resonance microscopy, molecular imaging, breast ultrasound, and nuclear medicine. Students have the opportunity to work with a diverse group of research and clinical faculty from radiology as well as biomedical engineering and physics. The program strongly emphasizes the use of quantitative and engineering methods to solve clinically significant problems. Students may select from a broad array of research areas including tumor biology, digital image analysis, predictive modeling, computer aided diagnosis, imaging instrumentation, and medical physics, to name just a few. Each student selects a faculty preceptor in consultation with the program directors and designs an individual plan in cooperation with the preceptor and directors. The primary emphasis of each student's plan is expected to be research. Students may, however, also be advised to take an existing course or to set up a tutorial with a faculty member to fill in deficient areas or to acquire needed quantitative or engineering skills. Depending on the subject area selected, a student may initiate a new research project of limited scope or take over a well-defined part of an existing project. Students are expected to produce a thesis based on their work, and possi-

bly (but not necessarily) a paper suitable for publication in a scientific journal. Students taking this program should have some prior training or experience in one or more of the following areas: mathematics, computer science, physics, chemistry, or engineering (electrical, mechanical, biomedical, etc.).

FACULTY: Jay Baker, M.D.; H. Cecil Charles, Ph.D.; James T. Dobbins III, Ph.D.; Carey E. Floyd, Jr, Ph.D.; Laurence W. Hedlund, Ph.D.; Scott Huettel, Ph.D.; Ronald J. Jaszczak, Ph.D.; G. Allan Johnson, Ph.D.; Joseph Y. Lo, Ph.D.; James R. MacFall, Ph.D.; Edward F. Patz, Jr, M.D.; Martin P. Tornai, Ph.D.; Timothy G. Turkington, Ph.D.; Terry T. Yoshizumi, Ph.D.

Biostatistics and Bioinformatics CRSP-301B. RESEARCH IN CLINICAL RESEARCH.

Clinical Research Study Program Coordinating Director: Galen S. Wagner; Christopher O'Connor, M.D., Co-Director.

This study program offers students the opportunity to explore the quantitative and methodological principles of clinical research. Under the direction of two preceptors, typically a clinical investigator and a statistician, students use the methods and techniques of biostatistics and related disciplines to address a clinical research question. Designated courses may be taken with the approval of the student's preceptors. Students in this study program may apply for admission as degree candidates in the Clinical Research Training Program, earning a Master of Health Sciences in Clinical Research.

FACULTY: David Albala, M.D.; Kathryn M. Andolsek, M.D., M.P.H.; Jay Baker, M.D.; John Bartlett, M.D., Lori A. Bastian, M.D.; Dan G. Blazer, M.D., Ph.D.; Terrill Bravender, M.D.; Haywood Brown, M.D.; Barbara J. Burns, Ph.D.; Marian Butterfield, M.D., Robert M. Califf, M.D.; Dennis A. Clements, M.D., Ph.D.; Harvey Cohen, M.D.; John M. Dement, Ph.D.; Rowena Dolor, M.D.; David Edelman, M.D.; Christopher Edwards, Ph.D.; Mark Feinglos, M.D.; Michael Freemark, M.D.; William Fulkerson, M.D.; Linda K. George, Ph.D.; Deborah T. Gold, Ph.D.; Christopher Granger, M.D.; Carol Dukes Hamilton, M.D.; Judith C. Hays, Ph.D.; Catherine Hoyo, M.D., Ph.D.; Margaret Humphreys, M.D., Ph.D.; Keith Kaye, M.D.; Linda Kinsinger, M.D.; Harold Koenig, M.D.; Paul Lee, M.D., J.D.; Hester Lipscomb, Ph.D.; Elizabeth Livingston, M.D.; Joseph Lo, Ph.D.; David Lobach, M.D., Ph.D.; David B. Matchar, M.D.; Lloyd Mitchener, M.D.; John Murray, M.D.; Evan R. Myers, M.D., M.P.H.; Kristen Newby, M.D.; Chris Newgard, M.D.; Steven Olson, M.D.; Truls Ostbye, M.D.; George Parkerson, M.D., Ph.D.; Eric Peterson, M.D.; Ricardo Pietrobon, M.D.; John Sampson, M.D., Ph.D.; Joellen M. Schildkraut, Ph.D.; Kenneth Schmader, M.D.; Kevin A. Schulman, M.D., M.B.A.; Bill Scott, M.D.; Pearl Seo, M.D.; David L. Simel, M.D., M.H.S.; Cellette Skinner, Ph.D.; Frank Sloan, Ph.D.; Laura Svetkey, M.D.; Nathan Thielman, M.D.; James A. Tulsky, M.D.; Eric Westman, M.D., M.H.S.; David Witsell, M.D., M.H.S.; Christopher Woods, M.D.

Cancer Biology Study Program CBP-301B. RESEARCH IN CBP.

Program Director: Matthias Gromeier, M.D.

The Cancer Biology Study Program offers third year medical students a 32 credit program of basic science instruction. Each student has an opportunity to focus on an area of interest and pursue a scholarly activity. Through a combination of research preceptorship and classroom work, students are introduced to cancer research. The students may choose to investigate oncogenes, tumor suppressor genes, growth factors, chromosomal abnormalities,

cellular invasion and metastases, tumor doubling time, cell loss, tumor hypoxia, tumor angiogenesis, chemical/radiation/foreign body/viral/tobacco carcinogenesis, biologic and immunotherapy principles, experimental cancer therapeutics, radiobiology and hyperthermic oncology, and the pharmacology of cancer chemotherapy.

FACULTY: Andrew Berchuck, M.D.; Gerard C. Blobe, M.D., Ph.D.; Patrick J. Casey, Ph.D.; O. Michael Colvin; M.D.; Mark W. Dewhirst, D.V.M., Ph.D.; Henry S. Friedman, M.D.; Eli Gilboa, Ph.D.; James M. Grichnik, M.D., Ph.D.; Matthias Gromeier, M.D.; Edward C. Halperin, M.D.; Maureane R. Hoffman, M.D., Ph.D.; Randy L. Jirtle, Ph.D., Michael J. Kelley, M.D.; Sally A. Kornbluth, Ph.D.; Joanne Kurtzberg, M.D.; Jeffrey R. Marks, Ph.D.; Lawrence B. Marks, M.D.; Joseph R. Nevins, Ph.D.; Edward F. Patz, Jr, M.D.; Ann Marie Pendergast, Ph.D.; Salvatore V. Pizzo, M.D., Ph.D.; Hilliard F. Seigler, M.D.; Victoria Seewaldt, M.D.; Douglas Tyler, M.D.

Cardiovascular Study Program CVS-301B. RESEARCH IN 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. Directed at students potentially interested in a career in cardiovascular research, this program affords a wide variety of opportunities for basic research under the guidance of a faculty mentor. Students In this program are not required to take any formal course work, but students Interested In graduate-level courses may enroll In them if they have the permission of their faculty mentor.

FACULTY: Page A.W. Anderson, M.D.; Marc G. Caron, Ph.D.; Neil J. Freedman, M.D.; Pascal J. Goldschmidt, M.D., F.A.C.C.; Augustus O. Grant, M.B., Ch.B.; Michael Gunn, M.D.; Barton F. Haynes, M.D.; Margaret Kirby, Ph.D.; Bruce M. Klitzman, Ph.D.; Christopher D. Kontos, M.D.; William E. Kraus, M.D.; F.C.C.P., Madan M. Kwatra, Ph.D.; Robert J. Lefkowitz, M.D.; Yin-Xiong Li, M.D., Ph.D.; Ann LeFurgey, Ph.D.; Anthony R. Means, Ph.D.; Claude A. Piantadosi, M.D.; Howard Rockman, M.D.; Jonathan S. Stamler, M.D.; Antonius M.J. VanDongen, Ph.D.; Xiao-Fan Wang, Ph.D.; R. Sanders Williams, M.D.; A. Richard Whorton, Ph.D.

Epidemiology And Public Health Study Program EPH-301B. RESEARCH IN EPI & PUBLIC HEALTH.

Program Director: Kathryn M. Andolsek, M.D., M.P.H.

The Epidemiology and Public Health Study Program is designed for students pursuing third year opportunities in public health, usually a masters of public health degree or a CDC experience. It supplements formal course work to allow students the opportunity to participate in the research design and/or analysis of a research study, .Participants will practice skills related to research design, statistical analyses, assessment health policy, and comparative health systems so that they can be effective contributors to the improvement of the system of health care. The focus may be on improved health of the patient or a discrete population but should be transferable to local, state, national and/or global health issues. Each student selects a Duke faculty mentor in consultation with the study track director. Required Research. . Each student will have the equivalent of 10-12 months participation in research. Students should identify a mentor, and research topic by Spring/Summer of the year in which they begin their third year. Ideally IRB approval is obtained at the same time recognizing that IRB approval is usually necessary through both Duke and other pertinent institutions. Coursework continuously informs their research project. Each student will to produce an in-depth thesis analyzing an area of epidemiology, health service research, finance, health

systems, or health policy. This research activity extends throughout the year, culminating with the acceptance of the completed thesis. This study track is for students participating in an MPH or CDC experience. For MPH students, the student must apply to the MPH school and to the Medical School by completing the Duke Third Year Elective Form. There are several "pre-approved" MPH programs at the School of Public Health (at the University of North Carolina at Chapel Hill). These include Epidemiology; Health Care and Prevention; Maternal and Child Health and Nutrition. Students interested in another study track must petition the Duke third year committee for "acceptance". Students usually complete all requirements for the M.P.H. degree during one academic year in fulfillment of their third year requirement. Dr. Andolsek is the director of the M.D./M.P.H. Program. Dr. David Matchar, director of the Epidemiology study track works with students interested in one of the other dual degrees: Duke master's degree in Public Policy from the Sanford Public Policy Institute (M.D./M.P.P. program), the Duke master's in Business Administration from the Fuqua School (M.D./M.B.A. program) and the J.,D., degree from Duke Law School. These programs typically take 2-3 years to complete necessitating an extension of the time required for completing the third year requirement. Students may also work with in the field of public health (but without pursuing a second degree) through the Clinical Research Study Track, headed by Dr. Galen Wagner or in an area of qualitative research through the Humanities study Tract headed by Dr. Margaret Humphreys. In addition, students may propose an individually-tailored Study Away option. Study away proposals are reviewed and approved individually by the Third Year Committee. Placements in the Cloister Program at the National Institutes of Health and at the National Institute of Environmental Health Sciences in Research Triangle Park are options; the supervision of students in the study away programs can be carried out by faculty from a number of study programs.

FACULTY: David Albala, M.D.; Kathryn M. Andolsek, M.D., M.P.H.; Jay Baker, M.D.; John Bartlett, M.D., Lori A. Bastian, M.D.; Dan G. Blazer, M.D., Ph.D.; Terrill Bravender, M.D.; Haywood Brown, M.D.; Barbara J. Burns, Ph.D.; Marian Butterfield, M.D., Robert M. Califf, M.D.; Dennis A. Clements, M.D., Ph.D.; Harvey Cohen, M.D.; John M. Dement, Ph.D.; Rowena Dolor, M.D.; David Edelman, M.D.; Christopher Edwards, Ph.D.; Mark Feinglos, M.D.; Michael Freemark, M.D.; William Fulkerson, M.D.; Linda K. George, Ph.D.; Deborah T. Gold, Ph.D.; Christopher Granger, M.D.; Carol Dukes Hamilton, M.D.; Judith C. Hays, Ph.D.; Catherine Hoyo, M.D., Ph.D.; Margaret Humphreys, M.D., Ph.D.; Keith Kaye, M.D.; Linda Kinsinger, M.D.; Harold Koenig, M.D.; Paul Lee, M.D., J.D.; Hester Lipscomb, Ph.D.; Elizabeth Livingston, M.D.; Joseph Lo, Ph.D.; David Lobach, M.D., Ph.D.; David B. Matchar, M.D.; Lloyd Mitchener, M.D.; John Murray, M.D.; Evan R. Myers, M.D., M.P.H.; Kristen Newby, M.D.; Chris Newgard, M.D.; Steven Olson, M.D.; Truls Ostbye, M.D.; George Parkerson, M.D., Ph.D.; Eric Peterson, M.D.; Ricardo Pietrobon, M.D.; John Sampson, M.D., Ph.D.; Joellen M. Schildkraut, Ph.D.; Kenneth Schmader, M.D.; Kevin A. Schulman, M.D., M.B.A.; Bill Scott, M.D.; Pearl Seo, M.D.; David L. Simel, M.D., M.H.S.; Cellette Skinner, Ph.D.; Frank Sloan, Ph.D.; Laura Svetkey, M.D.; Nathan Thielman, M.D.; James A. Tulsky, M.D.; Eric Westman, M.D., M.H.S.; David Witsell, M.D., M.H.S.; Christopher Woods, M.D.

Human Genetics Study Program HGP-301B. RESEARCH IN HGP.

Program Director: Michael A. Hauser, Ph.D.

Our genetic makeup to a large extent dictates our health. The promise of the Human Genome Initiative is a greater understanding of the genetic components to health. Once the genetic contributions to common diseases like osteoarthritis, heart disease, and cancer are

understood, the physician will have a powerful means at his or her disposal for identifying individual risk factors and offering lifestyle modifications. The study program in human genetics offers third year medical students an integrated program for understanding research in human genetics, its application to human genetic disease for risk assessment, genetic counseling, public health practice, and potential therapeutics, and ethical and legal implications for this research on the patient, the family, and society. We anticipate that students in this program will follow one of several broad paths, utilizing either a molecular approach or a statistical and epidemiologic approach to understanding and treating human genetic disease. Research opportunities are available in laboratories studying such diverse topics as positional cloning of human disease genes, apoptosis gene therapy, biochemical genetics, animal models of genetics and development, and genetic epidemiology. Opportunities for both basic science and clinical/epidemiologic research projects are available in various laboratories participating in the HGP. In addition to the research project and thesis, the program requirements include a year-long seminar series targeting current topics in human genetic research. Other elective courses may be taken with the permission of the program director and the student's preceptor.

FACULTY: Andrea Amalfitano, D.O., Ph.D.; Rose-Mary Boustany, M.D.; Blanche Capel, Ph.D.; Yuan-Tsong Chen, M.D., Ph.D.; John R. Gilbert, Ph.D.; Pascal J. Goldschmidt, M.D.; Elizabeth R. Hauser, Ph.D.; Michael A. Hauser, Ph.D.; John Klingensmith, Ph.D.; Virginia B. Kraus, M.D., Ph.D.; Douglas Marchuk, Ph.D.; Eden R. Martin, Ph.D.; Joseph R. Nevins, Ph.D.; Margaret Pericak-Vance, Ph.D; Joellen Schildkraut, Ph.D.; David A. Schwartz, M.D., M.P.H.; William K. Scott, Ph.D.; Marcy C. Speer, Ph.D.; Judith E. Stenger, Ph.D.; Bruce Sullenger, Ph.D.; Jeffrey M. Vance, M.D., Ph.D.; Michelle P. Winn, M.D.; Fulton Wong, Ph.D.

Immunology Study Program ISP-301B. RESEARCH IN 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 Lynn Gandy, M.D., Ph.D.; Eli Gilboa, Ph.D.; Russell P. Hall, III, M.D.; Barton F. Haynes, M.D.; Maureane Hoffman, M.D., Ph.D.; Michael S. Krangel, Ph.D.; Garnett H. Kelsoe, D.Sc.; Joanne Kurtzberg, M.D.; M. Louise Markert, M.D., Ph.D.; David C. Montefiori, Ph.D.; William Parker, Ph.D.; Dhavalkumar D. Patel, M.D., Ph.D.; David S. Pisetsky, M.D., Ph.D.; Scott Pruitt, M.D., Ph.D.; Hilliard F. Seigler, M.D.; Herman F. Staats, Ph.D.; Thomas F. Tedder, Ph.D.; Marilyn J. Telen, M.D; Kent J. Weinhold, Ph.D.; Yuan Zhuang, Ph.D.

Infectious Diseases Study Program INFECTIOUS DISEASES (IDP-301B. RESEARCH IN IDP)

Program Director: Thomas G. Mitchell, Ph.D.

Knowledge of infectious diseases is relevant to the care of patients of all ages and each clinical specialty. The Infectious Diseases Study Program provides students with the opportunity to directly explore infectious diseases in a laboratory or clinical setting coupled with seminars and optional courses. The IDP offers an in-depth research experience in several areas of infectious diseases and microbiology, such as microbial pathogeneisis, host defenses, chemotherapy, epidemiology, and clinical aspects. The goals of the IDP are to instill a critical assessment of information, provide direct experience with reserach and the opportunity for the creative acquisition of data, encourage independent thinking, and promote insight into biomedical technology and the interrelationship of clinical infectious diseases with basic microbiology and immunity. The participating faculty members are involved in a range of clinical, translational and basic research, including molecular mechanisms of bacterial, fungal or viral pathogenesis, the evolution of microbial pathogens, anti-microbial chemotherapy, the molecular epidemiology of infectious diseases, clinical studies in infectious diseases, and the use of model microorganisms to investigate fundamental processes in genetics and cellular and molecular biology. Each student will select a faculty mentor, and together, they will develop an original proposal within the framework of the mentor's ongoing research focus. The student will be expected to design experiments, critically assess the relevant literature, evaluate data, apply appropriate statistical tests,solve problems associated with the project, and communicate the research results in written and oral presentations. Appropriate guidance and assistance are provided by the faculty and others within the laboratory or clinical setting. The major emphasis of the program is the research project, and students function as graduate students. The commitment is a full-time effort, entailing at least 40 hours per week with negotiated time off.

Courses. During the spring term, students may take either Medical Immunology (MGM 330B), Virology and Viral Oncology (MGM 252B), or Microbial Pathogenesis (MGM 282B), depending on the nature of the student's research. Seminars. Students in the IDP attend seminars in which faculty members, fellows, and students present their ongoing research. Such presentations enable the student to observe and participate in the critical analysis of research before it reaches the publication stage.

Additional Course Work. Although other basic science electives may be taken upon approval by the mentor and the program director, the student is discouraged from excessively diluting the laboratory experience.

FACULTY: Alejandro Aballay, Ph.D.; Kenneth Alexander, M.D., Ph.D.; J. Andrew Alspaugh, M.D.;John A. Bartlett, M.D.; Rebecca H. Buckley, M.D.; Gary M. Cox, M.D.; Coleen K. Cunningham, 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.; Keith S. Kaye, M.D.; Jack D. Keene, Ph.D.; Kenneth N. Kreuzer, Ph.D.; John H. McCusker, Ph.D.; Thomas G. Mitchell, Ph.D.; David C. Montefiori, Ph.D.; Joseph R. Nevins, Ph.D.; John R. Perfect, M.D.; David J. Pickup, Ph.D.; Christian R.H. Raetz, M.D., Ph.D.; Daniel J. Sexton, M.D.; Herman F. Staats, Ph.D.; Raphael Valdivia, Ph.D.; J. Brice Weinberg, M.D.; Kenneth H. Wilson, M.D.; Christopher Woods, M.D.

Medical Humanities Study Program **MEDHUM-301B. RESEARCH IN MEDHUM.**

Program Director: Margaret Humphreys, M.D., Ph.D.

Overview: The Medical Humanities Study Program offers a multidisciplinary opportunity for students to explore topics in medical history, ethics, theology, and other fields within the medical humanities. Students design their own research projects under the guidance of medical humanities mentors, and tailor their third year experience around the completion of this project. While some students may participate in their mentor's ongoing research, others can pursue projects independent of (but related to) their mentor's primary areas of interest. Curriculum: Research. The principal component of the Medical Humanities Study Program is an in-depth research experience within the medical humanities. The location of this research will vary with the mentor and project chosen. Some projects may be appropriately pursued in libraries and archives. Others may include interviews with or experimentation upon human subjects in the clinical or other academic setting. Like their peers in the more traditional science track, medical humanities students will explore a research question, find data to support or refute it, and write a thesis that communicates their results. Proposal. All students are expected to prepare a 3-5 page proposal by the end of spring of the second year outlining the aims of the proposed research in consultation with their chosen mentor. This proposal will state the problem to be studied, the rationale and relevance of the problem, and include a bibliography of relevant literature and sources. Courses. Students are expected to take up to five courses in the medical humanities during their third year. Working with their mentor, students will identify courses within the university relevant to their research question. Courses may be chosen from the Medical School, Divinity School, or Faculty of Arts and Sciences. Individual readings courses with the mentor or other faculty may be included in the courses chosen. Lecture series. Students will attend the regular humanities lecture series offered through the Center for the Study of Medical Ethics and Humanities. Posters. Students are expected to submit abstracts to present results in poster or oral format at the annual Alpha Omega Alpha research day in the Searle Center that usually occurs in early June. Final Thesis. Students will prepare a thesis that represents the product of their research, usually 15-20 pages in length. This is due on the thesis deadline date set by the Registrar's Office. Presentations: Students are expected to present a paper based on their research to the humanities lecture series during the spring semester. Publication: Students are encouraged to produce work that is of sufficient originality, importance, and quality that it will be accepted for publication by a relevant medical humanities journal. Authors of historical theses will be encouraged to submit their work for the William Osler Prize awarded by the American

Association of the History of Medicine for the best essay by a medical student. The winning essay of this prize contest is traditionally published in the Bulletin of the History of Medicine.

FACULTY: Jeffrey P. Baker, M.D., Ph.D.; Peter C. English, M.D., Ph.D.; Angela Holder, J.D., L.L.M; Margaret Humphreys, M.D., Ph.D.; Keith Meador, M.D., Th.M., M.P.H.; James A. Tulsky, M.D.

Neurosciences Study Program NSS-301B. RESEARCH IN NSS.

Program Director: Daniel Laskowitz, M.D.

Overview: The Neurosciences Study Program provides a multidisciplinary opportunity for third year medical students over the broad range of basic and clinical neurosciences. Many of the most intractable and prevalent diseases of our time afflict the nervous system, and in many ways research in the neurosciences represents one of the final frontiers of medicine and biomedical science. Areas of study include molecular and cellular neuroscience, neuroimaging, developmental neurobiology, systems and cognitive neuroscience, animal modeling of neurological disease, and translational neuroscience. Faculty in the program are drawn from many departments including Neurobiology, Radiology, Pharmacology, Cell Biology, Psychology, Neurosurgery, Neurology, Pediatrics, Medicine, Psychiatry, and Ophthalmology, and are engaged in research that ranges from fundamental properties of ion channels and neurotransmitter receptors to cognition and perception. The program emphasizes a basic research experience under the guidance of a mentor along with opportunities to attend seminars and present results in written, oral, and poster presentations. Research. The basic component of the Neurosciences Study Program is an in-depth research experience in a research laboratory under the supervision of one of the participating faculty. Students will work full-time in a laboratory pursuing an independent research project including conducting experiments, analyzing results, and communicating findings. Proposal. All students are expected to prepare a 2-3 page proposal by the beginning of the third year, outlining the aims of the proposed research in consultation with their chosen mentor. This proposal should state the problem to be studied, the rationale and relevance of the problem, the specific hypotheses to be tested, a brief description of the experiments to be performed, and references. Courses. Students will have the opportunity to take or audit graduate level courses offered in the Departments of Neurobiology, Cell Biology, and Pharmacology, as well as courses in biostatistics and human disease pathophysiology and therapeutics. In addition, Vascular, Neurology, Neurosurgery, and Stroke Center conferences can also be attended. Importantly, there are no specific course requirements in the Program, but rather students may pursue their own particular interests by taking or auditing courses recommended by their mentor or relevant to their research project. Seminars. Students will be able to attend regular seminar series including the Neurobiology Seminar, Signal Transduction Colloquium, Cell Biology Seminar, and Brain Imaging Seminar as appropriate for their particular research project. Meetings. Students will attend monthly informal meetings with Dr. Laskowitz to present proposed research plans, discuss ongoing projects, and to assess progress. These meetings may include presentations by invited speakers to discuss particular topics of interest. Posters. Students are expected to submit abstracts to present results in poster or oral format at the annual Alpha Omega Alpha research day in the Searle Center that will occur in early June. Final Thesis. At the end of the spring semester (sometime toward the end of April), students are required to write up a description of their hypotheses, the outcome of their experiments, and conclusions of their work (15-20 pages).

FACULTY: George J. Augustine, Ph.D.; Rose-Mary Boustany, M.D.; James Burke, M.D.; Nell B. Cant, Ph.D.; Carol Coulton, Ph.D.; Michael Ehlers, M.D., Ph.D.; Guoping

Feng, Ph.D.; David Fitzpatrick, Ph.D.; Larry Goldstein, M.D.; William C. Hall, Ph.D.; Scott Huettel, Ph.D.; Erich Jarvis, Ph.D.; Lawrence C. Katz, Ph.D.; Cynthia M. Kuhn, Ph.D.; Daniel Laskowitz, M.D.; Darrell V. Lewis, Jr., M.D.; Donald C. Lo, Ph.D.; Roger Madison, Ph.D.; James O. McNamara, Sr., M.D.; J. Victor Nadler, Ph.D.; Michael L. Platt, Ph.D.; James M. Provenzale, M.D.; Dale Purves, M.D.; Peter H. Reinhart, Ph.D.; Saul M. Schanberg, M.D.; Ph.D.; Donald E. Schmechel, M.D.; Rochelle D. Schwartz-Bloom, Ph.D.; Sidney A. Simon, Ph.D.; J. H. Pate Skene, Ph.D.; Theodore A. Slotkin, Ph.D.; John E.R. Staddon, Ph.D.; Warren J. Strittmatter, M.D.; Dennis A. Turner, M.A., M.D.; Jeffrey M. Vance, M.D., Ph.D.; Michael Vitek, Ph.D.; Fulton Wong, Ph.D.

Ophthalmology And Visual Sciences Study Program OVS-301B. RESEARCH IN OVS.

Program Directors: Catherine Bowes Rickman, Ph.D. (Coordinating Director) and David L. Epstein, M.D.

The purpose of this study program is to provide third year medical students with research skills and experience that can be applied to future careers as clinician scientists in Ophthalmology and other fields. Although there is a primary emphasis on laboratory science, clinical research programs of inquiry based on strong scholarship are also possible. There is a focus on clinical investigators forming a true partnership with basic science researchers in attempting to advance the understanding and therapy of ocular diseases. There is an emphasis on hypothesis formation and the planning and execution of experiments that can address and then redefine the hypothesis. Curriculum. Each student chooses a preceptor according to her/his interests. Together they determine a topic of investigation which requires hands-on laboratory or clinical research by the student. Joint preceptors (for example, a clinical investigator and a basic science researcher) are acceptable and, in fact, encouraged. The course of study must be approved by the study program directors. At the end of the year, each student is expected to produce an in-depth paper based on the research. Throughout the year, students attend: a) regular lectures on topics about ophthalmology and visual science given by Duke faculty, as well as outside lecturers; b) participate in bi-monthly research workshops in which students and faculty make presentations of hypotheses, assumptions therein, methods, and results, and c) give formal presentations of research work at the conclusion of the year. Research Opportunities. Opportunities include research in physiology, pathology, and molecular and cell biology of the eye as they relate to eye diseases. Opportunities also exist in biophysics and instrumentation, laser cell biology, and scientific basis of glaucoma, corneal, and retinal diseases.

FACULTY: Catherine Bowes Rickman, Ph.D.; Edward G. Buckley, M.D.; Pratap Challa, M.D.; David L. Epstein, M.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.; and Fulton Wong, Ph.D.

Pathology Study Program PSP-301B. RESEARCH IN PSP.

Program Director: Patrick J. Buckley, M.D., Ph.D.

Pathology is the study of the essential nature of diseases and especially of the structural and functional changes produced by them. 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 element of this program is an independent, but guided research experience.

FACULTY: Soman N. Abraham, Ph.D.; Darell D. Bigner, M.D., Ph.D.; Patrick J. Buckley, M.D., Ph.D; Sheila Collins, Ph.D.; Mark W. Dewhirst, D.V.M., Ph.D.; Mark N. Feinglos, M.D.; Charles S. Greenberg, M.D.; Mark W. Grinstaff, Ph.D.; Laura P. Hale, M.D.; David H. Harpole, M.D.; Lizzie J. Harrell, Ph.D.; Maureane Hoffman, M.D., Ph.D.; Randy L.Jirtle, Ph.D.; Daniel J. Kenan, M.D., Ph.D.; Gordon Klintworth, M.D., Ph.D.; Virginia B. Kraus, M.D., Ph.D.; James E. Lowe, M.D.; Herbert K. Lyerly, M.D.; John F. Madden, M.D., Ph.D.; Sara E. Miller, Ph.D.; Salvatore V. Pizzo, M.D., Ph.D.; L. Darryl Quarles, M.D.;Nancy L. Reinsmoen, Ph.D.; L. Barth Reller, M.D.;Victor L. Roggli, M.D.; John D. Shelburne, M.D., Ph.D; Charles Steenbergen, M.D.,Ph.D.;John G. Toffaletti, Ph.D.; Robin T. Vollmer, M.D.

Pharmacology & Molecular Therapeutics Study Program

PMT-301B. Pharmacology and Molecular Therapeutics.

Program Director: Gerard Blobe, M.D., Ph.D.

The PMT program is based on utilization of the basic concepts of biology and chemistry for determining mechanisms of human disease, targeting signal transduction pathways for the treatment of human disease and determining 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. cellular signaling mechanisms, including the actions of calcium and cyclic nucleotides on protein phosphorylation/dephosphorylation; 2. receptor function and cell signaling mechanisms regulating cell growth, proliferation and death; 3. the mechanism of action of neuropeptides and neurotransmitters; 4. ontogeny of signaling pathways in nervous, cardiovascular and immune tissue; and 5. the molecular basis of rational drug design. The major emphasis of the PMT program is on student-generated independent study/research projects conducted in close association with a faculty preceptor. In addition, a weekly seminar series, the Signal Transduction Colloquium, exposes participating students to a variety of topics presented by experts in the various relevant fields of research. Research areas represented in the PMT program fall into four broad categories: - Molecular properties and actions of peptide hormones, growth factors and their receptors: Studies on membrane biology, ligand-receptor interactions, and signal transduction; molecular mechanisms of insulin action and related growth factors (EGF and PDGF); and mechanisms of action of regulatory peptides on gastrointestinal target organs. - Genetic and biochemical regulation of membrane function, cytoskeletal elements, intracellular motility, and macromolecular trafficking: Studies on the motor complexes which drive organelle movements within cells during endocytosis, exocytosis, and axonal transport; intracellular function of unconventional myosins encoded by abm genes; and regulation of nucleocytoplasmic trafficking. - Genetic regulation of cell proliferation, growth, and development: The biochemical and functional properties of the recessive retinoblastoma oncogene; hormonal regulation of malignant cell growth; the molecular basis of cytokinesis; the role of fetal and placental hormones in the regulation of fetal growth and oogenesis; molecular basis of morphogenetic changes using genetic and transgenic methods; and the role of cyclins in mitotic and meiotic events in relation to cell cycle specific kinases. - Regulation of integrated phys-

iological processes: Investigations on the role of atrial natriuretic factors in blood volume and arterial pressure regulation; the role of intracellular second messengers in ionic and metabolic regulation; regulation of chloride channels in epithelial cells; regulatory mechanisms of tissue oxygen concentration and oxidant damage; organization and control of intermediary metabolism pathways; neural regulation of gonadotropin function; and genetic regulation of intermediary metabolism in response to metabolic demands on striated muscle (myocytes).

FACULTY: Mohamed Abou Donia, Ph.D.; Nels C. Anderson, Jr., Ph.D.; Richard Lambert Auten Jr., M.D.; Gerard C. Blobe, M.D., Ph.D.; Marc G. Caron, Ph.D.; Patrick J. Casey, Ph.D.; Jonathan A. Cohn, M.D.; Christopher M. Counter, Ph.D.; Michael Freemark, M.D.; Larry Goldstein, M.D.; Joseph Heitman, M.D., Ph.D.; Homme W. Hellinga, Ph.D.; Daniel P. Kiehart, Ph.D.; Sally A. Kornbluth, Ph.D.; Madan Kwatra, Ph.D.; Daniel Lew, Ph.D.; Rodger A. Liddle, M.D.; Haifan Lin, Ph.D.; Donald P. McDonnell, Ph.D.; Anthony R. Means, Ph.D.; Elliott Mills, Ph.D.; Christopher O'Connor, M.D.; Thomas L. Ortel, M.D., Paul Modrich, Ph.D.; Thomas M. Murphy, M.D.; Christopher Nicchitta, Ph.D.; Ann Marie Pendergast, Ph.D.;Ph.D.; Don C. Rockey, M.D.; Johannes Rudolph, Ph.D.; Patricia M. Saling, Ph.D.; David W. Schomberg, Ph.D.; Steven R. Vigna, Ph.D.; Judith A. Voynow, M.D.; Xiao-Fan Wang, Ph.D. ; Thomas Weber, M.D.; Jo Rae Wright, Ph.D.; Tso-Pang Yao, Ph.D.; Heather N. Yeowell, Ph.D.; John D. York, Ph.D.

Class of 2005 with Postgraduate Year One Appointment

KEY: *Name (Hometown), Undergraduate Institution, Internship Institution – specialty, Location, Residency – Institution Specialty, Location,Ultimate Career Goals*

Aksoy, Olcay (Istanbul, Turkey), Duke University, Johns Hopkins Hospital – Internal Medicine, Baltimore, MD, Cardiology

Ames, Deborah Kempe Jacobowitz (Portland, Oregon) Reed College/Portland State University, Oregon Health Sciences University – Family – Medicine, Portland, OR

Arthur, Joshua Daniel (Wilmington, Delaware), University of North Carolina at Chapel Hill, Naval Medical Center – Pediatrics, Portsmouth, VA, Pediatrics

Atchison, Fawn Wen (Chongqing, China) University of Minnesota at Duluth, Mayo Clinic – Anesthesiology, Rochester, MN

Atra, Deepta S. (Fort Wayne, Indiana) Harvard College, Mayo Clinic – Emergency Medicine, Rochester, MN

Beatty, Alexis (Temecua, California) Duke University, Massachusetts General Hospital – Internal Medicine, Boston, MA

Boussios, Helen (Eleni) (Asheville, North Carolina) Duke University, Duke University Medical Center – Medicine/Pediatrics, Durham, NC, Medicine/Pediatrics

Bradford, Porcia (Montgomery, Alabama) University of Alabama, Vanderbilt University Medical Center – Surgery – Preliminary, Nashville, TN, Plastic Surgery

Brooks, Richard B. (Harriman, Tennessee) Furman University, University of California at San Francisco – Internal Medicine, San Francisco, CA, General Medicine/ Infectious Diseases

Butler, Renita (Baton Rouge, Louisiana) Washington University, University of Texas Southwestern – Radiology, Dallas, TX, Radiology

Byrd, Angela S. (Baton Rouge, Louisiana) Louisiana State University, Cincinnati Children's Hospital – Pediatrics, Cincinnati, OH, Academic Pediatrics

Chen, Chih Lynn (Boulder, Colorado) Duke University, University of North Carolina – Pediatrics – Preliminary, Chapel Hill, NC, Medical College of Wisconsin – Dermatology, Milwaukee, WI

Chu, Helen (Orange, California) Cornell University, Beth Israel Deaconess – Internal Medicine, Boston, MA, Infectious Diseases and Internal Health

Chudgar, Saumil Mahendra (Belmont, North Carolina) University of North Carolina at Chapel Hill, Duke University Medical Center – Internal Medicine, Durham, NC, Cardiology

Churpek, Matthew Michael (Navarre, Ohio) Ohio Wesleyan University, University of Chicago – Internal Medicine, Chicago, IL, Academic Medicine

Davis, Kathryn Rachel (Minneapolis, Minnesota) Brown University, University of California at San Francisco – Pediatrics, San Francisco, CA, Pediatrics

Doherty, Amanda R. (Redding, California) University of California at Davis, University of California at San Francisco – Pathology – Anatomic & Clinical, San Francisco, CA, Pathology

Eapen, Zubin (Concord, North Carolina) University of North Carolina at Chapel Hill, Duke University Medical Center – Internal Medicine, Durham, NC, Cardiology

Easter, Joshua Samuel (Richmond, Virginia) Williams College, Harvard Affiliated – Emergency Medicine, Boston, MA, Pediatric Emergency Medicine

Etzel, Jason Paul (San Diego, California) University of California at Berkeley, University of Washington – Internal Medicine, Seattle, WA, Gastroenterology

Fetter, Nicole (Woodbury, Minnesota) Duke University, Harvard – Combined – Orthopaedics, Boston, MA, Academic Orthopaedics

Flanders, Vincent Lorenzo (St. Petersburg, Florida) University of South Florida, Carilion Health System – Transitional, Roanoke, VA, Massachusetts General Hospital – Radiology, Boston, MA, International Radiologist

Floyd, James S. (Tacoma, Washington) Duke University, University of Washington – Internal Medicine, Seattle, WA

Garrison, Andrew W. (Allendale, New Jersey) Dartmouth College, University of Utah – Family Medicine, Salt Lake City, UT, Family Medicine

Ghodadra, Neilesh (Lilburn, Georgia) Duke University, Rush University Medical Center – Orthopaedics, Chicago, IL, Orthopaedics

Griffith, Brian C. (Cleveland, Tennessee) Vanderbilt University, Duke University Medical Center – Internal Medicine, Durham, NC, Academic Internal Medicine/ Gastroenterology

Hanks, Roy Kyle (Seneca, South Carolina) Duke University, Highland General Hospital – Internal Medicine, Oakland, CA, Anesthesiology

Hart, Justin (Washington, DC) Dartmouth College, Vanderbilt Medical Center – Internal Medicine – Preliminary, Nashville, TN, University of Texas, MD Anderson, Houston, TX, Academic Radiation Oncology

Hong, Andrea (DeKalb, Illinois) Stanford University, University of Illinois – Internal Medicine – Preliminary, Chicago, IL, University of Pittsburgh (UPMC Medical Education Program), Pittsburgh, PA,

Hsu, Gerald (Danville, California) University of Toronto, Brigham and Women's Hospital – Internal Medicine, Boston, MA, Hematology – Oncology

Jagadeesan, Rajasekar (Massillon, Ohio) Stanford University, Stanford University – Internal Medicine, Stanford, CA, Academic Generalist – Medicine

Janssen, Erin (Farmington Hills, Minnesota) Massachusetts Institute of Technology, Children's Hospital of Boston, Boston, MA, Pediatrics Hematology/ Oncology

Jayatilleke, Arunidathi (Englewood, New Jersey) Yale University, Cornell – New York Hospital – Internal Medicine, New York, NY

Johnson, Daniel N.(Salt Lake City, Utah) University of Utah, Latter Day Saints Hospital – Transitional, Salt Lake City, UT, University of Washington – Radiology, Seattle, WA

Jones, Kermit L. (South Hara, Michigan) Clark Atlanta/Georgia Tech, National Naval Medical Center – Internal Medicine, Bethesda, MD, International Health Policy

Kansagra, Susan (Greenville, North Carolina) University of North Carolina at Chapel Hill, Massachusetts General Hospital – Medicine – Primary, Boston, MA

Kara, Ravi (Franklin, Wisconsin) University of Wisconsin, Brigham and Women's Hospital – Internal Medicine, Boston, MA, Cardiology

Khan, Nayela Naz (Birmingham, Alabama) Massachusetts Institute of Technology, Birmingham Baptist Health Center – Internal Medicine – Preliminary, Birmingham, AL, University of California at San Francisco – San Francisco – Radiology, San Francisco, CA, Academic Radiology

Kim, Jennifer W. (Berrien Springs, MI) University of California at Berkeley, Oregon Health & Science University – Internal Medicine, Portland, OR, Pulmonary/Critical Care

Ko, Sae Hee (La Mirada, California) University of California at Berkeley, University of Pittsburgh – General Surgery, Pittsburgh, PA

Leung, Doris G. (Port Charlotte, Florida) Harvard College, Duke University Medical Center – Internal Medicine – Preliminary, Durham, NC, Stanford University – Neurology, Palo Alto, CA, Academic Neurology

Lo, Hao Steven (Durham, North Carolina) Duke University, University of Chicago – Radiology, Chicago, IL

Maclean, Courtney (Grand Junction, Colorado) Stanford University, University of Utah – Obstetrics and Gynecology, Salt Lake City, UT, Obstetrics and Gynecology

Maloney, Michaella (Turner, Maine) Harvard College, Harvard Combined – Brigham & Women's Hospital – Urology, Boston, MA, Urology

Mather, Richard C. III (Grove City, Ohio) Miami University of Ohio, Duke University Medical Center – Orthopaedics, Durham, NC, Orthopaedic Surgery

McClaine, Rebecca J. (Clarian, Pennsylvania) Juniata College, University of Cincinnati – General Surgery, Cincinnati, OH, Pediatrics Surgery

McFadden, Adrienne (Bowie, Maryland) University of Maryland, Baltimore County, University of Maryland Medical Center – Emergency Medicine, Baltimore, MD, Emergency Medicine

Mettu, Priyatham Sai (Pikeville, Kentucky) Duke University, Duke University Medical Center – Internal Medicine – Preliminary, Durham, NC, Duke University Medical Center – Ophthalmology, Durham, NC, Academic Ophthalmology

Naeger, David M. (Newtown, Pennsylvania) Duke University, California Pacific Medical Center – Internal Medicine – Preliminary, San Francisco, CA, University of California at San Francisco – Radiology, San Francisco, CA, Radiology

Naftanel, Mark Andrew (Austin, Texas) Texas A & M University, University of Michigan – Internal Medicine – Preliminary, Ann Arbor, MI, University of Michigan – Dermatology, Ann Arbor, MI, Pediatric Dermatology

Niebanck, Alison (Lancaster, Pennsylvania) Duke University, Baylor College of Medicine – Pediatrics, Houston, TX, Pediatric Sub-specialty

Park, Daniel Kwangwon (Martinez, Georgia) Emory University, Rush University Medical Center – Orthopaedics, Chicago, IL, Orthopaedic Surgery

Payne, Asha Soyini(Long Island, New York) Columbia University, Duke University Medical Center – Pediatrics, Durham, NC, Neonatology

Payyapilli, Rose (Brooklyn, New York) New York University, University of North Carolina at Chapel Hill – Otolaryngology, Chapel Hill, NC, Otolaryngology

Peery, Charles Andrew (Charleston, South Carolina) Davidson College, Duke University Medical Center – Anesthesiology, Durham, NC, Anesthesiology

Prasad, Sandip Madhavareddy (Northbrook, Illinois) Harvard University, Brigham and Women's Hospital – General Surgery, Boston, MA, Pediatric Cardiothoracic Surgery

Raman, Rajni Valli (Ithaca, New York) Cornell University, Massachusetts General Hospital – Pathology, Boston, MA, Pathology

Ray, Robin (Bradenton, Florida) University of Miami, Florida, University of Texas at Houston – Transitional, Houston, TX, Baylor College of Medicine – Ophthalmology, Houston, TX, Ophthalmology

Ro, Richard (Stillwater, Oklahoma) University of Oklahoma, Duke University Medical Center – Internal Medicine – Preliminary, Durham, NC, Duke University Medical Center – Radiology, Durham, NC, Radiology

Robertson, Nadia (Amherst, New York) Cornell University, University of Michigan – Internal Medicine, Ann Arbor, MI, Internal Medicine

Shaughnessy, Erin (Durham, North Carolina) Princeton University, Cincinnati Children's Hospital – Pediatrics, Cincinnati, OH, Pediatric Cardiology

Shukla, Sanjai K. (Reno, Nevada) University of Utah, University of Colorado – General Surgery, Denver, CO, Surgery

Suber, Robert Lee, Jr. (Clemmons, North Carolina) Georgia Institute of Technology, Carilion Health System – Transitional, Roanoke, VA, Duke University Medical Center – Radiology, Durham, NC, Radiology – Diagnostic

Sundberg, Thorsten (Charlotte, North Carolina) University of North Carolina – Chapel Hill, University of California at Los Angeles/VA – Internal Medicine – Preliminary, Los Angeles, CA, Brigham and Women's Hospital – Radiology, Boston, MA, Radiology – Diagnostic

Sung, Jeffrey (Bellaire, Texas) Stanford University, Beth Israel Hospital – Internal Medicine – Preliminary, Boston, MA, Brigham and Women's Hospital – Radiology, Boston, MA, Radiology – Diagnostic

Tanhehco, Tasha (Williamsville, New York) Yale University, University of Hawaii – Transitional, Honolulu, HI, Massachusetts Eye and Ear – Ophthalmology, Boston, MA, Ophthalmology

Trindade, Anil Julius (Princeton Junction, New Jersey) Lehigh University, Johns Hopkins Hospital – Internal Medicine, Baltimore, MD, Academic Gastroenterology/ Transplantation

Vanscoyoc, Erin (Fairfax County, Virginia) Brown University, Duke University Medical Center – Pediatrics, Durham, NC

Vanterpool, Stephanie G. (Tortola, British Virgin Islands) Baylor University, University of North Carolina at Chapel Hill – Anesthesiology, Chapel Hill, NC, General Anesthesia, Chronic Pain

Vemulapalli, Sreekanth (Erie, Pennsylvania) Duke University, University of California at San Francisco – Internal Medicine, San Francisco, CA, Cardiology

Venkat, Arun Prakash (San Antonio, Texas) University of Texas at Austin, Riverside Regional Medical Center – Transitional, Newport News, VA, University of Iowa Hospitals and Clinics – Dermatology, Iowa City, IA, Academic Dermatology

Venkatesan, Priya (Pleasanton, California) Stanford University, Duke University Medical Center – Internal Medicine – Preliminary, Durham, NC, Duke University Medical Center – Dermatology, Durham, NC

Walker, Karen Winkfield (Wheatley Heights, New York) SUNY Binghamton, Duke University Medical Center – Internal Medicine – Preliminary, Durham, NC, Brigham and Women's Hospital – Radiation Oncology, Boston, MA, Radiation Oncology – GU Cancer

Wallace, Dana J. (Richmond, Virginia) University of Richmond, Carolinas Medical Center – Internal Medicine – Preliminary, Charlotte, NC, Duke University Medical Center – Ophthalmology, Durham, NC, Ophthalmology

Wang, Luke Yuan-Je (Prairie Village, Kansas) Harvard College, Johns Hopkins University/Sinai Hospitals – Internal Medicine – Preliminary, Baltimore, MD, University of Michigan – Anesthesiology, Ann Arbor, MI

Wang, Sam C. (Albany, New York) Stanford University, University of California at San Francisco – General Surgery, San Francisco, CA, Surgical Oncology

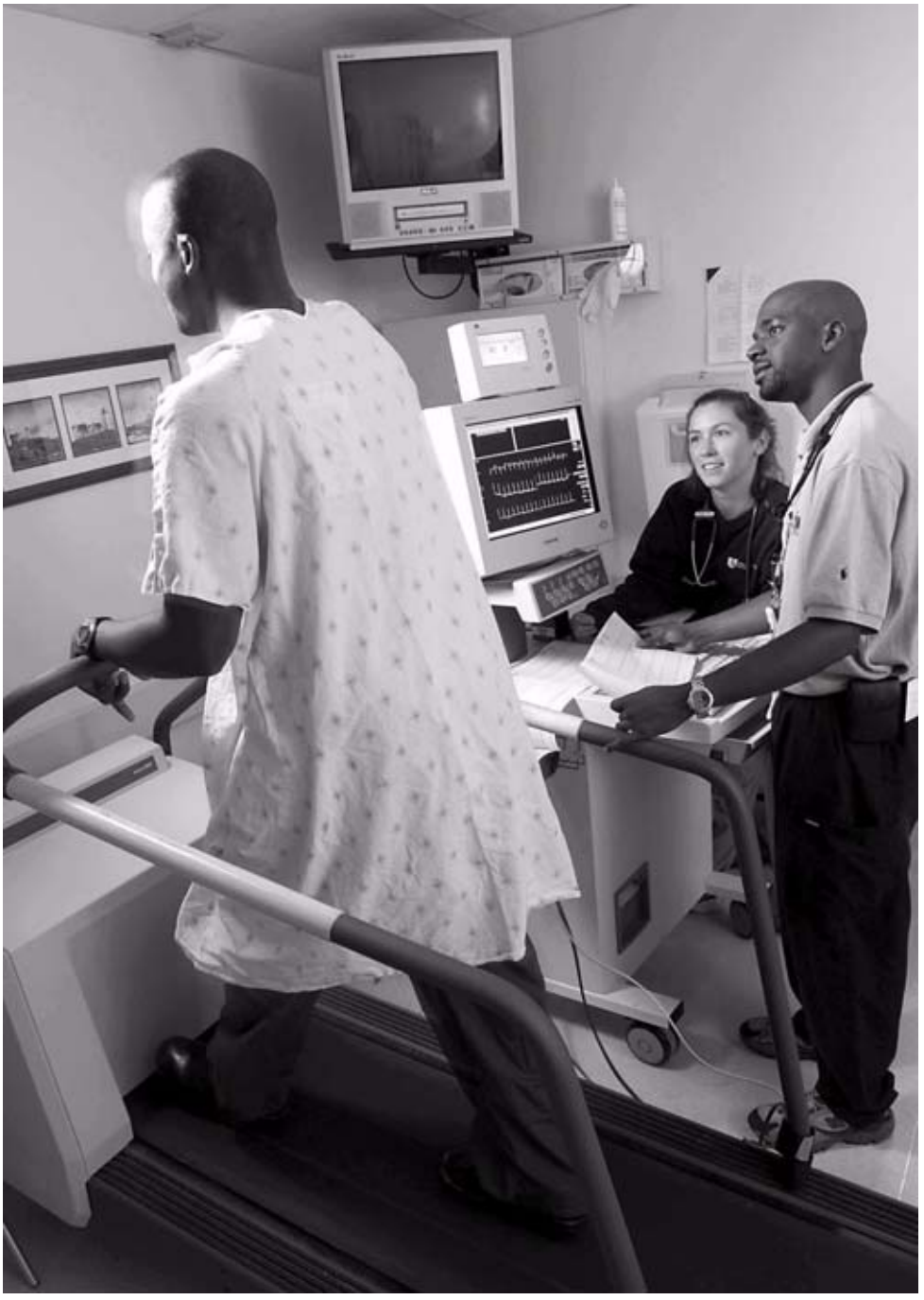
Whittaker, Brian (Long Island, New York) Duke University, SUNY Health Sciences Center – Brooklyn – Emergency Medicine, Brooklyn, NY, Emergency Medicine Attending

Wiechers, Ilse Ruth (Norwalk, Ohio) Case Western Reserve University, Residency Deferred, Research Fellowship, Duke University Institute of Genome Sciences and Policy

Williams, Jason E. (Foster City, California) Harvard College, Stanford University – Internal Medicine, Palo Alto, CA

Yu, Yen Rei Andrea (Houston, Texas) Duke University, Massachusetts General Hospital – Internal Medicine, Boston, MA, Pulmonary Medicine

Doctor of Physical Therapy Division



Doctor of Physical Therapy Division

The Profession of Physical Therapy

Doctors of Physical Therapy (DPT) apply the knowledge of the basic sciences to the prevention and treatment of movement dysfunction resulting from disease or injury. The physical therapist screens, examines, evaluates, diagnoses, prognoses, and provides interventions across the life span. Patient interventions are focused on prevention of dysfunction, relief of pain, improvement of strength, endurance, flexibility, coordination, and joint range of motion in order to maximize functional potential. The variety of settings in which a physical therapist may work includes hospitals, outpatient clinics, schools, skilled nursing facilities, rehabilitation centers, sports facilities, home care agencies, and corporate businesses. With experience, additional education, and board certification, the physical therapist may choose to specialize in orthopaedics, pediatrics, neurology, cardiopulmonary, sports physical therapy, clinical electrophysiology, women's health, and geriatrics. Beyond clinical practice, physical therapists may also pursue roles in education, research, and administration.

Mission Statement of the Doctor of Physical Therapy Division

The mission of the Doctor of Physical Therapy Division is to prepare Doctors of Physical Therapy, who by virtue of their critical thinking ability, clinical skills, diagnostic competence, ethical standards, and moral character are recognized experts in the diagnosis and management of neuromusculoskeletal function across the continuum of care, and who will serve their patients as primary clinical care practitioners, promoting the optimum health and function of their clients and society.

By pursuing this mission with vision and integrity, these leaders in the profession will seek to engage the mind, elevate the spirit, and stimulate the highest effort of all who are associated with the Doctor of Physical Therapy Division through education, practice, and research.

Doctor of Physical Therapy Curriculum

The Duke University Medical Center Doctor of Physical Therapy curriculum is a graduate professional degree program for entry into the profession of physical therapy. Upon successful completion of both didactic and clinical components of the curriculum, the student is awarded the Doctor of Physical Therapy (DPT) degree. The three year full-time program, located in the medical center, provides a comprehensive foundation in the art and science of physical therapy, preparing graduates to serve as primary clinical care practitioners for patients with neuromusculoskeletal dysfunction, throughout the continuum of care. The DPT program at Duke University has received full accreditation status from the Commission on Accreditation of Physical Therapy Education of the American Physical Therapy Association, and has offered an accredited educational program for physical therapists since its inception in 1943.

Faculty

Chief: J. K. Richardson, PT, PhD, OCS
Director of Graduate Studies: Daniel E. Erb, PT, PhD

D. Bongiorne, PT, MS; L. Case, PT, MS, PCS; R. Crouch, PT, MS; C. Cook, PT, PhD, MBA, OCS; R. Clendaniel, PT, PhD: D. Dore, EdD, PT, MPA; C. Figuers, PT, EdD; J. Gwyer, PT, PhD; E. Hegedus, PT, DPT, OCS; L. Lawrence, PT, MS; C. Odom, PT, DPT, ATC; A. Pastva, PT, PhD; J. Purser, PT, PhD, R. Richardson, PT, MEd; M. Riordan, PT, MS; W. Roy, III, PT; K. Shipp, PT, PhD; A. Taylor, PhD; K. Varvel, PT, MPH; L. White, PhD; T. Worrell, PT, EdD, SCS, ATC, FACSM.

Program of Study. The curriculum is comprised of 126 credits of academic work, completed over eight academic semesters, requiring 33 months of full-time attendance. Course work includes didactic courses in basic sciences, clinical sciences, patient management, research, administration, education, and two five-month clinical internships. The clinical 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. Surface Anatomy - Palpation	1 credit
PT-D-303. Histology, Embryology and Tissue Biomechanics	3 credits
PT-D-304. Human Development	2 credits
PT-D-305. Physical Therapist Interventions I	3 credits
PT-D-306. Professional Development Seminar	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	3 credits
PT-D-313. Physical Therapist Interventions II	4 credits
PT-D-314. Integumentary Practice Management	2 credits
PT-D-315. Cardiovascular and Pulmonary Practice Management	3 credits
PT-D-316. Clinical Examination, Evaluation, Diagnosis and Prognosis	3 credits
PT-D-317. Evidence-based Practice I	3 credits
PT-D-318. Clinical Experience II	1 credit
Total	**23 credits**

Summer Semester

PT-D-321. Movement Science II/Motor Control	2 credits
PT-D-322. Arthrological and Pathological Movement Science I	3 credits
PT-D-323. Diagnostic Imaging	3 credits
PT-D-324. Musculoskeletal Practice Management I	4 credits
PT-D-325. Medical Practice Management	3 credits
PT-D-326. Physical Therapist Interventions III	3 credits
PT-D-327. Patient/Client Management Seminar I	2 credits
PT-D-328. Clinical Internship I	1 credit
Total	**21 credits**

Year Two

Fall Semester

PT-D-402. Arthrological and Pathological Movement Science II	3 credits
PT-D-403. Musculoskeletal Practice Management II	4 credits
PT-D-404. Neurological Practice Management I	5 credits
PT-D-405. Evidence-based Practice II	3 credits
PT-D-406. Patient/Client Management Seminar II	2 credits
Total	**17 credits**

Spring Semester (8 weeks)

PT-D-411. Psychosocial Aspects of Care	2 credits
PT-D-412. Neurological Practice Management II	5 credits
PT-D-413. Educational Theory and Practice	2 credits
PT-D-414. Administration I	3 credits
PT-D-415. Patient/Client Management Seminar III	2 credits
Total	**14 credits**

Spring/Summer Semester (20 weeks)

PT-D-416. Clinical Internship II	4 credits

Year Three

Fall Semester (8 weeks)

PT-D-501. Clinical Pharmacology and Nutrition	2 credits
PT-D-502. Administration II	3 credits
PT-D-503. Primary Care Practice	3 credits
PT-D-504. Practice Elective I	3 credits
PT-D-505. Practice Elective II	3 credits
Total	**14 credits**

Fall/Spring Semester (20 weeks)

PT-D-506. Clinical Internship III	4 credits

Spring Semester (6 weeks)

PT-D-507. Professional Practice, Development and Evaluation	3 credits
PT-D-508. Evidence-based Practice III	3 credits
PT-D-509. Health Promotion and Injury Prevention	3 credits
Total	**9 credits**

In addition to the above courses, students must successfully complete written and practical comprehensive examinations as part of PT-D-507, and a research project as part of PT-D-508.

Program Policies and Grading Standards. Enrolled students should reference the *2003-2006 DPT Student Handbook* for detailed program policies. Graduate students in the Doctor of Physical Therapy degree program are participants in a professional educational program whose graduates assume positions of responsibility as primary clinical care practitioners in health practice. Accordingly, students are evaluated on their academic and

clinical performance and also on their interpersonal communication abilities, their appearance and professional conduct. [Deficiencies in any of these areas are brought to the student's attention in the form of a written evaluation, and failure to correct these performance issues may result in probation, suspension or expulsion from the program.]

Academic Progression and Requirements for Graduation. The faculty of the Doctor of Physical Therapy Division accept responsibility for monitoring the academic progress of each student enrolled in the program. The following policy describes the standards by which satisfactory academic progress will be assessed, the determination of academic standing, and the requirements for successful completion of the Doctor of Physical Therapy degree.

I. Standards of Academic Progress

A. Grades

1. Didactic Courses

   For all didactic courses in the curriculum, the following grading system will be used:

   A = 90 – 100 percent

   B = 80 – 89 percent

   C = 70 – 79 percent

   F = 69 percent or below

   I = Incomplete

2. Clinical Courses

   For Clinical Education Experiences I and II (PT-D 308 and 318) and for the Clinical Internship I (PT-D 328), the following grading system will be used:

   P = Pass

   F = Fail

   I = Incomplete

   For the Clinical Internship II and III (PT-D 416 and PT-D 506), the following grading system will be used:

   A = 90 – 100 percent

   B = 80 – 89 percent

   F = Fail

   I = Incomplete

Clinical Internship II and III will be graded on the letter grade scale of *A* or *B*. Students must have a grade of *A* or *B* to successfully complete the Clinical Internship. A grade of *F* will result in the requirement to repeat the internship. Students may only repeat an unsuccessful internship one time. If the student is unsuccessful in the repeat attempt, they will receive a failing grade and will be dismissed from the program. The student may appeal their dismissal from the program by notifying the chief in writing, as to why they believe an appeal is warranted. Repeat residencies are scheduled at the discretion of the chief and academic coordinator of clinical education.

3. Incomplete Grades

   A grade of *I* Incomplete is given when, at the time the grades are reported, some portion of the student's work in a course is lacking *for an acceptable*

reason, such as inability to attain sufficient mastery of the course content without additional study due to illness or impairment. Incomplete grades may be given at the instructor's, chief's, or director of graduate studies' discretion, with the approval of the Committee on Academic Performance for the following reasons:

A. Documented student illness that prevents the student from completing the required work in the semester in which the course is offered.
B. Illness of the student's immediate family member(s), which prevents the student from completing the required work in the semester in which the course is offered.
C. A student who selects alternative or additional unplanned learning experiences that will impede his/her ability to complete course work in the semester in which the course is offered. Examples of such opportunities include: acceptance of a Fulbright Grant, Rhodes Scholarship, or other academic award, or participation in the Olympics or Pan American Games.
D. A student who requires maternity or paternity leave or time to provide elder care.

A grade of Incomplete may not be given to a student for the sole purpose of providing additional time so the student may elevate a course grade. Instructors who elect to give a student an *I* grade are committing themselves to perform the additional instruction/ evaluation required for the student to complete the course within one calendar year. *I* grades remain on the transcript with the earned grade added later.

The course instructor will determine the manner in which the *I* grade will be converted to an earned grade. The instructor who gives an *I* for a course specifies the date by which the student must have made up the Incomplete, but in no case will this exceed more than one calendar year from the date the course ended or prior to matriculation into a clinical internship. Incomplete grades which are not satisfied within one calendar year automatically become grades of *F*–Fail. If an extension to this time limit is required, an appeal in writing must be made to the chief just prior to expiration of the calendar year in which the Incomplete grade must be completed. When the faculty member certifies that an Incomplete has been satisfied, a passing grade is placed alongside the Incomplete on the permanent and official transcript.

If a student's grade in a course that contains specific subunits is passing, but one or more subunits have been failed, the student will receive a grade of *I* in the course and must complete remedial work in order to earn a passing grade in the course.

4. Failing Grades

A. A grade of *F*– Fail is recorded on the permanent record of a student by the registrar upon submission by the faculty member that unsatisfactory work has been performed by the student. Failures will not be erased from the permanent record, and will result in immediate withdrawal from the Doctor of Physical Therapy Program. However, the student may appeal this withdrawal by indicating in writing to the chief (a) reasons why the student did not achieve minimum academic standards and (b) reasons why the student's immediate withdrawal should be changed. A student may continue to matriculate in courses until the decision of the appeal is determined. The chief will notify the student of the appeal decision in writing within three weeks of receipt of the appeal. All appeals must be mailed to the chief via United States Postal Service Certified Mail.

B. Progression

Normally, all first year courses must be satisfactorily completed before a student may enroll in the second year courses, and all second year courses must be satisfactorily completed before a student may enroll in the third year courses. (When requested by the student, altered sequences for students who require remediation may be considered for approval by the faculty, and the chief.)

II. Determination of Academic Standing

All students' records are reviewed periodically by the faculty, and each student is assigned to one of the following categories of Academic Standing.

A. Good Academic Standing

The student is considered to be in ***Good Academic Standing*** if they maintain an overall, cumulative, grade point average of 3.0 or higher, and "Pass" for Cinical Experiences or Clinical Internship I for all courses attempted. The student cannot receive less than a grade of *C* in any course attempted.

B. Academic Probation

Academic probation is an academic standing that indicates concern about the student's performance in the curriculum. By placing the student on academic probation, the student is notified of the faculty's concern regarding past performance. The student also is informed that future performance must improve or the student risks withdrawal from the program. In these instances, the director of Graduate Studies will notify the registrar that the student is being placed on academic probation.

When a student is placed on academic probation, they remain in this academic standing until the student either improves their grade point average to an overall cumulative grade point average of 3.0 or better, or is withdrawn from the program. A student who is currently on ***Academic Probation*** must achieve a cumulative grade point average of 3.0 or better in the next consecutive semester or will be withdrawn from the program.

The director of Graduate Studies will notify the student that their performance will be evaluated at the end of each succeeding semester, and that future poor performance may occasion withdrawal from the program (see following section).

The faculty of the Doctor of Physical Therapy Division will use the following standards for assigning the status of academic probation.

1. A student will be considered to be on ***Academic Probation*** if their cumulative grade point average is 2.99 or less.
2. A student who successfully appeals a grade of *F* in one course in the curriculum will be considered to be on ***Academic Probation.*** (See Withdrawal below).

   A student who has been placed on Academic Probation may require remedial work to rectify their weakness. Such remediation will be determined by the chief, advised by the faculty, and communicated to the student in writing by the director of Graduate Studies, and may entail additional costs for the student.

C. Withdrawal

A student who fails to demonstrate successful academic progress will be withdrawn from the program.

The faculty of the Doctor of Physical Therapy Division will use the following standards for withdrawing a student from the program.

1. A student will be asked to ***Withdraw*** following the attainment of a grade of *F* Failure in one course in the curriculum. The student may appeal this withdrawal as described under the section, "Failing Grades."
2. A student who is currently on ***Academic Probation*** will be asked to ***Withdraw*** following the attainment of a cumulative grade point average of 2.99 or less in a second consecutive semester.

III. Appeals of Academic Status (Academic Probation or Withdrawal)

A student placed on Academic Probation or Withdrawn from the program may appeal by indicating in writing to the chief: (a) reasons why the student did not achieve minimum academic standards, and (b) reasons why the student's academic standing should be changed. Each appeal will be considered on its merit. Individual cases will not be considered as precedent. The chief will notify the student of the decision on the appeal in writing within three weeks of receipt of the appeal. All appeals must be mailed to the chief via United States Postal Service Certified Mail.

IV. Requirements for Graduation

A. Academic Standards for Graduation

The following standards must be met by the student to successfully complete the Doctor of Physical Therapy degree program.

1. Completion with a passing grade of a minimum of 126 units of course credit, including all required courses. This includes the successful completion of a research requirement and of all clinical education courses.
2. Passing of all Practical Examinations administered by the faculty, and passing a written Comprehensive Examination with a grade of 70 percent or better.

B. Time Limits on Meeting Requirements for Graduation

1. The standard required length of study to complete the above-listed academic standards is eight continuous academic semesters of full-time work (including two summer terms), completed in 33 calendar months.

   Under extraordinary conditions, a student may be permitted a time limit of two semesters of full or part-time enrollment beyond the standard required length of study to complete the program. The student must apply in writing for such consideration to the chief who will review each case.
2. The student is expected to make continuous and successful progress towards the requirements for graduation throughout the curriculum. The student must register for all required courses during each semester of the curriculum, and may carry into succeeding semesters no more than one *I* course grade. Under extraordinary circumstances, a student may apply for an exception to the typical pattern of progress towards degree requirements.

C. Incomplete Mastery of Content

1. If a student successfully appeals a grade of *F* in a course and is permitted to continue in the curriculum, the instructor is not required to provide individual remediation to the student. In this case, the only plan for remediation is for the student to retake the course in the semester in which it

is normally given. The student will bear all financial implications of repeated course work. All remediation efforts must be completed within the above-outlined time limits for completion of the program, or a grade of *F* Fail will remain on the student's permanent record.

2. If a student achieves a failing grade (less than 70 percent) on the Comprehensive Examination, a specific remediation plan for the student will be developed. This remediation may involve retaking the entire examination, a portion of the examination, a new examination, or other performance evaluation as determined by the faculty.
3. The remediation plan will be developed within two weeks of the date of the Comprehensive Examination and will be conducted at a date mutually agreeable to the student and the director of Graduate Studies, but no later than 4 weeks following the date of the original examination. If the student is unsuccessful in a second attempt to pass the Comprehensive Examination with a passing grade of 70 percent or greater, the student will be dismissed from the program.

Attendance and Excused Absences. Students are expected to attend all classes and clinical internship hours, and are excused only for illness or personal emergency. The chief may approve a student's written request for a Leave of Absence for personal, medical, or academic reasons, for a period not to exceed one year. Written notification of the approved time frame of the leave of absence to the student, the registrar, and the director of financial aid will be provided. The student must provide written notification of their intent to return to the program at least 90 days prior to the anticipated date of re-entry. The student requesting an extension beyond one calendar year may be required to apply for readmission to the program, and/or to repeat some or all course work. For purposes of deferring repayment of student loans during a school-approved leave of absence, federal regulations limit the leave to six months.

Prerequisites for Admission. Requirements for admission to the Doctor of Physical Therapy Division include a baccalaureate degree, completion of prerequisite courses, Graduate Record Examination (GRE) Aptitude Test scores from within the last five years, the filing of an application (including essays and reference letters), and upon invitation, a personal interview. The GRE must be taken no later than the November test date.

Prerequisite course work: 3 semester hours of biological sciences (recommended courses include embryology, histology, microbiology), 3 semester hours of cell biology or molecular biology, 3 semester hours of human anatomy, 3 semester hours of human physiology, 6 semester hours of chemistry, 6 semester hours of physics (including principles of light, heat, electricity, mechanics, and sound), 3 semester hours of statistics, 6 semester hours of psychology (recommended courses include abnormal psychology, child, or developmental psychology), and 9 semester hours of humanities/social sciences (recommended courses include scientific and technical writing, and social anthropology). Human anatomy and human physiology courses must be completed within five years of the date of the application. All prerequisite courses must be completed with a grade of *C* or better. No prerequisite credit can be given to courses showing a Pass/Fail grade. A baccalaureate degree in the natural sciences is not a requirement for admission; however, a background of coursework in the natural sciences is strongly recommended.

Application Procedures. Application materials are available from July through December 1 each year, and may be obtained by writing: Admissions Secretary, Duke University Medical Center, Doctor of Physical Therapy Division, DUMC, Box 3907,

Durham, NC 27710, (919) 681-4380. The application and all supporting documents must be post-marked no later than December 1 of the year preceding admissions. The application must be received in the department within 14 days of the December 1 postmark. The application fee is $75. An early application deadline of November 1 will require a reduced application fee of $65. Fall semester transcripts containing any prerequisite course work must be submitted as soon as they are available. Only students for full-time study are accepted. State residence does not influence admissions policies or tuition costs.

Web-based application is available, and we encourage applicants to complete an electronic application, located at *http://dukehealth1/org/dpt/application.asp.*

Tuition and Expenses. The faculty of the Doctor of Physical Therapy Division practice a "need-blind admissions process," with adequate financial aid for those students with financial need. The tuition for the 126 credits of the program is budgeted in three annual payments of 42 credits/year. The approved costs will be available from the Office of Financial Aid in May prior to admissions in the fall. Detailed student budgets are provided for all interviewed applicants.

Financial Aid. Qualified applicants may be eligible for federal educational loan programs or institution-based loans. A small amount of need-based scholarship awards is available for selected matriculated students. Financial aid information is available for all interested applicants by contacting the Office of Financial Aid, Box 3067, Duke University Medical Center, Durham, NC, 27710, or at the School of Medicine's Office of Financial Aid website: *http://finaid.mc.duke.edu/.*

Courses of Instruction

PT-D-301. Human and Clinical Anatomy. This course is devoted to the study of regional gross structure and function of the human body. The emphasis is on the relationship between structure and function of the neuromusculoskeletal system and the clinical implications of dysfunction. The student is also introduced to clinical problem identification through discussion of the anatomical bases for somatic dysfunction.

PT-D-302. Palpation. This course is devoted to the study of surface anatomy and palpation of the human body. The emphasis is on the location of important regional and local bony and soft tissue structures, including bony landmarks, joint spaces, muscles, ligaments, bursae, nerves and vessels, and the demonstration of appropriate palpation techniques. This course is coordinated with PT-D 301, Human Clinical Anatomy.

PT-D-303. Histology, Embryology and Tissue Biomechanics. This course covers tissue structure and major function of the cells and tissues of the body. Topics in this course include: structure and function of the cells and tissues of the body, tissue diversity, histology of major organs, basic cellular anatomy, developmental biology/embryology, cell structure, function, cell diversity, and cell communication. The course covers topics of embryology from conception through birth. The course also presents the basic science of tissue biomechanics and the response of muscle, bone, joints, and soft tissue to disease and injury. The normal repair process and the effects of the physical therapist's interventions including rest, stress, stretch, resistance, immobilization, and work are discussed. Complications and benefits of interventions, the effects of nutrition, aging, exercise, and immobility are discussed.

PT-D-304. Human Development. This course covers human development from birth to death, including its physical, psychological, social, and economic aspects. Emphasis in the course is on physical development. The course highlights the diversity of development among individuals and cultures.

PT-D-305. Physical Therapist Interventions I. In this course students will be introduced to a variety of basic physical therapy skills. Early observation, communication, teaching and safety procedures, including body mechanics and universal precautions, are covered. Emphasis is placed on psychomotor performance including transfers, gait training, positioning, bandaging, and basic patient handling skills. Medical terminology is introduced and vital signs assessment is taught. Basic, but complete, competencies in goniometry and Manual Muscle Testing are expected.

PT-D-306. Practice Management/Health Service Delivery. This course will orient the student to the role and function of the physical therapist in contemporary health care with an awareness of ethical principles, historical foundations of the profession, current health care issues, and health economics. The course introduces the patient management model in physical therapy including patient examination, evaluation, diagnosis, prognosis, intervention, and outcomes. It will include a discussion of practice policies, models of disability, models of clinical decision-making, and documentation. Students will develop initial skills in patient interviewing and note writing.

PT-D-307. Movement Science I/Biomechanics. This course addresses basic concepts relating to the architectural design and function of synovial and non-synovial joints, the morphology and function of skeletal muscle, observational joint and movement analysis, anthropometry, and biomechanical force systems. Free body diagrams as well as trigonometric and algebraic functions are used to solve biomechanical problems related to physical therapy practice. Emphasis is on static analysis of both stationary and moving bodies.

PT-D-308. Clinical Experience I. This course will serve as the initial entry point into the clinical environment. A variety of patient types and settings will be observed during four full-day (eight hour) experiences. Emphasis will be placed on integrating didactic information and developing psychomotor skills in the clinical setting. Students will also be exposed to a variety of professional practice issues and roles of physical therapists. Licensed clinical and/or academic faculty will provide direct supervision of the students. The supervisory model for this experience will not exceed 4 students : 1 clinical instructor.

PT-D-311. Neurosciences. This course covers the anatomy and physiology of the nervous system. The student is introduced to concepts and terminology. Detailed neuroanatomy of the peripheral and central nervous system is presented. The neurophysiological basis of motor control is addressed, including sensory and motor systems, memory, cognition, and neural plasticity. Lectures, laboratory exercises, and problem-solving sessions are included.

PT-D-312. Pathology. In this course, an introduction to diseases commonly seen in patients receiving physical therapy will be presented. Body responses to injury and disease will be traced from the cellular level to the systems level. Typical disease processes in theses areas are covered: pulmonary, cardiac, neurological, infectious, genetic, immunosuppressive, metabolic, and metastatic.

PT-D-313. Physical Therapist Interventions II. This course covers strategies and techniques to manage pain, edema, loss of normal motion, tissue dysfunction, and weakness through direct interventions. Interventions include: strength training, stretching, soft tissue mobilization, and exercise training. The effects of exercise across the lifespan are discussed.

PT-D-314. Integumentary Practice Management. This course will present the practice management model for patients with pathology or impairment of the

integumentary system. The role of the physical therapist as a primary care practitioner in examination, evaluation, and intervention will be stressed. The continuum of impairment of functional limitation to disability will be presented.

PT-D-315. Cardiovascular and Pulmonary Practice Management. This course gives an overview of the related pathologies of the cardiovascular and pulmonary system, examination and evaluation procedures, diagnostic procedures, goal setting, interventions, and patient management. A major focus of this course is laboratory sessions applying cardiovascular and pulmonary evaluation and intervention procedures such as airway clearance and exercise testing. This course covers the principles of training, exercise, and health promotion related to the cardiovascular and pulmonary systems.

PT-D-316. Clinical Examination, Evaluation, Diagnosis and Prognosis. This course gives students skill in observation, communication, gross screening of posture, gait, function, integument, neurological, and musculoskeletal status. Additionally, students acquire skill in specific examination of flexibility, joint range (goniometry), anthropometric measures, and muscle strength (MMT). This course further provides opportunity for students to integrate material in determining patient problems and establishing an initial plan of care.

PT-D-317. Evidence-based Practice I. In this course, students will be introduced to the science of clinical reasoning in health care and physical therapy, and the integration of clinical reasoning and evidence-based practice will be developed. Students will then learn how to access knowledge for practice, and will learn the methods of scientific inquiry, including research theory, design, methods, and measurement. Students will read research literature weekly and participate in a critical appraisal of the selected research methods and the meaningfulness of the findings for clinical decisions.

PT-D-318. Clinical Experience II. This course will continue to reinforce principles learned throughout the program to date. Under the guidance of licensed clinical faculty, students will integrate concepts, principles, and techniques with emphasis on interventions learned during the first spring semester. The structure of this phase of clinical education will consist of four full days in the clinic. The focus will be on the practice areas of cardio-pulmonary and integumentary care. Students will spend two consecutive days in each of the above practice areas where they can experience and learn how physical therapists function in these environments. The supervisory model for this experience will not exceed 3 students: 1 clinical instructor.

PT-D-321. Movement Science II/Motor Control. Current concepts of motor control and motor learning are synthesized from multiple disciplines to provide a framework for physical therapy practice. Neurological mechanisms are examined and integrated with other physiological, psychological, and biomechanical contributions to movement and function. The role of task and environment in the control of movement is also analyzed.

PT-D-322. Arthrological and Pathological Movement Science I. A critical examination of the morphology and function of the articulations of the axial skeleton and upper limb. Course content stresses normal musculoskeletal movement of each of the pertinent segments as well as the pathomechanics of selected trunk and upper limb musculoskeletal anomalies resulting from congenital malformations, bone and soft tissue injuries, or disease. The course exposes students to kinematic and kinetic analysis of selected movement patterns pertinent to clinical practice.

PT-D-323. Diagnostic Imaging. The study of the principles, procedures, and interpretation of diagnostic imaging techniques. Primary emphasis will be on plain film

radiography of musculoskeletal injuries and conditions with secondary emphasis on computerized tomography scans, magnetic resonance imaging, bone scans, myelograms, and other nuclear medicine procedures.

PT-D-324. Musculoskeletal Practice Management I. This course is designed to expand the knowledge base of the student into the specialized area of Musculoskeletal Practice Management with emphasis on the cervical spine and upper extremities. Direct physical therapist intervention for patient examination, evaluation, diagnosis, prognosis, and intervention will be presented.

PT-D-325. Medical Practice Management. This final physical therapist intervention course will cover strategies and techniques to manage pain, edema, loss of normal motion, soft tissue dysfunction and weakness through direct interventions. Interventions include: basic exercise, soft tissue mobilization, relaxation, splinting and compression garments, athermal modalities, cryotherapy, deep thermal modalities, electrotherapeutic modalities, and hydrotherapy.

PT-D-326. Physical Therapist Interventions III. This course introduces students to an evidence-based approach to the use of therapeutic physical agents; that is, the literature that supports or refutes the use of each physical agent will be discussed. An algorithm is presented to facilitate accurate classification of the patient's impairments and functional limitations. In addition, the role of pain and joint effusion in inhibition of function is presented. Specifically, students will learn and understand the scientific bases of commonly used therapeutic physical agents in physical therapy practice. The physiological effect of each therapeutic physical agent will be discussed and specific reading will be available. Laboratory sections will require students to demonstrate specific competencies in the use of the agents. Students will use a case-study format to demonstrate the competency of the material.

PT-D-327. Patient/Client Management Seminar I. In this seminar course, students will expand on their ability to integrate knowledge from various content areas in the analysis of patient cases, and will further develop their skills in the integration of clinical reasoning and evidence- based practice. The seminar format will include presentation of written, video, computer, and live patient cases followed by discussion of diagnostic, prognostic, and intervention aspects of the case. Analysis and critique of cases will address the clinical and scientific information presented in each case, synthesis of the information, strength of the conclusions, areas needing further investigation, and issues regarding decision-making and intervention in the context of the current state of knowledge. An interdisciplinary format will be encouraged, with students required to attend and report back on 2-3 Medical Center Conferences / Grand Rounds as part of this course.

PT-D-328. Clinical Internship I. This first, full-time clinical experience will consist of a four-week learning experience in an inpatient setting, including: acute care, subacute, or skilled nursing. The focus of the experience will be the development of psychomotor skills, professional behaviors, gross and specific examination, and intervention procedures and documentation skills. Exposure to the multiple roles of the physical therapist will be emphasized (e.g., administration, case management, consultation). The student will be supervised by a licensed physical therapist. The supervisory model for this experience will not exceed 2 students : 1 clinical instructor.

PT-D-402. Arthrological and Pathological Movement Science II. The goal of this three-hour a week course is to learn and to understand the relationships of lower extremity arthrology to the normal, impaired, and pathological gait patterns. The course is

composed of the following sections: 1) Hip and SI Joints, 2) Knee Joint, 3) Ankle and Foot Joints, 4) Normal Gait, 5) Impaired and Pathological Gait Patterns. Specifically, sections 2-5 will consist of lecture. Students will be prepared to discuss specific unit objectives and reading assignments for clarification as needed in "Discussion Sessions." Students will assume an active role in the "Discussion Session," as the instructor facilitates problem-solving and clarifications if needed. Laboratory sessions will require students to demonstrate specific competencies. Students will analyze video tapes of normal, impaired and pathological gait patterns.

PT-D-403. Musculoskeletal Practice Management II. This course is designed to expand the knowledge base of the student in the specialized area of Musculoskeletal Practice Management with emphasis on the thoracic spine, lumbar spine, pelvis and lower extremities.

PT-D-404. Neurologic Practice Management I. An introduction to management of children and adults with neuromuscular disorders is presented. Examination, evaluation, diagnosis, prognosis, and intervention is discussed. Peripheral neuromuscular (e.g., muscular dystrophy, brachial plexus injury) and spinal cord disorders (e.g., spinal cord injury, spina bifida) are included.

PT-D-405. Evidence-based Practice II. This course is comprised of two complementary sub-units. In the Analytical Basis of Inquiry sub-unit, students will learn the logic of hypothesis testing and specific statistical tests used for descriptive and inferential analysis of research data. Students will read research literature weekly and discuss the analytical approaches that support the research findings. In the Critical Appraisal of Evidence for Practice unit, students will build on their knowledge of research methods and learn to critically appraise the evidence for physical therapy practice by: developing an answerable clinical question, identifying the best research evidence, and assessing the quality of the evidence. In addition, epidemiological statistics that enhance the understanding of diagnostic tests and treatment options will be covered. In both units, students will use statistical software to build skills in data analysis with practice data sets.

PT-D-406. Patient/Client Management Seminar II. The goal of this two-hour a week seminar course is to learn the cognitive components and psychomotor skills required to perform a patient/client interview in the most efficient and valid manner. The class is divided into smaller group interactions and discussions. Students complete specific readings on the three components of the patient/client interview process. After students read the assignments, small group discussions will occur where the students actively explore the topics. Then, at the next class meeting, students practice the interviewing techniques while being video- or audio-taped. At the next class meeting, "Demonstration of Core Skills Lab," students demonstrate their mastery of the core skills practiced in the previous class while being video- or audio-taped. Verbal critiques from the professor and peers will be provided. The final and midterm examinations will each consist of a 15-minute video-taped interview of a patient with a written self-critique that provides strategies to improve the student's own performance.

PT-D-411. Psychosocial Aspects of Care. In this course, students will survey the various factors affecting the patient, the family, and the physical therapist relationship in situations of chronic illness and loss. Students will increase skill in developing an effective helping relationship with other people. Experiential learning experiences and self-observation will be used to promote this development.

PT-D-412. Neurological Practice Management II. The study of management of children and adults with neuromuscular disorders is continued with emphasis on more

complex CNS and multisystem disorders. Examination, evaluation, diagnosis, prognosis, and intervention are discussed. Both concepts and skills are addressed. Acquired injuries (e.g., cerebrovascular disease, traumatic brain injury), degenerative disorders (e.g., Parkinson's disease, multiple sclerosis) and congenital disorders (e.g., cerebral palsy) are included.

PT-D-413. Educational Theory and Practice. In this course, principles of teaching and learning will be introduced and applied to the health care setting. Students will learn to use a variety of teaching methods selected and developed for a specific audience. Students will formulate and implement a plan for facilitating personal behavioral change.

PT-D-414. Administration I. The study of administrative styles in the healthcare delivery system. Emphasis on management analysis in professional settings of hospitals, long term care facilities, home care, private practice, and community-based programs as related to business operations, budget development, and personnel management.

PT-D-415. Patient/Client Management Seminar III. In this course students will be introduced to the management of patients who require prosthetic or orthotic assistive devices. Students will complete readings outside of class and participate in problem-solving laboratories with patients who use these assistive devices. Additional case studies will be presented on patients with a variety of complex diagnoses, and students will analyze the clinical decisions that are crucial to each case.

PT-D-416. Clinical Internship II. This 20-week clinical internship may occur in varied settings under the supervision of a selected and trained clinical instructor, and following a written curriculum. The required focus of this clinical experience will be in either the musculoskeletal or neuromuscular practice areas. Under supervision, students will learn skills in all components of the physical therapy practice management model, including conducting patient examinations and evaluations, establishing patient diagnoses and prognoses, conducting patient interventions, and measuring patient outcomes. When possible, students will experience patients in these practice patterns who are across the range of acute to chronic conditions. Students will practice all administrative aspects of their professional roles during these internships, and will learn the components of safe, ethical, and efficacious practice. Performance expectations will include safe and effective examination, evaluation, diagnosis, prognosis, intervention, and patient management skills. Students will complete a variety of learning experiences during this internship related to patient care, teaching, and research. The maximum supervisory ratio for this course will be 2 student interns: 1 clinical instructor.

PT-D-501. Clinical Pharmacology and Nutrition. This course will introduce students to the basic principles of pharmacology and nutrition. Study of pharmacologic intervention and nutritional practices for patients commonly seen in physical therapy is included.

PT-D-502. Administration II. The study of various aspects of the operations of a business. Personnel aspects to be studied are: interviewing, negotiating, hiring, training, promoting, and terminating personnel. Professional development and mentoring as related to quality practice will be emphasized. Business aspects will include development of new programs and services, problem-solving techniques, and quality improvement programs. Emphasis will be placed on customer service methodology.

PT-D-503. Primary Care Practice. This course explores the related concepts of direct access to physical therapy care, autonomous/independent physical therapist practice, and physical therapists in the roles of point-of-entry or primary care providers. Examples of direct access physical therapist practice in the United States are covered as well as the legal, political, ethical, and liability issues surrounding the concept of direct access.

This course is designed to allow the student to integrate the coursework and clinical experiences thus far in the curriculum in the context of the practice of physical therapy without physician referral. To that end, students apply the principles of screening for medical disease or conditions and decision-making regarding referral to a physician or another health care provider, when their examination and evaluation of a patient warrants this action via case examples and case presentations based on their own clinical experience. In addition, students are exposed to several complementary and alternative medicine (CAM) disciplines in order to increase their understanding of what type of care the patient may be receiving when being treated by a CAM practitioner.

PT-D-504/505. Practice Elective I and II. In these courses, students will choose two electives in which to deepen their knowledge base for practice. Practice electives will be offered in: pediatrics, geriatrics, orthopaedics, sports, cardiopulmonary, neurology, education, research, and administration.

PT-D-506. Clinical Internship III. This 20-week clinical internship may occur in varied settings under the supervision of selected and trained clinical instructors. The required focus of this clinical experience will be in either the musculoskeletal or neuromuscular practice areas, depending on the previously completed internship (PT-D-416). Under supervision, students will learn skills in all components of the physical therapy practice management model, including conducting patient examinations and evaluations, establishing patient diagnoses and prognoses, conducting patient interventions, and measuring patient outcomes. When possible, students will experience patients in these practice patterns who are across the range of acute to chronic conditions. Students will practice all administrative aspects of their professional roles during these internships and will learn the components of safe, ethical, and efficacious practice. Performance expectations will include safe and effective examination, evaluation, diagnosis, prognosis, intervention, and patient management skills. Students will complete a variety of learning experiences during this internship related to patient care, teaching, and research. The maximum supervisory ratio for this course will be 2 student interns: 1 clinical instructor.

PT-D-507. Professional Practice Development and Evaluation. This course will require students to read about and discuss the concept of professionalism and interpret this concept for their own careers. Students will integrate the didactic, clinical, and research components of their experience in preceding course work, with the goal of evaluating their strengths and weaknesses for professional practice. Students will develop skills in self-assessment and planning for continuous professional development in five areas of physical therapy: teaching, research, administration, clinical practice, and service.

PT-D-508. Evidence-based Practice III. This course will provide students the opportunity to finalize their research or scholarly project in written form and complete a formal research presentation of their project results. The role of critical inquiry and evidence-based practice will be discussed, including the development of practice policies and the use of evidence to support clinical decisions. Students will discuss strategies to change practice at the grass roots level and will develop a plan to foster their growth as scholarly practitioners.

PT-D-509. Health Promotion and Injury Prevention. In this course, the student will learn to identify and assess the health needs of individuals, groups, and communities through screening for prevention of injury, developing wellness programs, and triaging appropriate patients for physical therapy. The student will be able to design and execute programs to promote optimal health by providing information or consultation on many aspects of health risks and disability. The student will be exposed to a multidisciplinary approach to health promotion and injury prevention and will participate in an existing program.

Master of Health Sciences Degree Programs

The Clinical Leadership Program

MASTER OF HEALTH SCIENCES CURRICULUM

Department of Community and Family Medicine

Chairman: J. Lloyd Michener, M.D.
Program Director: Michelle J. Lyn, M.B.A., M.H.A.
Clinical Leadership Program Steering Committee:
Ruth Anderson, Ph.D., R.N., C; Steven J. Bredehoeft, M.D., M.P.H.; Mary T. Champagne, Ph.D., R.N.; Christopher Conover, Ph.D.;.; Joseph S. Green, Ph.D.; Clark C. Havighurst, J.D.; J. Lloyd; Michener, M.D.; Gwendolyn Murphy, Ph.D., R.D.; Kevin A. Schulman, M.D., M.B.A.; Justine Strand, M.P.H., PA-C; Duncan Yaggy, Ph.D.; Susan Yaggy, MPA

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 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.

Clinical Leadership students move through the program as an integrated team. The cohort creates an exceptional peer learning experience which results in relationships that continue throughout one's professional and personal life. Shared experiences through team problem-solving and project collaboration form lasting professional and personal bonds. This can be one of the most rewarding outcomes of the program. The structure of the cohort enables classmates to start the program together and continue through the

curriculum together. Because the class size is limited, students receive individual attention from faculty members.

Prerequisites for Admission. The prerequisites for admission to the MHS in Clinical Leadership curriculum include:

1. A clinical degree such as MD, PA, NP, or the equivalent.
2. Three years post-training clinical experience or the equivalent.
3. Prior preparation in statistics. A list of course offerings as well as online/self-paced tutorials is provided for students who do not have such training.
4. Prior experience in budgeting.
5. Computer skills, including experience with: word processing, e-mail, spreadsheets, Internet research, and presentation programs. (All students in the MHS-CL are required to have their own PC of Pentium class with Internet Access.)
6. Administrative experience desirable.

Admissions Procedures. Applicants seeking admission either as a degree candidate or as a non-degree participant should submit the application form and the following supporting documents.

1. Official transcripts from each post-secondary institution attended. Transcripts must be sent by the institutions attended directly to the Clinical Leadership Program. Personal copies are not accepted.
2. Three letters of recommendation, including one from an individual with direct knowledge of the candidate's clinical experience and one from someone with direct knowledge of the candidate's administrative experience. All letters should be written by persons who are qualified to testify to the candidate's capacity for graduate work. The provided evaluation forms should be mailed to the Clinical Leadership Program directly by the evaluators.
3. Applicants who do not possess a graduate degree are required to provide Graduate Record Examination (GRE) General (Aptitude) Test results. Scores must not be more than five years old, and must be mailed directly to the Clinical Leadership Program from the Educational Testing Service.
4. Proof of current NC practice licensure. In addition, candidates must maintain licensure 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 2005-2006 academic year is July 1,2005. 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, 2005. 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 2005-2006 academic year is $900.00 per unit. Duke faculty members may be eligible for the University's Educational Assistance Program. Other sources of support may exist in clinical departments; prospective applicants should consult with program directors and division chiefs regarding potential funding sources.

Financial Aid. Qualified students may be eligible for Stafford Loans up to $8,500, and

up to $10,000 in tuition loans. Clinical Leadership students may be eligible for up to $10,000 in unsubsidized federal Stafford Student Loans. The North Carolina Student Loan Program for Health, Science, and Mathematics provides financial assistance in the form of loans up to $6,500 per year for North Carolina residents; these loans may be cancelled through approved service in shortage areas, public institutions, or private practice. Applicants may call (919)571-4182 for further information about this loan program. Limited scholarships funds are also available. All financial aid awards are made on the basis of documented financial need. Financial aid application packets are distributed on the admissions interview date. Additional information is available from the Office of Financial Aid at (919) 684-6649.

This program is part-time. It is assumed that the candidate will continue to work in a clinical capacity while working toward the Master of Health Sciences in Clinical Leadership.

Grading Policies. Grades for all courses and clinical rotations within the Clinical Leadership curriculum are assigned on the basis of the following: Honors (*H*), Pass (*P*), Low Pass (*L)*, and Fail (*F)*. The Clinical Leadership Program is designed to integrate classroom and clinical learning experiences considered necessary for competency as health care providers. Therefore, the failure of any required course prevents a student from continuing in the program. Also, a student can receive no more than a total of three grades of "Low Pass" in the ***15*** required courses.

A grade of "Incomplete" (*I)* may remain on a student's transcript for one year only. After one year, a grade of "Incomplete" is automatically converted to an *F* (Fail). An extension to this one year limit may be granted by the program director; a request must be submitted in writing to the program director no later than 30 days prior to the expiration of the one year time limit.

Satisfactory Academic Progress. Satisfactory academic progress for students in the Clinical Leadership Program consists of the successful completion of all requirements necessary for the advancement from one semester to the next. This includes successful completion of the Clinical Leadership Seminar and at least one core course each semester. During the Clinical Leadership longitudinal project period the student must maintain consistent progress with their cohort in meeting designated project deadlines. 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 Clinical Leadership Program.

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

Attendance and Excused Absences. Students are required to attend all lectures and seminars and complete all assignments. Absences are excused only for illness, personal emergency, or emergency clinical schedule conflict. Students must notify program faculty in advance of an expected absence.

Leave of Absence. A leave of absence will be granted upon request at the discretion of the Steering Committee.

Withdrawal. If a student withdraws, including involuntary withdrawal for academic reasons, tuition is refunded according to the following schedule:

Before classes begin: Full amount
During first or second week: 80%
During third to fifth week: 60%

During sixth week: 20%

After sixth week: none

Student fees are nonrefundable after classes begin.

Historically, voluntary withdrawals are initiated at the request of the student. Working with the program director, a mutual decision is reached with regard to the effective date of the withdrawal and any academic penalty to be assessed. Per letter, the program director will notify the Offices of the Registrar and Financial Aid in the School of Medicine. The Office of the Registrar will process the withdrawal and remove the student from any current and/or future enrollments. The Office of Financial Aid may revoke any financial aid that has been disbursed. The student should also contact these offices to ensure that they have fulfilled any responsibilities with regard to this process. The student's permanent academic record will reflect that he/she was enrolled for the term and that he/she withdrew on the specific effective date.

Courses of Instruction

CLP-200. Clinical Leadership Seminar (2 units)–*Perspectives on Health Care.* Under the direction of a senior faculty leader, students will explore the principles behind the forces impacting the dynamic health care environment. Building upon topics covered in the complementary core course, "Population-Based Approaches to Health Care," students will be exposed to current issues and strategies regarding population analysis and decision-making through the use of case studies and interaction with leaders in health care planning, financing, and programming. *TBA*

CLP-201. Clinical Leadership Seminar (2 units)–*Health Care Finance: Barriers and Opportunities for Change.* This seminar will focus on leadership skills for effecting change while demonstrating sound fiscal judgment. Students will apply financial management and budget planning skills gleaned from the complementary core course, "Fundamentals of Healthcare Finance," as well as management theory covered in "Dynamics of Management," to case studies and current situations of various health care settings. Duke Health System leaders will expose students to examples from the evolution of and current issues facing health systems as a basis for exploring management principles and leadership skills for effecting change that reflects fiscal responsibility. *TBA*

CLP-202. Clinical Leadership Seminar (2 units)–*Organizational Structure and Use of Data to Support and Manage Change.* Through interaction with leaders from the private and public health care sectors, students will analyze the current state of health care delivery in the United States with a focus on the impact of changing organizational structures and rapidly advancing technologies. To provide further exploration of specific topics covered in the core courses, "Health System Organization" and "Introduction to Medical Informatics," discussion leaders will focus on the health care workforce, the economic framework of the health care industry, changing private and public responsibilities, and opportunities for entrepreneurial endeavors. *TBA*

CLP-203. Clinical Leadership Seminar (2 units)–*Management of Self.* Students will be challenged to apply the skills and knowledge they have acquired through the program to develop a strategic career management plan. The plan will include statements of a personal vision, mission, and values; a description of identified strengths and weaknesses; and strategies to achieve goals, including strategies to overcome weaknesses that would impede the student's professional performance. *TBA*

CLP-204. Clinical Leadership Seminar (2 units)–*Leading in a Chaotic Environment.* Students will meet with industry experts on health care law and policy to work through case studies in risk, regulation, and antitrust. *TBA*

CLP-205. Clinical Leadership Project (6 units). The Clinical Leadership Project helps a real client decide what to do about a problem in health policy, financial planning, or administration. Its purpose is to recommend and defend a specific course of action. Students work as part of a team to complete the project. The project is divided into two parts, with the first being devoted to client and problem identification and developing and defending a written prospectus. The second semester is devoted to the completion and final defense of the project in its entirety. *TBA*

CLP-206. Quality Management. The course provides a survey of all related aspects of quality management including a review of HEDIS, NCQA, JCAHO structures and guidelines. Special emphasis is placed on outcomes, clinical guidelines, evidence–based medicine, disease management, interdisciplinary team care, CQI/TQM, role of purchaser, and patient satisfaction. *Bradley*

CLP-207. Operational Management. The course covers the practical aspects of communication, meeting management, and human resource management. Topics include performance appraisal, conflict management, demand management, aligning incentives, labor substitution/consolidation, role of extenders, analytical decision-making, project management, and process (systems) analysis. *Michener*

CLP-210. Strategy and Strategy Implementation in Healthcare. The course offers a comprehensive application of the fundamentals of strategy by examining new and previously discussed concepts and techniques in the Masters in Clinical Leadership curriculum as they apply to recognizing core competencies, serving customers, managing competition, and facilitating growth. *Sangvai and Michener*

CLP211. Fundamentals of Healthcare Finance. This course provides a background to healthcare finance including basic corporate finance, financial and cost accounting, and investment. Students will develop sound financial management and budget planning skills. *Sangvai and Lyn*

LAW-347. Health Care Law and Policy. A survey of the legal environment of the health services industry in a policy perspective, with particular attention to the tensions and trade-offs between quality and cost concerns. Topics for study: access to health care; the clash between professionalism and commercialism, including antitrust law; personnel licensure; private personnel credentialing and institutional accreditation; hospital organization and staff privileges; professional and institutional liability; cost containment regulation, including certification of need; cost controls in government programs. Of interest to students interested in public policy, law and economics, as well as those with specific interests in the health care field. *Havighurst*

MEDINFO-233B. Introduction to Medical Informatics. An in-depth study of the use of computers in biomedical applications. Important concepts related to hardware, software, and applications development are studied through analysis of state-of-the-art systems involving clinical decision support, computer-based interviewing, computer-based medical records, departmental/ancillary systems, instructional information systems, management systems, national data bases, physiological monitoring, and research systems. *Murphy*

HLTHMGMT 326.401. Economics of Health Care. This is a course in Health Economics that applies the tools of Microeconomic Theory to examine the market behavior of consumers and firms in the health care sector. The focus is on analyzing the economic fundamentals behind the actions and reactions of the players in the health care market. The emphasis will be on acquiring a tool kit that will enable a structured and analytical examination of the issues rather than a review of the issues per se. On the demand side, the course will an-

alyze the economic factors affecting medical care utilization. The role of health insurance will be explored in detail. The course will examine the supply of health insurance and the rising costs of medical care. The growth of the managed care industry will be studied, as will the economic issues underlying the operation and performance of hospitals and group practices. In conclusion, the role of the physician will be analyzed through an economic lens. *Khwaja*

NUR-301. Population-Based Approaches to Health Care. Provides an overview of population-based approaches to assessment and evaluation of health needs. Selected theories are the foundation for using scientific evidence for the management of population-based care. Enables the health care professional to make judgments about services or approaches in prevention, early detection and intervention, correction or prevention of deterioration, and the provision of palliative care. Fall. *TBA*

NUR-401. Dynamics of Management. This course is an in-depth analysis of selected organizational behavior topics and management practices related to patient care systems administration within a larger, integrated health care system. From a well developed theoretical orientation, students will critically identify issues, formulate questions, and pursue managerial interventions that will result in high quality, aggregate patient care, and organizational outcomes that are socially relevant and clinically cost-effective. Spring. Prerequisite: NUR 400 or consent of instructor. *Anderson*

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. *TBA*

PHYASST-250. Health Systems Organization. An introduction to the structure and administrative principles used by health care organizations. A lecture series taught by an interdisciplinary faculty and by community experts in health care organization. Topics include the patient as consumer, third-party payment, and public policy trends. *Strand*

Electives

CLP-208. Faculty Development: Teaching Skills and Curriculum Design. This semester-long seminar series is designed for health professionals in academic or leadership roles wishing to improve their teaching, and educational skills. It is also appropriate for fellows considering academic careers. The course uses active discussions supplemented by readings, role plays, observed teaching and peer feedback to assist participants in improving their skills in the following areas: clinical teaching, lecture, small group facilitation, advising, dealing with problem learners, and curriculum design and implementation. Participants complete and present a semester project of a curriculum design suitable for implementation in their own or other program of choice. *Murphy*

CLP-209. Faculty Development: Surviving and Thriving and Academia. The changing health care environment has put increasing pressures upon health professions faculty. Similar forces have created needs for change in both the content and process of our educational programs. This semester-long seminar is designed for health professionals in or considering academic or leadership roles. The course uses discussion supplemented by readings, role plays, problem-solving exercises, and peer feedback to assist participants in improving their knowledge and skills in the following: negotiation, time management, quality improvement, delegation/supervision, academic writing, finance and budgeting, leadership, and managing change. Participants complete and present a semester project on an administrative issue/problem of their choosing. *Murphy*

The Clinical Research Training Program

MASTER OF HEALTH SCIENCES CURRICULUM

Program Director: Eugene Z. Oddone, M.D.
Associate Directors: Linda S. Lee, Ph.D. and Gregory P. Samsa, Ph.D.

This Duke University Medical Center program provides formal academic training in the quantitative and methodological principles of clinical research. In contrast to a public health degree which focuses on epidemiology, this program is 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 from an accredited institution is a prerequisite for admission either as a degree candidate or as a non-degree student.

A student seeking admission to the Clinical Research Training Program should obtain an application packet which contains the necessary forms and detailed instructions on how to apply. Requests for application forms or for additional information about the training program should be directed to the Clinical Research Training Program, Box 3827, Duke University Medical Center, Durham, North Carolina 27710, (919) 681-4560 or by email to *crtp@mc.duke.edu*. Additional information may be found on the program's website at *http://crtp.mc.duke.edu*.

A complete application for admission, either as a degree candidate or as a non-degree student, consists of the application form and the following supporting documents: (1) a current *curriculum vitae* (CV); (2) an official transcript from each post-secondary institution attended; (3) three letters of evaluation written by persons qualified to testify to the applicant's capacity for graduate work.

Program of Study. The degree requires 24 credits of graded course work and a research project for which 12 units of credit are given. Six courses (241, 242, 245, 247, 253, and 254) constitute 18 credits that are required for all degree candidates (see Courses of Instruction below). The student's clinical research activities provide the setting and the data for the project, which serves to demonstrate the student's competence in the use of quantitative methods in clinical research. The program is designed for part-time study, which allows the fellow/student to integrate the program's academic program with clinical training.

Examining Committee. Three faculty members constitute an examining committee to certify that the student has successfully completed the research project requirement for the degree. The committee must include a clinical investigator and a statistician, both of whom are on the faculty of the Clinical Research Training Program (CRTP). The third member of the committee should be a faculty member who has substantive knowledge in the area in which the clinical research project is conducted; for clinical fellows, this committee member is often the student's mentor. The chair of the committee must be a member of the CRTP faculty.

Grades. Grades in the Clinical Research Training Program consist of *H* (High Pass), *P* (Pass), *L* (Low Pass) and *F* (Fail). In addition, an *I* (Incomplete) indicates that some portion

of the student's work is lacking for a reason acceptable to the instructor at the time grades are reported. Students will not be permitted to enroll in any course for which they have an unresolved *I* in a prerequisite course. In any case, a grade of *I* must be resolved no later than the end of the following academic semester, unless the course director specifies an earlier date by which the student must make up the deficiency. In exceptional circumstances, an Incomplete that is not resolved within the designated period may be extended for a specified period with the written approval of the course director and the program director. If an Incomplete is not resolved within the approved period, the grade of *I* becomes permanent and may not be removed from the student's record.

A student's enrollment as a degree candidate is terminated if he or she receives a single grade of *F* or two grades of *L* in the program. For these purposes, both *WF* (see below) and a permanent *I* are considered to be failing grades.

Withdrawal from a Course. A course may be dropped at the student's discretion during the first three weeks of class; no grade is recorded and all tuition is refunded. If a course is dropped later in the term, no tuition is refunded and the status of the student at the time of withdrawal is indicated on the permanent record as *WP* (Withdrew Passing) or *WF* (Withdrew Failing).

Tuition. Tuition for the 2005-2006 academic year is $510 per unit of credit. Faculty may be eligible for the university's Educational Assistance Program. Other sources of support exist in some clinical departments; prospective students should consult with program directors and division chiefs regarding potential funding sources.

Transfer of Credit. Transfer of credit for graduate work completed at another institution is considered only after a student has earned a minimum of 12 credits in the Clinical Research Training Program. A maximum of six units of credit may be transferred for graduate courses completed at other institutions. Such credits are transferred only if the student received a grade of *B* (or its equivalent) or better. The transfer of graduate credit does not reduce the required minimum registration of 36 credits for the degree. However, a student who is granted such transfer of credit may be permitted to register for as much as 18 credits of research instead of the usual 12 credits.

Time Limitations. A degree candidate is expected to complete all requirements within six calendar years of matriculation. Degree credit for a course (including one for which transfer credit is given) expires six years after the course is completed by the student; in this case, degree credit can be obtained only by re-taking the course.

Courses of Instruction

CRP-241. Introduction to Statistical Methods. This course is an introduction to the fundamental concepts in biostatistics and their use in clinical research. Through directed readings and discussion of representative research reports from peer-reviewed journals, students are introduced to the concepts of hypothesis formulation, descriptive statistics, commonly used research designs and statistical tests, statistical significance, confidence intervals, statistical power, and commonly used statistical models. In addition, the basic concepts of data collection and analysis are presented using Microsoft Access and SAS. 4 credits.

CRP-242. Principles of Clinical Research. The emphasis is on general principles and issues in clinical research design. These are explored through the formulation of the research objective and the research hypothesis and the specification of the study population, the experimental unit, and the response variable(s). In addition, the course content promotes an understanding that allows the student to classify studies as experimental or observational,

prospective or retrospective, case-control, cross-sectional, or cohort; this includes the relative advantages and limitations and the statistical methods used in analysis of each type. Emphasis is placed on the traditional topics of clinical epidemiology such as disease etiology, causation, natural history, diagnostic testing, and the evaluation of treatment efficacy. In addition, an introduction to ethical issues in clinical research is included. Corequisite: CRP-241. 4 credits.

CRP-244. Health Economics in Clinical Research. A practical foundation in economic evaluation of medical diagnostic procedures and therapeutic interventions is provided. The focus is on the development, analysis, and communication of economic data in the context of clinical research. Topics include: basic finance and organization of health care, evidence tables, utility theory, tree-structured decision models, health care cost accounting, cost-effectiveness, cost-utility and cost-benefit analysis, and special statistical issues in analysis of economic data. Prerequisite: CRP-242. 2 credits.

CRP-245. Statistical Analysis. This course extends CRP-241 (Introduction to Statistical Methods) to more advanced topics relevant in clinical research. Topics include regression models (linear and logistic regression models, their practical applications in assessing multivariable relationships and formulating predictive models, and the interpretation of model parameters), categorical data analysis (methods for analyzing nominal and ordinal response variables), and survival analysis (inferences from time-to-event data with censored observations, including Kaplan-Meier curves, hazard functions, and the Cox proportional hazards regression model). Prerequisite: CRP-241. 4 credits.

CRP-247. Clinical Research Seminar. This seminar integrates and builds on three core courses (CRP-241, 242, and 245) to provide practical experience in the development and critique of the methodological aspects of clinical research protocols and the clinical research literature. Assigned readings are drawn from contemporary literature and include both exemplary and flawed studies. Prerequisites: CRP-242 and CRP-245. 2 credits.

CRP-248. Clinical Trials. Fundamental concepts in the design and analysis of clinical trials are examined. Topics include protocol management, sample size calculations, determination of study duration, randomization procedures, multiple endpoints, study monitoring, and early termination. Prerequisite: CRP-245. 2 credits.

CRP-249. Health Services Research. Research methods in health services research are explored. Topics include measurement of health-related quality of life, case mix and comorbidity, quality of health care, and analysis of variations in health care practice. The course emphasizes the design and analysis of health services interventions and their influence on health outcomes. Advantages and disadvantages of studies that use large databases, as well as advanced methods in analysis and interpretation of health services outcomes are addressed. This includes application of traditional research designs (e.g., randomized trials) to address health services research questions and the interface between health services research and health policy. Prerequisites: CRP-242 and CRP-245. 2 credits.

CRP-250. Genetic Analysis of Human Disease. This is an introduction to methods associated with the analysis of human genetic data, with an emphasis on applied projects aimed at identifying genes leading to human disease. The course provides an overview of modern techniques in the analysis of complex human disease, with a focus on statistical techniques. Topics include: how a trait is determined to have a genetic component; basic genetic concepts, study design and sampling strategies; testing Hardy-Weinberg equilibrium; utilization of linkage maps; detection and location of genes using linkage disequilibrium and other methods; gene-environment interactions; and a molecular overview of DNA techniques and evolving methodologies (SNPs, microarray analysis, etc). Students are introduced to spe-

cialized software and internet-based resources for the analysis of genetic data. Prerequisites: CRP-241 and basic knowledge of genetics. 2 credits.

CRP-251. Questionnaire Design and Psychometrics. An introduction is provided to the elements of psychometric theory that are relevant to the conduct of clinical research. Topics include issues in questionnaire and scale design, types of scales, scale construction and validation; definition, measures, and estimation of reliability and validity; statistical issues resulting from unreliability (such as the effect of reliability on sample size estimation); and methods for assessing the psychometric properties of scales (such as factor analysis and Cronbach's alpha). Prerequisites: CRP-242 and CRP-245. 2 credits.

CRP-252. Principles of Clinical Pharmacology. This course provides a basis for understanding the scientific principles of rational drug therapy and contemporary pharmaceutical development. Topics include evaluation of the physiologic and pathophysiologic factors involved in drug absorption, distribution, metabolism, and elimination. A major focus is on determinants that result in inter- and intra-patient variability in pharmacokinetics/pharmacodynamics. A variety of tests used in a surrogate fashion for evaluation of drug response are discussed. A practical guide to pharmacokinetic/pharmacodynamic data analysis provides an introduction to common modeling approaches. Prerequisites: CRP-242 and CRP-245. 2 credits.

CRP-253. Responsible Conduct of Research. This course explores a variety of ethical and related issues that arise in the conduct of medical research. Topics include human subjects and medical research, informed consent, ethics of research design, confidentiality, diversity in medical research, international research, relationships with industry, publication and authorship, conflict of interest, scientific integrity and misconduct, intellectual property and technology transfer, and social and ethical implications of genetic technologies and research. Prerequisite: CRP-242. 2 credits.

CRP-254. Research Management. Operational issues that arise in the conduct of a clinical research project are addressed. Topics include administration (human resources, project management, budget development and management), data management systems (databases, case report forms, data acquisition, quality assurance and quality control (QA/QC), monitoring and auditing), regulation (Investigational New Drug [IND]) applications, good clinical practice (GCP), and the Health Insurance Portability and Accountability Act (HIPAA), and sponsorship (sources, sponsor motivations, identifying sponsors). Prerequisite: CRP-242. 2 credits.

CRP-270. Research. An individualized research project under the direction and supervision of the student's mentor and examining committee forms the basis for this culmination of the program of study leading to the degree of Master of Health Sciences in Clinical Research. 12 credits.

The Pathologists' Assistant Program

MASTER OF HEALTH SCIENCES CURRICULUM

Professor and Chairman, Department of Pathology: Salvatore V. Pizzo, M.D., Ph.D.
Director, Pathologists' Assistant Program: Claudia M. Brady M.H.S.
Medical Director, Pathologists' Assistants Program: Marcia Gottfried, M.D.
Director, Surgical Pathology: Marcia Gottfried, M.D.
Surgical Pathology Training Coordinator: Pamela Vollmer, B.H.S.
Director, Autopsy Service, Veterans Affairs Medical Center: Jane Gaede, M.D.
Director of Surgical Pathology, Veterans Affairs Medical Center: Robin Vollmer, M.D.
Chief, OB-GYN Pathology: Stanley Robboy, M.D.

Program of Study. This is a 24-month program beginning with the start of the medical

school academic year in August of each year. It provides a broad, graduate level background in medical sciences in support of intensive training in anatomic pathology. With the background in anatomy, histology, physiology, and microbiology, the students learn pathology at the molecular level in the classroom and are trained and given experience in the microscopic and gross morphology of disease in close one-on-one training with pathology department faculty. They learn dissection techniques and all technical aspects of anatomic pathology in summer rotations. The curriculum is designed to produce individuals who fill the gap between the pathologist on the autopsy and surgical pathology services and other technical personnel who work in the tissue processing laboratory.

Accreditation. The curriculum, faculty, facilities, and administration of the program are accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Graduates are able to sit for the American Association of Pathologists' Assistants fellowship examination.

Degree Requirements. Passage of 69 units of graduate credit is required for the MHS degree. An additional 11 credits are required to receive a certificate at the end of the program. There is a mandatory, comprehensive oral presentation and examination administered by a panel of pathology department faculty which all students must pass for successful completion of the program.

Grading Policies. The grading system is the same as the medical school: *H* (Honors), *P* (pass), *F* (fail). Rotations are accompanied by written critiques of performance. Failure in any course may result in removal from the program. Poor performance on any rotation, even if passed, may result in the student performing extra work. All incomplete grades automatically revert to *F* if work is not completed within one semester or one summer session following award of the grade. The comprehensive final examination is Pass/Fail, with the award of Honors for outstanding students. Students who fail the final can register for one semester to prepare for and take the examination again. Any student who fails the final twice cannot complete the program.

Attendance and Excused Absences. Students are required to attend all lectures, laboratories, seminars, and clinical assignments. Absences are excused only for illness or personal emergency, and students must notify program faculty in advance of an expected absence. Absences of one to two days duration for professional purposes during the second year are allowed with the approval of the program director.

Withdrawal. If a student withdraws, including involuntary withdrawal for academic reasons, tuition is refunded according to the following schedule:

Before classes begin: Full amount
During first or second week: 80%
During third to fifth week: 60%
During sixth week: 20%
After sixth week: none

Student fees are nonrefundable after classes begin.

Historically, voluntary withdrawals are initiated at the request of the student. Working with the program director, a mutual decision is reached with regard to the effective date of the withdrawal and any academic penalty to be assessed. Per letter, the program director will notify the Offices of the Registrar and Financial Aid in the School of Medicine. The Office of the Registrar will process the withdrawal and remove the student from any current and/or future enrollments. The Office of Financial Aid may revoke any financial aid that has been disbursed. The student should also contact these offices to ensure that they have fulfilled any

responsibilities with regard to this process. The student's permanent academic record will reflect that he/she was enrolled for the term and that he/she withdrew on the specific effective date.

Curriculum

Year 1

Fall

INTERDIS 100B. Molecules and Cells	6 credits
INTERDIS 101, Normal Body	14 credits

Year 1

Spring

PATHASST-200. Introduction to Dissection	2 credits
PATHASST-201. Basic Neuroanatomy	1 credits
INTERDIS 102, Body and Disease	16 credits

Year 1

Summer

PATHASST-210. Introduction to Autopsy Pathology	4 credits
PATHASST-220. Introduction to Surgical Pathology	4 credits
PATHASST-215. Histology Techniques	1 credit

Year 2

Fall

PATHOL-241P. Pathologic Basis of Clinical Medicine	3 credits
PATHOL-223P. Autopsy Pathology	4 credits
PATHASST-230. Surgical Pathology	4 credits
PATHOL-359P. Fundamentals of Electron Microscopy	2 credits
PATHASST-216. Histology Techniques	1 credit
PATHASST-240. Photography	2 credit

Year 2

Spring

PATHOL-241P. Pathologic Basis of Clinical Medicine	3 credits
PATHASST-231. Surgical Pathology	4 credits
PATHOL-223P. Autopsy Pathology	4 credits

Year 2

Summer

PATHASST-300. Autopsy Practicum	4 credits
PATHASST-301. Surgical Pathology Practicum	4 credits
PATHASST-302. Forensic Pathology Seminar	2 credits
Total	**86 credits**

Prerequisites for Admission

1. A baccalaureate degree in a biological or chemical science from an accredited institution.

2. A baccalaureate degree in a non-science major, but at least 12 credit hours in biological sciences and six credit hours in chemistry.
3. Scores for the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT) taken within the last five years.

Candidates who receive their baccalaureate degrees from institutions outside the United States must submit a transcript evaluation showing degree equivalency and subject matter description.

Application Procedures. Application materials are mailed to prospective candidates for admission up to January 31st of the year of expected matriculation. Applications can be obtained by writing to: Claudia M. Brady M.H.S., Director, Pathologists' Assistant Program, Department of Pathology, Box 3712, Duke University Medical Center, Durham, NC 27710, (919) 684-2159. Application forms may also be downloaded from our website: *pathology.mc.duke.edu.* All applications must be received by February 28.

Applications must include:

1. A completed application form and a non-refundable application fee of $50;
2. Official transcripts of all colleges and universities attended;
3. GRE or MCAT scores;
4. Three letters of recommendation.

Candidates are notified of the Admission Committee's decision no later than April 15. Accepted candidates are required to submit a non-refundable deposit of $350 to retain their places in the class. This deposit applies to tuition.

Tuition, Fees, and Estimated Costs for Year One, 2005-2006

Tuition	$20,000
Technology fee	2,000
Recreation fee	60
Books	674
Student health fee	786
Student insurance (single)	1,310
Vehicle registration	72
Rent, food, and miscellaneous	20,040
Total*	44,942

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

INTERDIS 100 - Molecules and Cells - A course designed for first year medical students that focuses on the molecular and cellular principles of human disease. The course has four components, which are tightly integrated: biochemistry, cell biology, genetics, and a series of clinical correlations. The biochemistry component re-emphasizes the relationship between structure and function of the major classes of macromolecules in living systems including proteins, carbohydrates, lipids, and nucleic acids. The metabolic interrelationships and control mechanisms are discussed as well as the biochemical basis of human diseases.

*. Subject to change and board approval.

The cell biology component emphasizes the structure and function of the cells and tissues of the body. The laboratory provides practical experience with light microscopy studying and analyzing the extensive slide collection of mammalian tissues. The genetics component emphasizes molecular aspects of the human genome, the structure of complex genes, regulation of gene expression, experimental systems for genetic analysis, human genetics -- including population genetics and genetic epidemiology, the use of genetic analysis for the identification of disease causing genes, cytogenetics, cancer genetics, and genetic diagnosis and counseling. The series of clinical correlations links the material covered in the basic science lectures to clinical problems. Many of the correlations include an interview with a patient. Also included are a day symposium on nutrition and a day symposium on aging. Credit: 8. Enrollment: max 105. Garcia-Blanco, Nicchitta, Raetz, and staff

INTERDIS 101 - Normal Body - This core course of the preclinical curriculum is intended to present the scientific principles underlying the structure and function of the normal body, thereby providing the foundational knowledge for the practice of medicine and facilitating the incorporation of the new scientific knowledge thorough out the medical career. To accomplish this end, the goals of the Normal Body component are to ensure that all students possess a conceptual model of the structure and integrated function of the human body (as an intact organism) and each of its major organ systems, emphasizing their role in the maintenance of the body's homeostasis. Credit. TBD. Cartmill

INTERDIS 102 - Body and Disease - This core course is presented from February through June of the first year. The course begins with fundamental principles of the four basic sciences most directly related to human disease: immunology, microbiology, pathology and pharmacology. This component is followed by an integrated presentation of the most common human diseases organized sequentially by organ system. Teaching modes include lectures, a variety of small group activities guided by faculty, and clinically-oriented disease workshops. Credit: TBD Nadler, Dawson, Hulette, Mitchell, and Steenbergen.

PATHOL-223P. Autopsy Pathology. A detailed consideration of the morphologic, physiologic, and biochemical manifestations of disease. Includes gross dissection, histologic examinations, processing, and analyzing of all autopsy findings under tutorial supervision. 4 credits each course or 8 credits. *DiBernardo and staff*

PATHOL-241P. Pathologic Basis of Clinical Medicine. This is the medical school and graduate course in the detailed pathology of major organ systems and how it relates to clinical medicine. This course serves as a systemic pathology course for pathologists' assistant students. The course consists of lectures and seminars presenting the latest scientific concepts of disease spanning two semesters. 6 credits. *Bradford and staff*

PATHOL-359P. Fundamentals of Electron Microscopy. Cellular and Subcellular Pathology is presented in this course. The course consists of lectures and seminars on the alterations of cellular structure and associated functions that accompany cell injury. 2 credits. *Shelburne and staff*

PATHASST-200. Introduction to Dissection. This is a course in basic tissue dissection techniques taught through participation in autopsies and using autopsy tissues. 2credits.*DiBernardo and staff*

PATHASST-201. Basic Neuroanatomy. This is an intensive course in neuroanatomy designed expressly for pathologists' assistant students. The purpose of the course is to teach students the gross and microscopic anatomy of the brain and how to dissect and take sections for microscopic diagnostic purposes. Non-pathologists' assistant students require permission of the instructor. 1 credits. *Hulette*

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. *DiBernardo and staff*

PATHASST-215, 216, 217. Histology Techniques. These are rotations through various histology laboratories. These are designed to acquaint students with the various techniques used in tissue processing and special procedures. 1 credit each. *Dotson and staff*

PATHASST-220. Introduction to Surgical Pathology. This is a rotation conducted during the first summer session. It is designed to acquaint students with the techniques of gross dissection, descriptions, and submission of tissue samples from surgical specimens. 4 credits. *Vollmer and staff*

PATHASST-230, 231. Surgical Pathology. These courses consist of thorough laboratory training in the orientation, description, and dissection of gross surgical specimens. Students follow many of the cases through to signout by the pathologist. 4 credits each. *Vollmer and staff*

PATHASST-240, 241. Photography. This is an introduction to medical photography. Students become familiar with photography equipment and the fundamentals of gross specimen photography. 1 credit each. *Reeves and Conlon*

PATHASST-300. Autopsy Practicum. This is the final autopsy rotation in which the students must perfect their dissection skills, demonstrate the ability to conduct full autopsy prosections in all possible situations, and write full preliminary autopsy reports. In addition, special dissection skills are taught in this course. 4 credits. *DiBernardo and staff*

PATHASST-301. Surgical Pathology Practicum. This is the final surgical pathology rotation in which the students must perfect their dissection skills and demonstrate the ability to orient, dissect, describe, and submit appropriate tissue samples from all commonly encountered surgical pathology specimens. 4 credits. *Vollmer and staff*

PATHASST-302. Forensic Pathology. Selected seminars and rotations in forensic pathology. 3credits. *Staff*

Pathologist's Assistant Program
(Master of Health Sciences and Certificate)

1st year	**Fall 2005**	08/08/05	01/27/06
	Spring 2006	02/06/06	06/30/06
	Summer 2006	07/10/06	09/01/06
2nd year	**Fall 2005**	09/12/05	12/16/05
	Spring 2006	01/02/06	05/12/06
	Summer 2006	05/15/06	07/20/06

Students enrolled in the Pathologists' Assistant Program are required to complete a minimum of 82 credits – *pending approval and subject to change.*

The Physician Assistant Program

MASTER OF HEALTH SCIENCES CURRICULUM

Department of Community and Family Medicine

Department Chairman: J. Lloyd Michener, M.D.
PA Division Chief: Justine Strand, M.P.H., PA-C
Program Director: Patricia M. Dieter, M.P.A., PA-C

Medical Director: Joyce A. Copeland, M.D.
Academic Coordinator: Thomas P. Colletti, M.P.A.S., PA-C
Academic Coordinator: David M. Coniglio, M.P.A., PA-C
Clinical Coordinator: Karen J. Hills, M.S., PA-C
Clinical Coordinator: Elizabeth P. Rothschild, M.M.Sc., PA-C
Assistant Clinical Professor: Peggy R. Robinson, M.S., M.H.S., PA-C
Director of Recruitment and Minority Affairs: Lovest T. Alexander, M.H.S., PA-C
Surgical Coordinator: Paul C. Hendrix, M.H.S., PA-C
Laboratory Medicine Coordinator: Margaret Schmidt, Ed.D., M.T. (A.S.C.P.)
Behavioral Medicine Coordinator: Victoria Scott, M.H.S., PA-C
Evidence-Based Medicine II Coordinator: Prema R. Menezes, M.H.S., PA-C
PA Teaching Fellow: Valerie J. Schaffer, MHS, PA-C
PA Research Fellow: Perri Morgan, MS, PA-C

The physician assistant (PA) concept originated at Duke over 35 years ago. Dr. Eugene A. Stead Jr., then chairman of the Department of Medicine, believed that mid-level practitioners could increase consumer access to health services by extending the time and skills of the physician. Today, physician assistants are well-recognized and highly sought-after members of the health care team. Working interdependently with physicians, PAs provide diagnostic and therapeutic patient care in virtually all medical specialties and settings. They take patient histories, perform physical examinations, order laboratory and diagnostic studies, and develop patient treatment plans. In most states, including North Carolina, PAs have the authority to write prescriptions. Their job descriptions are as diverse as those of their supervising physicians, and also may include patient education, medical education, health administration, and research.

PAs practice in all specialty fields; about 40 percent of all PAs provide primary care services, especially in family and general internal medicine. While PAs remain dependent in that they provide medical services with the supervision of physicians, other non-physician tasks have been integrated into the role, particularly in the institutional and larger clinic setting. While not always clinical in nature, these tasks are essential to the practice of the PA's supervising physician. For example, PAs in the tertiary care setting are often involved in the acquisition, recording and analysis of research data, the development of patient and public education programs, and the administration of their departments' clinical and educational services. Involvement in these other services has provided job advancement for PAs in these settings.

Additional non-clinical positions are developing for PAs. While these positions do not involve patient care, they depend on a strong clinical knowledge base. The M.H.S. curriculum provides PAs with depth of knowledge in the basic medical sciences and clinical medicine, as well as skills in administration and research. With these expanded skills, graduates can take advantage of the wide diversity of positions available to PAs.

Program of Study. The curriculum is 24 consecutive months in duration and is designed to provide an understanding of the rationale for skills used in patient assessment, diagnosis, and management. The first 12 months of the program are devoted to preclinical studies in the basic medical and behavioral sciences, and the remaining 12 months to clinical experiences in primary care, medical and surgical specialties, and advanced study in evidence-based medicine.

Each student is assessed a technology fee for both the first and second years. As part of the technology fee, the program provides computers and PDAs which are used for a variety of in-class and clinical assignments and activities, as well as communication.

The preclinical curriculum is integrated to introduce the student to medical sciences as they relate to specific organ systems and clinical problems. Learning strategies include the traditional lecture format and basic science laboratory, small group tutorials, and patient case discussions. Regular patient contact is an important part of the first year

curriculum. Students begin to see patients during the spring semester as part of the Patient Assessment course; this patient contact continues throughout the summer term of the preclinical year.

As part of the clinical practicum, students are required to take rotations in inpatient medicine, surgery, emergency medicine, primary care, pediatrics, obstetrics/gynecology, and behavioral medicine. In addition, two elective clinical rotations are included in the clinical year schedule, as is a four-week period devoted to advanced study in Evidence-Based Medicine. At least two clinical rotations must be completed in a medically underserved site. The final weeks of the clinical year are spent in a senior seminar which includes intensive preparation for the PA National Certifying Examination (PANCE).

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 credits5 credits
PHYASST-205. Anatomy	4 credits
PHYASST-210. Laboratory Medicine	4 credits
PHYASST-215. History and Physical Diagnosis	3 credits
PHYASST-220. Clinical Medicine I	4 credits
PHYASST-251 Practice and the Health System I	2 credits
Total	**22 credits**

Spring Semester

PHYASST-211. Laboratory Medicine II	1 credit
PHYASST-221. Clinical Medicine II	9 credits
PHYASST-230. Fundamentals of Surgery and Emergency Medicine	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-252. Practice and the Health System II	2 credits
PHYASST-255. Evidence-Based Medicine I	3 credits
Total	**13 credits**

Clinical Year

Following successful completion of the preclinical courses, students enter the clinical phase of the program, completing the following experiences:

PHYASST-300. Primary Care	8 credits

PHYASST-305. Evidence-Based Medicine II	3 credits
PHYASST-310. Behavioral Medicine	4 credits
PHYASST-320. Inpatient Medicine	8 credits
PHYASST-340. General Surgery	4 credits
PHYASST-350. Emergency Medicine	4 credits
PHYASST-360. Pediatrics	4 credits
PHYASST-370. Obstetrics/Gynecology	4 credits
Elective	4 credits
Elective	4 credits
PHYASST-390. Senior Seminar	2 credits
Total	**49 credits**

The student receives four credits for rotations which are four weeks in length, and eight credits for rotations which are eight weeks in length.

In addition to successful completion of the preclinical and clinical phases of the program, the PA student must also successfully complete BLS, ACLS, and all components of summative evaluation.

Program Policies and Grading Standards. Grades for all courses and clinical rotations in the Physician Assistant curriculum are assigned on the basis of the following: Honors (*H*), Pass (*P*), and Fail (*F).* The Physician Assistant Program is designed to integrate classroom and clinical learning experiences considered necessary for competency as health care providers. Therefore, the failure of any required course will result in dismissal from the program. Determination of satisfactory academic progress is made by the PA program director upon advisement by the progress and promotions committee, at the conclusion of each semester/term.

A grade of "Incomplete" (*I*) may remain on a student's transcript for one year only. After one year, a grade of "Incomplete" automatically is converted to an *F* (Fail). An extension to this one-year limit may be granted by the program director; a request must be submitted in writing to the program director no later than 30 days prior to the expiration of the one-year time limit.

Students in the Physician Assistant Program are participants in a professional training program whose graduates assume positions of high responsibility as providers of health care. Accordingly, students are evaluated not only on their academic and clinical skills, but also on their interpersonal skills, reliability, appearance, and professional conduct. Deficiencies in any of these areas are brought to the student's attention in the form of a written evaluation and may result in probation, suspension, or expulsion from the program.

Appeals of Academic Status (Academic Probation or Withdrawal). A student placed on academic probation or withdrawn from the program may appeal by indicating in writing by registered mail to the program director (a) reasons why he/she did not achieve minimum academic standards, and (b) factual evidence for changing the academic standing. Appeals will be considered individually on their merits and will not be considered as precedent. The program director will notify the student of the decision on the appeal in writing within three weeks of receipt of the appeal.

Appeals of Course Grades. A student may appeal a course grade by writing to the program director, providing factual evidence for changing the final course grade. Appeals will be considered individually on their merits and will not be considered as precedent.

The program director will notify the student of the decision on the appeal in writing, within two weeks of receipt of the appeal.

Satisfactory Academic Progress. Satisfactory academic progress for students in the Physician Assistant Program consists of 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 senior seminar (a total of 49 credits) during the fall, spring, and summer terms; rotations begin in the semester immediately following the completion of the preclinical year and must proceed as scheduled without interruption for three semesters/terms (12 months).

In unusual circumstances (including illness, academic remediation, or irregular sequencing of courses) the determination of satisfactory progress for academic purposes is made by the program director of the Physician Assistant Program.

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

Attendance and Excused Absences. Students are required to attend all lectures, laboratories, seminars, and clinical assignments. Absences are excused only for illness or personal emergency, and students must notify program faculty in advance of an expected absence.

Leave of Absence. A PA student, after presenting a written request to the PA program director, may be granted an official leave of absence for personal, medical, or academic reasons for a period not to exceed one calendar year. If the leave of absence is approved, the program director provides written notification including applicable beginning and ending dates to the student, the medical school registrar, and the director of financial aid. The student must notify the program director in writing of his or her wish to return to the PA Program or to extend the personal leave at least 60 calendar days prior to the anticipated date of reentry. The student desiring an extension beyond one calendar year may be required to apply for readmission to the PA Program. When a leave of absence is taken, the program director may require the student to repeat some or all of the courses completed prior to the leave of absence. In all cases of leave of absence, the student is required to complete the full curriculum to be eligible to earn the PA certificate.

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

Withdrawal. If a student withdraws, including involuntary withdrawal for academic reasons, tuition is refunded according to the following schedule:

Before classes begin: Full amount
During first or second week: 80%
During third to fifth week: 60%
During sixth week: 20%
After sixth week: none

Student fees are nonrefundable after classes begin.

Historically, voluntary withdrawals are initiated at the request of the student. Working with the program director, a mutual decision is reached with regard to the

effective date of the withdrawal and any academic penalty to be assessed. Per letter, the program director will notify the Offices of the Registrar and Financial Aid in the School of Medicine. The Office of the Registrar will process the withdrawal and remove the student from any current and/or future enrollments. The Office of Financial Aid may revoke any financial aid that has been disbursed. The student should also contact these offices to ensure that they have fulfilled any responsibilities with regard to this process. The student's permanent academic record will reflect that he/she was enrolled for the term and that he/she withdrew on the specific effective date.

Prerequisites for Application. The prerequisites for application to the M.H.S. physician assistant curriculum include:

1. A baccalaureate degree from an accredited institution. College seniors are eligible to apply, provided they receive the baccalaureate degree prior to the August starting date for the PA Program. Those candidates who received their baccalaureate degrees from colleges and institutions outside of the United States must complete at least one year (30 semester credits) of additional undergraduate or graduate study at a U.S. college or university prior to application to the program.
2. Specific prerequisite college courses:
   - At least five biological science courses of three semester credits or four quarter credits each are REQUIRED. Of these five courses, at least one must be in anatomy, one in physiology, and one in microbiology. Courses in human anatomy and human physiology are preferred to courses of a more general nature, and courses with labs are preferred. To fulfill the remaining biological science course prerequisite, the PA Program recommends courses in cell biology, molecular biology, genetics, embryology, histology, or immunology. While none of the latter courses are required, they provide a good foundation for the study of medicine.
   - At least two chemistry courses with labs are REQUIRED. Each of these courses must be at least four semester credits or five quarter credits each.
   - At least one statistics course of at least two semester credits or three quarter credits is REQUIRED.
   - All prerequisite courses must be completed with grades of *C* or better (not *C* minus).
3. Scores of the Graduate Record Examination (GRE general test), taken within the last four years, and no later than October 1 of the year of application. No other test scores are accepted in lieu of the GRE
4. A minimum of 1,000 hours of patient care experience, with direct "hands-on" patient contact, completed by October 1 of the year of application.

Application Procedures. Duke's PA Program is a participant in CASPA (Centralized Application Service for PAs). The CASPA application may be accessed via the program's website *http://pa.mc.duke.edu*. The application is available from May 1 – October 1. In addition to completing and submitting the web-based application by October 1, candidates must also submit:

- the CASPA application fee
- official transcripts from all colleges/universities and other post-secondary institutions attended;
- scores of the (GRE). The GRE must be taken no later than October 1;
- three completed recommendation forms, including at least one from a health care provider with whom the applicant has worked;

- the on-line supplemental application (access provided to the applicant after submission of CASPA application)

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 December, January and February; 48 students are chosen from among those interviewed. Only full-time students are admitted.

Candidates are notified of the Admission Committee's decision as soon as possible after the interview, and no later than March 1. Those candidates who have been accepted are asked to respond in writing with their decision and to confirm their place in the class by submitting the non-refundable registration and deposit fees by the requested date. Each year, a ranked alternate list of 10-15 candidates is selected from those candidates who have been interviewed for a position in the class. Should an accepted candidate withdraw from the program prior to the start of classes, the position is offered to the highest ranked candidate on the alternate list.

[*] **Tuition and Fees.** On notification of acceptance, prospective PA students are required to pay a non-refundable first registration fee of $75, as well as a non-refundable program deposit of $475. For those who do matriculate, the program deposit is applied to the cost of tuition.

Estimated yearly expenses[†] for the 2005 entering class of the Master of Health Sciences Physician Assistant Program are as follows:

Tuition, First (Preclinical) year	$24,996
Tuition, Second (Clinical) year	24,996
Books, uniforms, and instruments, first year	1,940
Books, uniforms, and instruments, second year	677
Technology Fee, First (Preclinical) year	1,750
Technology Fee, Second (Clinical) year	1,750
Other fees	212
Food, board, and miscellaneous	20,040
First Year Fee (laboratory)	1,000
Student Health Fee	786
Student Accident and Hospitalization Insurance per year (single)	1,310
Total, First year	47,174
Total, Second year	46,583

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.

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[*] Subject to change and Board approval

[†] Includes Stead Society dues $60, Recreation $60, Parking $72, Graduate Activity $20

Financial Aid. All financial aid awards are made on the basis of documented financial need. Most Duke PA students finance their education through student loans up to the cost of the school-approved budget, by qualifying for student federal, state, private, and PA tuition loans.

Qualified students may be eligible for subsidized Federal Stafford Loans up to $8,500, unsubsidized Federal Stafford loans up to $10,000, and alternative private loans up to the cost of education. The Federal Stafford Loans interest rate is dependent on the 91-day Treasury bill, but Stafford loan interest rate cannot exceed 8.25%. Alternative, private lenders will have varying rates based on prime rate, the T-bill rate, or LIBOR. The financial aid office participates in the Duke University School as Lender program. Information about this program will be included on the award notification. The final decision, however, is left solely to the student applicant.

The North Carolina Student Loan Program for Health, Science, and Mathematics provides financial assistance in the form of loans up to $6,500 per year for North Carolina residents; these loans may be cancelled through approved service in shortage areas, public institutions, or private practice. Applicants may call (919) 549-8614 for further information about this loan program. Additional loans are available from private or alternative lenders. On occasion, there are additional federal loans available.

The U.S. Public Health Service has several programs that offer scholarships, stipends, and loan repayment to PA students who commit to varying periods of employment within designated facilities. Interested applicants can call the National Health Service Corps Program directly at 1-800-221-9393 for further information. Limited scholarship funds are available through the Duke Physician Assistant Program. The Physician Assistant Scholarship Committee will review each applicant and make decisions in the Spring prior to matriculation. This scholarship will reduce the amount a student borrows. All financial aid awards are made on the basis of documented financial need. Financial aid application packets are distributed on the admissions interview date. The application process includes a Duke application, completion of the Free Application for Federal Student Aid (FAFSA), and submission of the applicant's most recent tax return.

Once all of these have been received, a review will be made and an award notification is mailed to the student. It is extremely important that instructions on the award notification are followed in order to apply for loans in a timely manner and to have funds available at the beginning of the academic year.

Applicants are urged to request information and application forms from clubs, organizations, foundations, and agencies as soon as possible after applying for admission to the program. Many libraries have information on sources of financial aid. Also, the financial aid offices at nearby colleges and universities often have information on sources of funding. Applicants are strongly urged to use web search engines in locating scholarships. At no time, however, should an applicant pay a person or company to search for scholarships. Scholarship information is available free to applicants by using their local and web resources.

Some first-year students are employed part-time; however, the rigor of the academic curriculum usually prevents the student from maintaining part-time employment. Students who wish to be employed during their training must comply with the program's academic schedule and are prohibited from working more than 20 hours per week. Part-time employment must never interfere with class or clinical schedules. Any student unable to maintain adequate academic standing will be required to terminate his/her employment. Because of the demands of the clinical year, it is difficult or impossible for the second year student to work.

More detailed information regarding financial aid can be obtained from the Office of Financial Aid, Box 3067, Duke University Medical Center, Durham, NC 27710 or by emailing *financial_aid@mc.duke.edu*.

Criminal Background Check. Candidates offered admission to the Physician Assistant Program will undergo criminal background checks.

Commencement. To receive the M.H.S. degree at the May commencement ceremony, the physician assistant student must successfully complete 89 credits including all preclinical courses, Evidence-Based Medicine II (PHYASST 305), and all clinical rotations scheduled to that date. The PA program certificate of completion is awarded four months later, following the student's completion of a total of 103 credits, the remaining clinical rotations, and the final preceptorship.

PA students should be aware that failure to begin or complete a clinical rotation as scheduled could delay receipt of both the M.H.S. degree and the PA program's certificate of completion. Furthermore, any incomplete rotations must be completed prior to receiving the PA Program certificate.

Courses of Instruction

Course credits are the recognized units for academic work in the PA Program. **All courses are required, no transfer credit is accepted, and no credit is granted for past experiential learning.**

Preclinical Year Courses

PHYASST-200. Basic Medical Sciences. The basic facts, concepts, and principles which are essential in understanding the fundamental mechanisms of human physiology, immunology, and pharmacology. 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. *Colletti, Coniglio*

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. History and Physical Diagnosis. An introduction to history-taking and to the techniques for performing and recording the physical examination. Taught in lecture and small-group format; audiovisuals are used, as well as extensive small group practice sessions. 3 credits. *Hills*

PHYASST-220, 221, 222. Clinical Medicine I, II, III. The essentials of diagnosis and management of the most common clinical problems seen by primary care practitioners. Using an organ systems approach, clinical information is presented in conjunction with appropriate correlative lectures and labs in pathophysiology, pharmacotherapeutics, radiology, and nutrition. Patient simulations are used in the small group setting to enhance readings and lectures. This is a core course around which most other courses are organized. 20 credits. *Colletti, Coniglio, Robinson, and Rothschild*

PHYASST-230. Fundamentals of Surgery and Emergency Medicine. The basic surgical concepts needed for the PA to function in primary care settings as well as major sur-

gical 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 the practical application of history-taking and physical examination skills, and the recording and presentation of clinical information. Teaching methods include weekly small group meetings and weekly clinical assignments to examine and/or interview patients in hospital, outpatient, or long-term care settings. 3 credits. *Coniglio, Dieter*

PHYASST-240. Behavioral Aspects of Medicine. An introduction to the skills, knowledge, and sensitivity needed to communicate and intervene effectively in a wide variety of psychosocial situations. 2 credits. *Scott*

PHYASST- 251, 252. Practice and the Health System I,II. An introduction to the structure and administrative principles in use in health care organizations, and professional issues review. 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, organizational behavior, legal and ethical problems, and the unique place of PAs in the health care system. 4 credits. *Strand*

PHYASST 255. Evidence-Based Medicine I. A lecture and seminar course that provides a practical approach to making sound medical decisions on the basis of current evidence in the medical literature. Through a series of didactic presentations, group exercises, and reading, students will learn the basic principles of evidence-based medicine using a case-based approach. Basic skills in using MEDLINE and other medical databases will be emphasized and practiced. Research principles, research ethics, and basic statistical review are introduced. 3 credits. *Schmidt, Coniglio*

Clinical Year Courses - Required

COMMUNITY AND FAMILY MEDICINE

PHYASST 300. Primary Care. This rotation emphasizes the outpatient evaluation and treatment of conditions common at the primary care level and the appropriate health maintenance measures for different age groups. Many of the training sites provide care for underserved populations in rural North Carolina communities. 8 weeks, 8 credits. *Staff*

PHYASST 305. Evidence-Based Medicine II. During this month-long course during the clinical year, PA students complete an evidence-based review paper on a clinical question of interest. They present their findings to faculty and student colleagues. *Coniglio*

PHYASST-310. Behavioral Medicine. The student is assigned to a psychiatric and/or behavioral clinical setting, either inpatient or outpatient. This rotation facilitates the acquisition of communication and behavioral modification skills which are useful in the primary care setting. 4 credits. *Staff*

PHYASST-390. Senior Seminar. In small group and lecture settings, students review clinical cases and common medical topics and procedures. A final written summative evaluation is part of this course, which also serves as preparation for the PA National Certifying Examination (PANCE). 2 credits. *Dieter*

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 surgery may be a part 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 credits. *Staff*

PHYASST-350. Emergency Medicine. This rotation emphasizes the evaluation and management of both medical and surgical problems of the ambulatory patient. Students gain experience in the initial evaluation of emergency room patients, perform problem-specific exams, and practice minor surgery skills. 4 credits. *Staff*

Clinical Year Courses – Elective

In addition to the above required core rotations, each student is required to complete two electives that can be chosen from among the following rotations. All are four weeks long.

COMMUNITY AND FAMILY MEDICINE

PHYASST-301. Occupational Medicine
PHYASST-302. Geriatrics

GENERAL ELECTIVES

PHYASST-300E Primary Care
PHYASST-310E Behavior Medicine
PHYASST-320E Inpatient Medicine
PHYASST-340E General Surgery
PHYASST-350E Emergency Medicine
PHYASST-360E Pediatrics
PHYASST-370E Obstetrics/Gynecology

OBSTETRICS/GYNECOLOGY

PHYASST-371 Maternal/Fetal Medicine

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-328. Gastroenterology
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
PHYASST-338. Radiology

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
PHYASST-368. Pediatric Emergency Medicine

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-348. Pre-Operative Screening Unit
PHYASST-352. Trauma
PHYASST-353. Adult Surgical ICU

Each of these electives is 4 credits.

Postgraduate Physician Assistant Courses

PHYASST-401. Occupational and Environmental Medicine Certificate Program. This one-week, on-campus course is offered to graduates of accredited physician assistant programs, nurse practitioner programs, and to physicians. 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. *Strand*

PHYASST-450. Health Systems Organization. An introduction to the U.S. health care system. A lecture series taught by an interdisciplinary faculty and by community experts in health care policy and organization. Topics include major determinants of health and disparities, how health care is organized, delivered and financed in the U.S., health law and regulation, international comparisons and future trends. 3 credits. *Conover*

Physician Assistant Program Calendar
Academic Year 2005-2006 Schedule

Fall Term 2005

Physician Assistant Program

(Master of Health Sciences and Certificate)

1st Year

Fall 200508/22/05 to 12/16/05

Spring 200601/02/06 to 04/13/06

Summer 200604/17/06 to06/30/06

Fall Term 2005

Clinical Rotation Calendar for July 2005-July 2006

Fall 2005

Rotation # 1 July 25 - Aug 19, 2005

Rotation # 2 Aug 22 - Sept 16, 2005

Rotation #3Sept 19 - Oct 14, 2005

Rotation #4 Oct 17 - Nov 11, 2005

Rotation #5 Nov 14 - Dec 9, 2005

Spring 2006

Rotation #6 Jan 2 - Jan 27, 2006

Rotation #7 Jan 30 - Feb 24, 2006

Rotation #8 Feb 27 - Mar 24, 2006

Rotation # 9 Mar 27 - April 21, 2006

MHS Award Date – May 14, 2006

Summer 2005

Rotation # 10 May 1 - May 26, 2006

Rotation # 11 May 29 - June 23, 2006

Rotation # 12 June 26 - July 21, 2006

Senior Seminar / July 24 – August 4, 2006

Certificate Award Date – August 11, 2006

Allied Health Certificate Programs

School of Medicine Professional 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

Ophthalmic Medical Technician

Medical Director: David Chesnutt, M.D.
Program Director: Karen Summerville, COMT

The Ophthalmic Medical Technician Training program is sponsored by the Department of Ophthalmology, Duke University Medical Center. This is a one-year certificate program designed to prepare the student to perform adequately as an ophthalmic medical technician. The program consists of didactic lectures and clinical experiences designed to provide the background information necessary for students to understand and perform the technical tasks designated to them by an ophthalmologist. The first two months consist of core curric-

* Includes involuntary withdrawal for academic reasons.

ulum lectures supplemented with clinical introductory labs and workshops. In approximately the third month, clinical rotations begin. Students rotate through various subspecialty departments observing, learning, and demonstrating the skills particular to that service. Students are monitored under the close supervision of clinical support staff and faculty and are evaluated on a routine basis as their skills develop. Orientation and classes begin on the first Monday in July, and consist of 51 instructional weeks including 12 days of personal leave.

Upon satisfactory completion of the curriculum, students receive a certificate from Duke University Medical Center and are eligible to sit for the national certification examination offered by the Joint Commission of Allied Health Personnel in Ophthalmology at the Technician level.

Prerequisites for Admission. Official documentation of prior educational experience is required for applicants to the program. Applicants must have either completed high school or passed a high school equivalency test. Preference will be shown to applicants who have completed college level courses and/or have some ocular-related work experience. Students must be capable of providing adequate ophthalmic medical clinic patient care.

Application Procedures. Applications are reviewed between January 1 and April 1 of the year for which admission is requested and must contain the following:

1. The completed Duke University Medical Center Application for Admission for the Ophthalmic Medical Technician Training Program, which can be sent by mail or found on-line at *www.dukeeye.org/education*. This includes a nonrefundable processing fee;
2. Official transcript(s) from the most recent schools attended;
3. One original letter of recommendation from a previous employer or course instructor;
4. An essay on your reasons or motivations for wanting to enter the OMT Training Program.

A personal interview with members of the Admissions Committee may be requested following receipt and approval of the application and other information.

The deadline for applications is April 1 of the year for which admission is requested. It is strongly recommended that applications be submitted as early as possible. The Admissions Committee will request that eligible applicants come for an interview following receipt of all necessary information. Applicants are notified no later than May 15 regarding admission to the program. Orientation and classes will begin on the first Monday in July. Requests for further information and application forms should be directed to the Program Director, Karen Summerville, COMT, Box 3802, Duke University Eye Center, Durham, North Carolina 27710. For additional program information, refer to *www.dukeeye.org/education.*

Fees and Expenses. Tuition for the program is $2,800. The student is responsible for housing, board, books, the student health fee, and medical insurance. Fifty percent of the tuition is due at matriculation with the balance being due in January.

Transportation Required. Students should be aware that they may rotate to clinical sites outside of the university campus. The university does not provide transportation.

Financial Aid. For information, please contact the Financial Aid Office, Box 3067, Duke University Medical Center, Durham, NC 27710, or refer to *http://finaid.mc.duke.edu.*

Courses of Instruction. Students must satisfactorily complete the following courses. The curriculum includes, but is not limited to, the following:

COURSE TITLE	CLOCK HOURS
Orientation Lectures	50
Basic Science Lecture	125
Visual Acuity Assessment	10
Physiology and Anatomy of the Eye	15
Physical History	24
Cardiopulmonary Resuscitation	8
Instrument Maintenance	5
Visual Fields	24
Optics and Refractometry	40
Medical Terminology	12
Spectacles	10
Pharmacology	5
Glaucoma and Tonometry	15
External Ocular Diseases	8
Physiology of Systemic Diseases	12
Contact Lens and Keratometry	14
Ocular Motility	15
Neuro-Ophthalmology	5
General Psychology	5
Clinical Rotations	1172
Total	**1574**

General Information

Student Life

CONDUCT OF STUDENTS

Duke University expects and requires of all its students cooperation in developing and maintaining high standards of scholarship and conduct.

All students are subject to the rules and regulations of the university which are currently in effect or which, from time to time, are put into effect by the appropriate authorities of the university.

Any student, in accepting admission, indicates the willingness to subscribe to and be governed by these rules and regulations and acknowledges the right of the university to take such disciplinary action, including suspension and/or expulsion, as may be deemed appropriate for failure to abide by such rules and regulations or for conduct adjudged unsatisfactory or detrimental to the university.

LIVING ACCOMMODATIONS

Duke University has two apartment facilities on campus. One is dedicated solely to graduate and professional students (Town House Apartments) and the other is a subset of the undergraduate housing on Central Campus. The apartments are available for either continuous or academic term occupancy, are fully furnished and wired for cable, telephone and DukeNet. Information, including an on-line application, can be found at the Residence Life and Housing Services website at *http://rlhs.studentaffairs.duke.edu.*

The Town House Apartments are located approximately three blocks from the main East-West Campus bus line. These apartments are more spacious than other apartments on campus. Because of its location, residents find that these apartments offer more privacy and a change from the routine campus life and activities.

Each air-conditioned Town House Apartment includes a living room, a master bedroom, a second bedroom, a bath and a half and an all electric kitchen with dining room. Spacious closets and storage space are provided within each apartment. A swimming pool, located in the center of the complex, is open during the late spring and throughout the summer months. All utilities—water, heat, air-conditioning, gas and electricity—are provided. Residents must make arrangements with Duke University OIT Residential Services to connect cable, voice, and data services.

A portion of the Central Campus Apartments complex is set aside for graduate and professional students. Air-conditioned efficiency, two-bedroom, and three-bedroom apartments are rented to students. Efficiency units are very limited in number and are generally not available to new students. All utilities—water, heat, and electricity—are provided. Residents must make arrangements with Duke University OIT Residential Services to connect cable, voice, and data services.

Both facilities house single and married students. Single students may choose their own roommates, or Residence Life and Housing Services will assign students with similar interests and schedules together. Each single student pays rent per academic term to Duke University. Married rental rates are available on the website.

Application Procedures. Information about Graduate and Professional Student Housing and an on-line application can be found at *http://rlhs.studentaffairs.duke.edu.* In recognition of the unique challenges that face newly accepted international students, priority for assignment to graduate student housing is awarded to students who arrive from abroad on student visa status. Due to limited availability of space, assignment to university housing cannot be guaranteed.

COMMUNICATION BETWEEN DUKE UNIVERSITY AND STUDENTS

Electronic mail (email) is the official medium by which Duke University communicates policies, procedures, and items related to course work or degree requirements to students enrolled at the university. All students matriculated at the university are assigned a Duke University email account upon acceptance of an offer of admission. It is the student's responsibility to check this email account regularly and to respond promptly to requests made by email.

Off Campus Housing. Duke Community Housing is a resource to locate off-campus rental housing options in the Durham area. Duke Community Housing maintains a database of available rental housing which is accessible through the Duke Community Housing website, *http://communityhousing.duke.edu* or the campus office. The Duke Community Housing office is located at 200 Crowell Hall, Room 216, telephone (919) 684-6711, email *communityhousing@duke.edu.* Office hours are 8:00 a.m. to 5:00 p.m. Monday-Friday. Appointments are recommended to meet with staff.

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, and fast food facilities. The many dining locations on campus give Duke students, faculty, staff, and visitors virtually unlimited dining options. For more information about campus dining options, contact Dining Services, 029 West Union, Box 90898, Durham, NC 27708-0898, (919) 660-3900, *http://auxweb.duke.edu/Dining.*

Food and Other Expenses. Duke Dining Services and Duke University Stores operations are located on campus to service the needs of the Duke community. The Duke University identification card, the DukeCard, serves as official identification for activities such as library book check out, recreational center, parking gate, and academic building access. The DukeCard is also the means of accessing the Dining and Flexible Spending (FLEX) Accounts. These two prepaid accounts allow students to make purchases with their DukeCard at certain Medical Center and campus Dining Services locations, retail stores, photocopiers, vending, and laundry machines. The Dining and FLEX Accounts may also be used to purchase pizza and sub sandwiches delivered to campus from several approved off-campus merchants. A FLEX Account can be opened via cash or check at either of the two DukeCard Office locations (Medical Center Parking Garage II and West Union Building) or by sending a signed contract and check in the mail to the address listed below. Additional deposits can be made at the DukeCard Office or by visiting any of the Value Transfer Stations located across campus and the Medical Center. The Dining Accounts can be activated at the DukeCard Office and will be billed to the student's bursar account. For more information about establishing an account, contact The DukeCard Office, 100 Union West, Box 90911, Durham, NC 27708-0911, (919) 684-5800, *http://dukecard.duke.edu.*

MOTOR VEHICLE REGISTRATION

Each motor vehicle operated on Duke University campuses by students enrolled in the School of Medicine must be registered at the Medical Center Traffic Office, PRT Level, Parking Deck II, within five days after operation on the campus begins, and thereafter must display the proper registration decal.

All students must pay an annual fee of $132 for each four-wheeled motor vehicle and $35 for each motorcycle, motorbike, or motor scooter registered. Payment is accepted by cash or check only. To register a vehicle, the student must provide the license tag number of each vehicle to be registered. Bicycles are registered free of charge at University Transportation Services, 2010 Campus Drive.

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

SERVICES AVAILABLE

Student Health Center. The Student Health Center, (919) 681-WELL, is a joint program supported by the Department of Community and Family Medicine, Duke University Medical Center, and Student Affairs. A wide variety of services is available: general medical care, nutrition counseling, laboratory, pharmacy, travel and immunization, x-rays, cold/flu self-help table, and allergy clinic. There is a charge for x-rays, prescription drugs and some laboratory tests. The Student Health Center, located on Flowers Drive in the Duke Clinic complex, is the primary location for medical care and health promotion. Medical services are provided by board-certified faculty and by physician assistants, nurse practitioners, and resident physicians under faculty supervision. Students are seen by appointment, (919) 681-WELL, Monday-Friday, 8:30 a.m. - 5:30 p.m. (Wednesday, 9:30 a.m.–5:30 p.m.). During the academic year, a Nurse Advice Clinic operates from 5:30 p.m.–10:00 p.m. on weekdays, and an Acute Care Clinic is held on Saturday and Sunday from 11:00 a.m.–2:00 p.m. After hours nurse advice is available by telephone.

Students are encouraged to use the Student Health Center as their portal of entry to other health resources when needed, including the specialty clinics at Duke University Medical Center. This helps with coordination of appropriate care.

In the event of an obvious life-threatening emergency, students should go directly to the Emergency Department. If necessary, Duke Police (call 911 or (919) 684-2444) provides on-campus transportation to the Emergency Department.

Health Promotion. Health promotion staff are available to assist students in making informed decisions that promote their health. Topics include fitness assessment, nutrition, alcohol and other drug usage, eating and body image concerns, 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 several weekday afternoons (consult our website for specific days and times) when undergraduate classes are in session, on a walk-in basis, to assess exercise-related problems and to outline short-term treatment plans, aid recovery, and help prevent re-injury. Call (919) 684-6480 during the summer months for hours.

Confidentiality. Information regarding the physical or mental health of students is confidential and is released only with the student's permission except in life-threatening circumstances. As a member of the Duke University Medical Center, the Student Health Center is fully compliant with HIPAA federal regulations.

Student Accident and Hospitalization Insurance. Health insurance is essential to protect against the high cost of unexpected illnesses or injuries which would require hospitalization, surgery, or the services of specialists outside the Student Health Center. Therefore, all students are required to have such insurance. At the beginning of each fall semester, medical students must use the ACES online system to provide proof of coverage under an accident and hospitalization insurance policy or purchase the Duke Student Accident and Hospitalization Insurance policy. This insurance policy provides protection 24 hours per day during the 12-month term of the policy of each student insured and is specifically designed to complement the coverage provided by the student health fee (see below). Students are covered on and off the campus, at home, while traveling between home and school, and during interim vacation periods. Coverage for the student's spouse and dependent children also may be purchased. Further information about this plan can be obtained from Hill, Chesson, and Woody (919) 489-7426.

Health Fee. All currently enrolled full-time students and part-time degree candidates are assessed a mandatory student health fee. This covers most services rendered within the Student Health Center during each enrolled semester. An optional summer health fee for students not enrolled in summer sessions is also available through the Student Health Center.

Services Covered by the Health Fee. The health fee covers most of the services at the Student Health Center if medically indicated and rendered by a student health provider:

-medical care for acute and chronic illness and minor injuries

-one health maintenance examination every two years

-annual gynecological exam

-some routine laboratory services

-administration of allergy shots

-confidential pregnancy testing

- some immunizations excluding prematriculation immunizations

-health promotion, including nutrition consultation

-mental health care at CAPS

Services not Covered by the Health Fee. If you are unsure whether a service is covered, please ask the Student Health reception staff in the clinic prior to receiving the service. You are financially responsible for the following:

-prescription drugs

-x-rays

-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

-routine eye exams

-pregnancy care or deliveries

-tests, procedures, and prescriptions not medically indicated, not on the approved list, or not ordered by student health providers

-immunizations required for entrance to Duke or other universities or for travel

Student Health Center: William A. Christmas, M.D., Director, 00371 Duke Clinic.

Counseling and Psychological Services. Counseling and Psychological Services (CAPS) is located in Suite 214, Page Building on West Campus. CAPS, a department of the Division of Student Affairs, provides a range of counseling and psychological services designed to address the acute emotional and psychological difficulties of Duke students.

The professional staff is composed of psychologists, clinical social workers, and psychiatrists experienced in working with college students. They provide direct services to students including evaluation and brief counseling/psychotherapy, with issues such as self-esteem and identity, depression, anxiety, family relationships, academic performance, dating, intimacy, and sexual concerns. Ordinarily, students are seen for counseling by appointment. If the concern requires immediate attention, a CAPS staff member assists with the emergency at the earliest possible time.

Each year CAPS offers a series of counseling, therapy, and support groups. Recent groups have focused on stress, anxiety, interpersonal process, meditation, eating and body image concerns, and dissertation support.

Another function of CAPS is to provide consultation regarding student development and mental health issues affecting not only individual students, but the campus community as a whole. The staff works with other campus personnel including administrators, faculty, the student health staff, and student groups in meeting needs identified through such liaisons. Contact CAPS at (919) 660-1000.

Student Personal and Professional Advisory System for M.D. Program Students. The advisory dean system is the heart of the Office of Student Affairs. Developed in 1986 in response to the need for personal advising in a highly elective curriculum, it is the current mission of the advisory program to:

-help each medical student derive the maximum benefit of his/her medical school experience and opportunities

-promote the personal, academic, and professional development of each student

-aid each student in making deliberate and thoughtful curricular and career decisions

-promote each student toward his/her future endeavors, and

-celebrate with students the milestones of personal and professional growth

The Office of Student Affairs also coordinates medical school orientations, celebrations, and graduations, and provides access for students to other student services and resources.

Resources for Study

The goal of Duke University School of Medicine 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 School of Medicine 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 288,136 volumes are available, including the Trent Collection in the History of Medicine. Approximately 1,221 current print subscriptions and 2,600 electronic journal titles are available. The library has extensive back files of older volumes. The collection contains over 1,013 audiovisual titles. The Medical Library Education Center (MLEC), located on the lower level of the library, houses an electronic classroom for hands-on computer training. The Frank Engel Memorial Collection consists of a small group of books on consumer health and non-medical subjects for general reading, together with several newspapers and popular magazines. Traditional library services include reference, circulation, Internet assistance, and document delivery services, which are supplemented by mediated and self-service online database searching. Public workstations for searching databases and the on-line catalog are available in the reference area and other areas of the library. Detailed information on services and resources may be found in the information guides available at the library.

The Medical Center Library is open at the following times: Monday-Thursday, 8:00 a.m. – 11:00 p.m.; Friday, 8:00 a.m. – 6:00 p.m.; Saturday, 10:00 a.m. – 6:00 p.m.; Sunday, 2:00 p.m. – 10 p.m. Summer and holiday hours are announced.

Associate Dean for Library Services: Patricia L. Thibodeau, M.L.S. (Rhode Island, 1976), M.B.A. (Western Carolina University, 1991). Deputy Director: Richard A. Peterson, M.S.L.S. (Case Western Reserve University, 1977).

Bookstore. The Medical Center Bookstore offers a wide selection of medical reference books, textbooks, software, and instruments to the Duke University Medical Community. Clothing, including scrubs and uniforms, office supplies, and Duke gifts are also offered. Special orders are welcomed. The store is located in the Facilities Building adjacent to the PRT walkway between Duke Hospital North and Duke Hospital South and is open Monday through Friday from 8:30 a.m–5:30 p.m., and Saturdays from 10:00 a.m–4:00 p.m. The telephone number is (919) 684-2717.

Searle Conference Center. The Searle Conference Center for Continuing Education in the Health Sciences provides elegant accommodations for conferences, symposia, lectures, and meetings to support the continuing education activities of the Medical Center and university. Additionally, banquets, dinners, weddings, receptions, and other private events may be held on a space- available basis. Meeting space, audiovisual needs, catering, and assistance with event planning are all provided by the on-site staff. Please call (919) 684-2244.

Manager: Michael A. Evans

Medical Center Commons. The Medical Center Commons restaurant is open for fine dining at lunch time, Monday-Friday. Accepting credit cards, IRs, Flex Account Cards, and reservations at (919) 684-5805, the Commons is located in the Searle Conference Center on the ground floor of the Seeley Mudd Building. The restaurant features gourmet salads, homemade soups, carved meats, hot entrees, and weekly specials. Prices range from $6 to $9. Private dining rooms are available as well as morning, evening, or weekend meeting and catering space. For additional information on these services, please call (919) 684-2244.

Manager: Michael A. Evans

The Office of Curriculum. The Office of Curriculum offers expertise to the Medical School community in the areas of curriculum and course development, educational research

and evaluation studies, standardized patients, faculty development, and curricular support. Interdisciplinary courses are managed from this office. Support is provided for all four years of the curriculum.

Support includes space, equipment and supplies, and services. The Thomas D. Kinney Central Teaching Laboratory, located on the fourth floor of the Davison Building, provides laboratory, demonstration, and conference space for all courses taught in the basic sciences with the exception of gross anatomy. The Medical Student Amphitheater in the Clinic Building provides space for 150 learners and is equipped with digital projectors, document and room cameras, computers for the presenter and network access for the learners, and an audience response system. Six small group rooms in the Student Affairs area in the basement, Purple Zone complement this type of education. A Clinical Skills Lab of eight rooms in the basement, Orange Zone provides a mock clinic experience and is the site for the Clinical Performance Examination (CPX). A Patient Simulator Lab on the fourth floor, Orange Zone provides "hands on" learning of normal and abnormal physiological processes, as well as a patient's responses to a variety of pharmaceutical agents in adults and children. The Office of Curriculum has a full-time staff of 14 who provide software support, standardized patients, instructional design, exam grading, Web-based course and exam support, in-house microscope cleaning and repair, course evaluation tabulation and reporting, database support, and help desk support for medical students and physical therapy students, laptops, and personal digital assistants. This enables the faculty of each department to devote their efforts entirely toward student learning. The office also supports curriculum and evaluation databases used in curriculum management and tracking of student progress, as well as Curriculum Committee and standing task force clerical support. Three deans provide expertise in curriculum assessment (Emil Petrusa, Ph.D.), curriculum development (Colleen Grochowski, Ph.D.), and curriculum oversight (Edward Buckley, M.D.). The deans have offices on the fourth floor of the Davison Building.

All first year medical students are given space (which they maintain for the entire academic year) in one of the Central Teaching Laboratory (CTL) rooms for their own work. CTL includes a computer cluster with electronic mail capability available to students 24 hours a day and a 24-workstation electronic laboratory for computer-assisted educational training for students, faculty, and employees.

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

Clinical Performance Examination (CPX). In 1993, Duke University School of Medicine developed, along with the other three medical schools in North Carolina, a standardized test of clinical performance. The CPX consists of a number of clinical cases for which the student is in the role of primary provider. Each patient, portrayed by a standardized patient, has a complaint or reason for the visit. The student begins each case by talking with and sometimes physically examining a patient and then answering questions about the data obtained from the patients. For some cases, additional radiologic or diagnostic data are available for consideration, along with data from the patient, in determining a differential diagnosis and possibly an outline of a management plan. Cases are selected to sample a variety of dimensions including patient age, gender, all organ systems, and specialties represent through the clerkship year. The major purposes of the CPX are (a) to evaluate, in a more standardized way, each student's approach to patients with common complaints, demonstrating the orchestration of history-taking, physical examination and communication skills that cannot be adequately assessed through written tests, (b) to provide a measure of curriculum effectiveness and (c) to prepare students for Step 2 CS, a standardized patient-based assessment that is part of the physician licensing system in the United States. This preparation is achieved by giving students an experience that closely resembles the actual Step 2 CS.

Each student's encounters are videotaped. These tapes will be reviewed and discussed with a faculty physician during the assessment week at the end of the second year. This assessment of clinical performance is structured to be competency-based, where each student's performance is compared to a pre-determined performance. Through this approach each student may be competent, at least to the level and scope that the CPX assesses. Each student receives a written report of their level of competence with each case, comments directly from the standardized patients and their performance scores for the five skills as well as the class as a whole. For the assessment week in August 2005, performance on the CPX will not affect clerkship grades or academic standing. However, it is required for graduation.

Division of Educational Media Services. As a core technology support center within the School of Medicine and Health System, the Division of Educational Media Services provides total media support for the teaching, research, patient care, and service missions of Duke University School of Medicine, Duke Health System, and the university. The Division has three primary service sections: Medical Photography, Graphics, and Imaging; Creative Art and Web Development; and Instructional Television.

The Creative Art and Web Development Section provides comprehensive web development and electronic media creation. Full computer graphics and manual art production methods and techniques are possible along with animation and other contemporary media technologies. Web Development services include entire site design, information architecture, page design and graphics creation, and programming. Offerings include E-commerce, Notes, Access and Java Script programming, indexing and search functionality, and hosting with secure web servers for on-line Continuing Medical Education (CME) activities. Streaming video and audio on the Internet and Internet-based live broadcasts are also offered. Special capabilities include production and hosting of on-line educational modules with quizzing and participant tracking.

The Medical Photography, Graphics, and Imaging Section is staffed and equipped to provide a full range of photographic, graphics and imaging services for patient care, teaching, and research. Patient photography activity includes black-and-white and color photos in the studio, on the ward, in the clinic, or in the operating room. Copy photography includes a full range of slide services for internal and external lecture and presentation purposes. An extensive computer graphics creation and imaging service is also available. Graphics services rendered include digital poster session design and printout, imaging of computer files in color and black-and-white for slides, overheads, prints and transparencies; graphics creation for slides, prints, and artwork; and graphic design and other creative services for PowerPoint presentations and desktop publishing. Medical illustration and traditional pen and ink or carbon dust, as well as electronic creations, are offered for scientific and technical publication purposes.

The Instructional Television section also supports teaching, research, and patient-care programs of the Medical Center. It provides educational and commercial video production services for educational, informational, and promotional uses. The four available formats for video recording are Beta SP, DV-cam, VHS, or S-VHS. Script writing, music, graphic support, narration, and full post-production effects are also available for finished productions. Applications include education, training, marketing, and video news releases as well as others. Videoconferencing, satellite downlinking, audiotape services, projection services, and equipment rental are also offered.

Director: Thomas P. Hurtgen, M.B.A.

Duke Hospital. Duke Hospital, one of the largest private hospitals in the South, is part of Duke University Health System and currently is licensed for 1,019 beds. The hospital directs its efforts toward the three goals of expert patient care, professional education, and service to the community. It offers patients comprehensive diagnostic and treatment facilities and special acute care and intensive nursing units for seriously ill patients. Approximately 37,000 patients are discharged annually. Surgical facilities include 26 inpatient operating rooms and 12 ambulatory surgery rooms in which surgeons perform more than 28,000 operative procedures annually. Approximately 2,900 babies are born each year in the delivery suite. Other special facilities for patients include a heart catheterization laboratory, hemodialysis unit, cancer research unit, medical and surgical intensive care units, hyperbaric oxygenation chamber, and cardiac care unit.

Duke's home care, hospice, and infusion services provide opportunities for continued care of patients after they leave Duke Hospital.

Ambulatory services include the outpatient clinics, ambulatory surgery center, the employee health service, and the emergency department, with more than one million combined patient visits annually. The clinical faculty of the Duke University School of Medicine participate in undergraduate and graduate medical education and practice medicine in the hospital and in the Private Diagnostic Clinic.

Duke Hospital, with a house staff of approximately 800, is approved for residency training by the American Medical Association, the Accreditation Council for Graduate Medical Education, and is accredited by the Joint Commission on Accreditation of Healthcare Organizations for another three years (from 2001).

Veterans Administration Medical Center. The Durham Veterans Affairs Medical Center, with 154 beds (plus 120 nursing home beds), annually admits over 6,000 patients. The hospital is within walking distance from the School of Medicine and has closely integrated teaching and training programs for medical students and house staff. These programs are provided by the full-time professional staff who are members of the faculty of Duke University School of Medicine.

Lenox Baker Children's Hospital. On November 1, 1987, the Lenox Baker Children's Hospital became a part of Duke University Medical Center, entering a new phase in its development as an orthopaedic and rehabilitation outpatient center for the children of North Carolina. A full spectrum of outpatient orthopaedic and rehabilitation services is offered to identify and meet realistic goals and to educate, support, and assist families, schools, and communities in providing a rich environment for disabled children.

Durham Regional Hospital. Durham Regional Hospital, a 369-bed acute care facility, became part of Duke University Health System on July 1, 1998 through a lease agreement with Durham County. As the only community hospital with tertiary care services in an eight contiguous county area, Durham Regional has a long tradition of caring for the residents of Durham and surrounding communities. A comprehensive health care facility, Durham Regional provides inpatient, outpatient, and emergency care and features a level II intensive care nursery, on-site radiation oncology service, Durham Rehabilitation Institute, and the Davis Ambulatory Surgery Center. It is also home to the Triangle's only Long-term Acute Care Hospital, operated by Select Medical. Durham Regional participates in many medical and health-related professional training experiences. The Watts School of Nursing, North Carolina's oldest nursing school, is located on-site.

Raleigh Community Hospital. Raleigh Community Hospital, located in north Raleigh, is a 186-bed acute care facility, which became a part of the Duke University Health System on September 15, 1998. Raleigh Community Hospital provides primary and special-

ty care, including a Sports Medicine Clinic, Outpatient Imaging Center, Pain Clinic, Diabetes Treatment Center, and a Cardiac Rehabilitation Center.

In addition, Raleigh Community Hospital has a comprehensive childbirth center with an LDRP birthing service, Level III Special Care Nursery, cancer center, same day surgery center, and cardiac diagnostic services.

Other Hospitals. Various cooperative teaching and training programs are available for medical and allied health professional students and house staff at other hospitals including Asheville Veterans Administration Medical Center in Buncombe County, John Umstead Hospital in Butner, Fayetteville Area Health Education Center in Fayetteville, and Cabarrus Memorial Hospital in Concord, North Carolina.

Medical Center and Health System Buildings and Facilities

The 91 buildings and additions which make up the medical education, research, and patient care facilities are located on approximately 200 acres, mostly on or near the West Campus of the university.

The Clinic Zone is contiguous with the main quadrangle of the university and consists of the following: *Duke Clinic*—Ten contiguous buildings, including: *Clinic Reception Building*—Entrance lobby, clinics, food court, and amphitheater. *Edwin A. Morris Building*—Clinics, diagnostic, treatment and support services, Department of Radiation Oncology administration, departmental research laboratories, and offices. *Davison Building*—Department of Pathology administration, research laboratories and offices, Central Teaching Facility, Division of Audiovisual Education, Medical Center and Health System Administration, and School of Medicine Administration. *Original Hospital, 1940 and 1957 Additions*—Clinics, diagnostic, treatment, and support services including: Clinical Laboratories, Physical Therapy, Pharmacy, departmental offices, Medical School Admissions, Registrar, Financial Aid, Central Teaching facilities, Educational Media Services and Student Health Clinic. *Baker House*—Department of Obstetrics and Gynecology administration, clinics, diagnostic, treatment and support services including: Speech and Hearing, Oral Surgery, Pastoral Care and Counseling, departmental offices and NeuroOncology Program. *Barnes Woodhall Building*—Psychiatry inpatient care unit, diagnostic, treatment, and support services, outpatient pharmacy, pre-operative screening, Radiology, departmental research laboratories, and offices, and Hospital administration. *Diagnostic and Treatment #3 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 Surgery offices*, Department of Psychiatry administration, departmental research laboratories and offices, hyperbaric medicine unit. Other buildings within the Clinic zone include the *Bell Building*—offices for the Departments of Surgery, Pediatrics, Radiology, Obstetrics and Gynecology, Medicine, and Psychiatry, Duke Health Technology Solutions (DHTS), Gross Anatomy laboratories, and Brain Imaging and Analysis administration and research. *Marshall Pickens Building*—Clinics, Employee Health Services, and *Parking Garage I.*

The Hospital Zone consists of the following buildings: *Duke Hospital (Anlyan Tower and Ancillary Building)*—Inpatient care units, diagnostic, treatment, and support services including surgical suite, cath labs, Emergency Department, Labor and Delivery suite, Operating and Recovery Suite, Full-Term Nursery, Radiology, Clinical Laboratories, MRIs, Respiratory Therapy, Pharmacy, the Departments of Anesthesiology, Medicine, Radiology,

Surgery administration, Cardiology Division offices, and Brain Imaging and Analysis research. *Children's Health Center*—Children's clinics, diagnostic, treatment and support services, Department of Pediatrics administrative offices. *Joseph A.C. Wadsworth Building (Eye Center)*—Department of Ophthalmology administration, clinic, diagnostic, treatment, and support services including: operating rooms, recovery, research laboratories and offices. *Albert Eye Research Institute*—Ophthalmology faculty offices and research space and Peds Ophthalmology Clinic. *Civitan Building and Child Guidance Center*—Clinics, laboratories, and offices for the Departments of Pediatrics and Psychiatry. *Hanes House and Nursing School*—Physician Assistant Program, Clinical Research Training Program, Community and Family Medicine administrative and departmental offices, and School of Nursing administrative and departmental offices, Hospital Education and teaching facilities, and Medical Center News Office. *Seeley G. Mudd Communications and Library*—Medical Center Library,Medical Center Commons, the Searle Center for Continuing Education, and the Center of Medical Ethics and Humanity. *Parking Garage II*—House Staff and Student Exercise Facility, and Nursing Recruitment.

The Research Zone consists of the following: *Joseph and Kathleen Bryan Research Building for Neurobiology*—Department of Neurobiology administration, Alzheimer's Disease Research Center, 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 Molecular Genetics & 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, section C*—Department of Pharmacology and Cancer Biology administration, research laboratories, and offices. *Surgical Oncology Research Building, Environmental Safety Building, Research Park Buildings I, II, III and IV*—Departments of Anesthesiology, Medicine, Pediatrics, Radiology, Pharmacology, and Surgery research laboratories, offices, and hospital clinic laboratories. *Vivarium. Cancer Center Isolation Facility. Snyderman Genome Science Research Building and Genome Science Research Building-II—genomic science research.*

The West Zone consists of the *Lenox Baker Children's Hospital*—Clinics, diagnostic, treatment, and support services, departmental offices, and mobile MRIs. *Dialysis Center*—Treatment facility. *Center for Living Campus*—four buildings including: *Sarah Stedman Nutrition Center*—Stedman Nutrition Center administrative offices and food facility. *Andrew Wallace Clinic Building*—Clinics, diagnostic, treatment, and support services and departmental offices. *Pepsico Fitness Center*—Exercise facilities including indoor track, exercise equipment, swimming pool. *Aesthetic Services and Dermatologic Surgery Clinic*—clinics, diagnostic treatment, and support services and CFL administrative offices.

The North Campus Zone consists of the following buildings: *North Pavilion*—Ambulatory Surgery center, Adult and Pediatric Bone Marrow Transplant, Duke Clinical Research Institute (DCRI), Anesthesiology offices, Office of the University Counsel, and

the Office of Continuing Medical Education. *Parking Garage III*, and *Elba and Elder Street Buildings*—Diagnostic and treatment services, offices for the Departments of Pathology, Psychiatry and Medicine, the Center for the Study of Aging, Hospital transport and laboratory services, Occupational and Environmental Safety, Medical Center Engineering and Operations, and PRMO Finance offices.

Contact Information other Professional Programs at Duke University

- ***Pratt School of Engineering – (919) 660-5386***
  http://www.pratt.duke.edu/
- ***School of Nursing – (919) 684-3786***
  http://www.nursing.duke.edu/index.html
- ***Nicholas School of the Environment and Earth Science – (919) 613-8000***
  http://www.nicholas.duke.edu/
- ***School of Law – (919) 613-7006***
  http://www.law.duke.edu/
- ***The Graduate School – (919) 681-3257***
  http://www.gradschool.duke.edu/
- ***The Fuqua School of Business - (919) 660-7700***
  http://www.fuqua.duke.edu/index_40.html
- ***Divinity School – (919) 660-3400***
  http://www.divinity.duke.edu/home/

Graduate Program Information

Graduate Program Information

Accreditation Council for Graduate Medical Education Programs. Appointments are from July 1 through June 30 with a few exceptions. Trainees receive stipends, professional liability insurance, disability insurance, life insurance, health insurance, parking, psychological counseling, uniforms, and laundry of uniforms.

Programs offered with the program training director of each service are as follows:

Allergy and Immunology	Dr. A. Wesley Burks
Anesthesiology	Dr. Catherine Lineberger
Anesthesiology: Critical Care	Dr. Chris Young
Anesthesiology: Pain Management	Dr. Billy Huh
Cardiovascular Disease	Dr. Thomas Bashore
Child Neurology	Dr. Darrel Lewis
Child Psychiatry	Dr. Alan Chrisman
Clinical Cardiac Electrophysiology	Dr. Tristram D. Bahnson
Clinical Neurophysiology	Dr. Atif Husain
Critical Care Pediatrics	Dr. Craig Weldon
Cytopathology	Dr. Claudia Jones
Dermatology	Dr. Sarah Myers
Dermatopathlogy	Dr. Maria Selim
Emergency Medicine	Dr. Susan Promes
Endocrinology/Metabolism	Dr. Mark Feinglos
Family Practice	Dr. Brian Halstater
Family Practice: Sports Medicine	Dr. Jeffrey Bytomski
Gastroenterology	Dr. Jane Onken
General Surgery	Dr. Michael Skinner
Geriatric Medicine	Dr. Kenneth Lyles
Geriatric Psychiatry	Dr. David Steffens
Hematology/Oncology	Dr. William Kane
Hematopathology	Dr. Patrick Buckley
Infectious Diseases	Dr. Gary Cox
Internal Medicine	Dr. Diana McNeill
Interventional Cardiology	Dr. Michael Sketch
Medical Genetics	Dr. Marie McDonald
Medical Microbiology	Dr. Barth Reller
Medicine/Pediatrics	Drs. Thomas Owens/Suzanne Woods

Medicine/Psychiatry	Drs. Diana McNeill/Grace Thrall
Neonatal/Perinatal Medicine	Dr. Ronald Goldberg
Nephrology	Dr. Thomas M. Coffman
Neurological Surgery	Dr. Allan Friedman
Neurology	Dr. Joel Morganlander
Neuropathology	Dr. Roger McLendon
Neuroradiology	Dr. James Eastwood
Nuclear Medicine	Dr. Edward Coleman
Nuclear Radiology	Dr. Edward Coleman
Obstetrics-Gynecology	Dr. Fidel Valea
Ophthalmology	Dr. Pratap Challa
Orthopaedic Surgery	Dr. William Hardaker
Orthopaedic Hand Surgery	Dr. James Urbaniak
Ortho: Sports Medicine	Dr. Lawrence Higgins
Ortho: Foot and Ankle	Dr. James Nunley, II
Otolaryngology	Dr. Joseph Farmer
Pathology	Dr. Patrick Buckley
Pediatric Cardiology	Dr. Brenda Armstrong
Pediatric Endocrinology	Dr. Michael Freemark
Pediatric Hematology/Oncology	Dr. Susan Kreissman
Pediatric Infectious Diseases	Dr. Coleen Cunningham
Pediatric Nephrology	Dr. John Foreman-voluntary withdrawal 6/30/04
Pediatric Pulmonology	Dr. Judith Voynow
Pediatric Radiology	Dr. Donald Frush
Pediatric Rheumatology	Dr. Laura Schanberg
Pediatrics	Dr. Joseph M Majure
Plastic Surgery	Dr. Scott Levin
Preventive Medicine	Dr. Dennis Darcey
Psychiatry	Dr. Grace Thrall
Psychiatry: Forensic	Dr. Jean Zula
Pulmonary Critical Care Medicine	Dr. Loretta Que
Radiation Oncology	Dr. Larry Marks
Radiology: Diagnostic	Dr. Linda Gray
Rheumatology and Genetics	Dr. John Sundy
Surgery: Critical Care	Dr. Mark Sebastian
Thoracic Surgery	Dr. Thomas A. D'Amico
Undersea & Hyperbaric Medicine	Dr. Bret Stolp
Urology	Dr. Glenn Preminger
Vascular Surgery	Dr. Richard McCann
Vascular/Interventional Radiology	Dr. Paul Suhocki

Duke University Medical Center is a participating member of the National Resident Matching Program, 2450 N Street N.W., Suite 201, Washington, DC 20037-1141. All applicants for first-year, post-medical school appointments must register with this program.

The Durham Veterans Administration Medical Center adjoins the Duke University Campus and is affiliated with Duke University Medical Center. The full-time professional

staff of the V.A. Medical Center are all faculty members of the School of Medicine. All training programs are integrated with corresponding programs at the Duke University Medical Center, including rotation of house officers at each hospital.

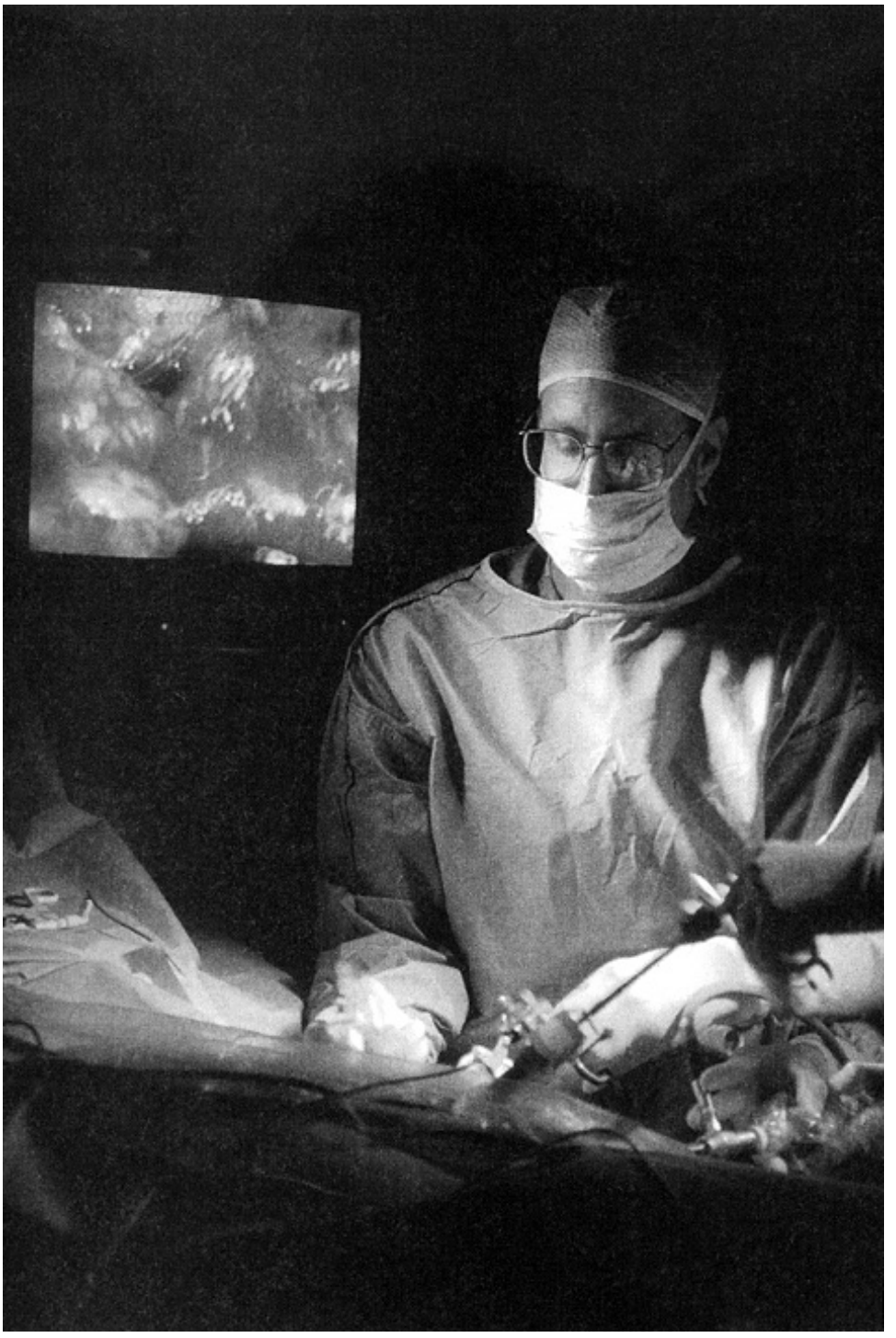
All trainees are required to be licensed by the State of North Carolina. This may be accomplished by: (1) a residency training license that covers only training by Duke and is not convertible to a full North Carolina license, or (2) a full North Carolina license that is a complete medical license. A complete medical license is obtained either by state boards (North Carolina Boards can only be taken upon completion of internship) FLEX, USMLE Step III, or National Boards. North Carolina is not reciprocal with other states for full licenses. Duke University Medical Center cannot make applications for full license. Since house staff members must have a license before beginning duties, arrangements for the license should be made in advance. All incoming house staff must contact the House Staff Office, Box 3951, DUMC, Durham, North Carolina 27710 for current licensure requirements, and to make application for a training license.

Auditing of Courses by House Staff. Residents and fellows at the Medical Center may audit courses through the undergraduate and graduate divisions of Duke University by obtaining the written permission of the course instructor and the dean for continuing studies 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 E. Gilbert, Academic Dean for Continuing Studies, The Bishop's House, Duke University, Durham, North Carolina 27708, (919) 684-2621; website: *www.learnmore.duke.edu*; email: pgilbert@duke.edu.

International Medical Graduates (IMG). Those persons graduating from medical schools outside the United States or Canada, must hold valid certification from the Educational Commission for Foreign Medical Graduates (ECFMG) for admission to and participation in training programs. IMGs obtain ECFMG certification by passing the following combination of exams: the United States Medical Licensing Examination (USMLE), Steps 1 and 2; the ECFMG Clinical Skills Assessment (CSA); and an English examination acceptable to ECFMG for certification purposes. Some physicians may have taken an earlier version of the USMLE under a different name such as NBME, FMGEMS, or VQE. Physicians must contact ECFMG to determine if those exams are acceptable for ECFMG certification. Write to ECFMG, 3624 Market Street, Philadelphia, Pennsylvania, 19104, or visit the website at *http://www.ecfmg.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 Office of Graduate Medical Education website at *http://www2.mc.duke.edu/gme/*. An application from an IMG that does not include a copy of a valid ECFMG certificate, or other evidence from ECFMG confirming passage of all of the required exams, is considered incomplete and may be discarded without further notice to the applicant.

For further information regarding special requirements for IMGs contact Catheryn Cotten, International Office, Box 3882, Duke University Medical Center, Durham, North Carolina 27710, or visit the website at: *http://www.international.duke.edu.*



Roster of House Staff by Departments

Anesthesiology

Chief Residents: Not determined at press time.

Senior Residents: David Auyong, M.D. (Washington, 2002); James Benonis, M.D. (Temple, 2002); Daniel Briggs, M.D. (North Carolina, 1999); Andrea Clark, M.D. (Northwestern, 2002); Jeffrey Gonzales, M.D. (Illinois at Chicago, 2002); Michael Lucas James, M.D. (Louisiana State, 1999); Cheryl Jones, M.D. (Connecticut, 2002); Andrew Lutz, M.D. (Pennsylvania State, 2002); Heather Frederick, M.D. (Duke, 2002); Nathaniel Nonoy, M.D. (Loma Linda, 2002); Christina Noyes, M.D. (Alabama, 2002); Stephen Packer, M.D. (Ohio State, 2002); Reed VanMatre, M.D. (Northwestern, 2002).

Junior Residents: Idi Allen, M.D. (UMDNJ-New Jersey, 2004); Raquel Bartz, M.D. (Washington, 1998); Christopher Beadles, M.D. (Texas-San Antonio, 2004); Alecia Blake, M.D. (Morehouse, 2004); Robert Cinclair, M.D. (Texas-Galveston, 2004); Tameta Clark, M.D. (North Carolina, 2004); Alison Clay, M.D. (Chicago Pritzker, 1998); William Corbett III, M.D. (Johns Hopkins, 2003); Richard D'Alonzo, M.D., Ph.D. (St. Louis, 2003); Daniel Deming, M.D. (UCLA, 2003); Joshua Dooley, M.D. (Pittsburgh, 2004); Elisabeth Flachofsky, M.D. (Texas A&M, 2003); Stephen Kushins, M.D. (UMDNJ-New Jersey, 2004); Anjolie Laubach, M.D. (North Carolina, 2004); Jason Lemons, M.D. (Med. Col. Georgia, 2004); Andrew Matisoff, M.D. (Virginia, 2003); Davin Mitchell, M.D. (Wayne State, 2004); Matthew Njaa, M.D. (Stanford, 2003); Christina Reiter, M.D. (UMDNJ-Robert Wood Johnson, 2003); Erin Rose, MD. (Nebraska, 2004); Shanna Ten Clay, M.D. (Northwestern, 2003); Christopher Thunberg, M.D. (Pittsburgh, 2003); Ross Thormahlen, M.D. (Texas-Southwestern, 2004), Brandon Winchester, M.D. (Virginia, 2003).

Interns: Mingda Chen, M.D. (Louisville, 2005); Jennifer Johnson, M.D. (Tufts, 2005); Daniel LaValley, M.D. (Michigan, 2005); Robert Lobato, M.D. (Stanford, 2004); Kieu Luu, M.D. (Pennsylvania State, 2005); Charles Andrew Peery, M.D. (Duke, 2004); Aliana Sindram-Trujillo, M.D., Ph.D. (North Carolina, 2005); Andrea Styron, M.D. (Illinois, 2005).

Fellows: Cardiothoracic Anesthesia: Tamas Szabo, M.D., Ph.D. (Semmelweis, Budapest, Hungary, 1995)

Critical Care Medicine: Larry Field, M.D. (Illinois, 2001); Duane Funk, M.D. (Manitoba, Canada, 2000)

Pain Management: Peter Nagi, M.D. (Alabama, 1999); Farrukh Sair, M.D. (North Carolina, 2001)

Undersea & Hyperbaric Medicine: Austin Chhoeu, D.O. (Des Moines, Iowa, 1996); Jonathan Conard, D.O. (Tulsa, Oklahoma, 2001)

Community and Family Medicine

Chief Residents: Robin R. Ali, M.D. (North Carolina, 2000); Harry C. Stafford, Jr., M.D. (North Carolina, 2002).

Residents: Eric S. Butler, D.O.(Midwestern, 2004); Timothy R. Carle, M.D. (Duke, 2004); Maya J. Carter, M.D. (Southern Illinois, 2003); Joseph A. Cefalu, M.D. (East Carolina, 2001); Durga Rani Chadalawada, M.D. (India, 2000); David Z. Frankel, M.D. (Jefferson Medical College, 2002); Karl D. Friedrich, M.D. (Ross, 2002); Harriet N. Hansell, M.D. (North Carolina, 2003); Janeen M. Hudzinski, M.D. (Med. Coll. of Wisconsin, 2002); Moria E. McQuillan, M.D. (Royal College of Surgeons-Ireland, 2004); Jason J. Pirozzolo, D.O. (Southeastern, 2002); Deanne N. Rhodes, M.D. (Georgetown, 2004); Jeffrey B. Roberts, M.D. (Virginia Commonwealth, 2004); Daniel P. Woydick, M.D. (Med. Coll. of Wisconsin, 2003); Kimberly B. Zuzak, M.D. (Howard University, 2004).

Medicine

Chief Residents: Richard F. Riedel, M.D. (Jefferson, 2000); Hope E. Uronis, M.D. (SUNY at Buffalo, 2000); Heather E. Whitson, M.D. (Cornell, 2000).

Senior Assistant Residents: Zarina Alam, M.D. (Duke, 2002); James D. Allred, M.D. (Med. Coll. of Virginia, 2002); Carey Kernodle Anders, M.D. (East Carolina, 2002); Amber R. Atwater, M.D. (Illinois, 2002); Bret D. Atwater, M.D. (Chicago Pritzker, 2002); Matthew C. Becker, M.D. (SUNY at Syracuse, 2002); Jorge Davalos, M.D. (Miami, 2002); John Delmonte, M.D. (California at San Francisco, 2002); Melvin R. Echols, M.D. (Morehouse, 2002); Matthew J. Ellis, M.D. (Duke, 2002); Wendell K. Ellis, M.D. (Meharry, 2002); Rachael L. Fawcett, M.D. (Indiana, 2002); Laura L. Fitzpatrick, M.D. (North Carolina at Chapel Hill, 2002); Lara B. Gadkowski, M.D. (Jefferson, 2002); John M. Galla, M.D. (Univ. of Washington, 2002); Katherine S. Garman, M.D. (Duke, 2002); Steven P. Higgins, M.D. (Duke, 2002); Beatrice Hong, M.D. (Hopkins, 2002); Andrew P. Hope, M.D. (Columbia, 2002); David G. Jones, M.D. (Arkansas, 2002); Susan A. Kaplan, M.D. (Duke, 2002); Rania Y. Kazan, M.D. (Beirut, 1998); Tahaniyat Lalani, M.D. (Aga Khan, 2000); Kathleen E. Lambert, M.D. (Med. Coll. Virginia, 2002); Mark C. Lanasa, M.D. (Pittsburgh, 2002); Seung-Joon Lee, M.D. (Albert Einstein, 2002); Tereza Martinu, M.D. (McGill, 2002); Angela M. Meyer, M.D. (Arizona, 2002); Cynthia A. Moylan, M.D. (Miami, 2002);Susanna Naggie, M.D. (Hopkins, 2002); Benjamin J. Powers, M.D. (California, San Diego, 2002); Zainab Samad, M.D. (Aga Khan, 2000); Scott J. Samuelson, M.D. (Utah, 2002); Salima Shafi, M.D. (Aga Khan, 2000); Mohammadreza Tabesh, M.D. (Hopkins, 2002); Naasha J. Talati, M.D. (Aga Khan, 2000); Carl Wei-Chan Tong, M.D. (Texas A&M, 2002); Jay B. Varkey, M.D. (Wisconsin, 2002); Stanley S. Wang, M.D. (Texas at Dallas, 2001); Nicole Whitlach, M.D. (Boston, 2002); Anita Wokhlu, M.D. (Hopkins, 2002).

Senior Assistant Residents-Medicine/Pediatrics: Todd E. Bell, M.D. (Arkansas, 2001); Steven L. Condron, M.D. (New York Medical, 2001); Molly M. Emott, M.D. (Connecticut, 2001); Courtney D. Fitzhugh, M.D. (California at San Francisco, 2001); Christopher M. Howard, M.D. (Texas A&M, 2001); Holly E. Rawizza, M.D. (Vanderbilt, 2001).

Senior Assistant Resident-Medicine/Psychiatry: Kellie D. Clearo, M.D. (Univ. of Washington, 2002).

Junior Assistant Residents: Wael AlJaroudi M.D. (Beirut, 2002); Allen E. Atchley, M.D. (Tennessee at Memphis, 2003); Natalie M. Bachir, M.D. (Dublin, 2003); Rami J. Badreddine, M.D. (Beirut, 2002); Arthur M. Barrie, M.D. (Cincinnati, 2003); Darren M. Boe, M.D. (Louisiana State, 2003); Jamie M. Bourque, M.D. (Duke, 2003); Kevin D. Brown, M.D. (Howard, 2003); Jessica Y. Chia, M.D. (Louisiana State, 2003); Margaret K. Crook, M.D. (Virginia, 2003); Ayotunde O. Dokun, M.D. (Mount Sinai, 2003); Cynthia K. Feltner, M.D. (West Virginia, 2002); Haley Fiske, M.D. (Vanderbilt, 2003); Ziad Gellad, M.D. (Hopkins, 2003); Jason A. Goebel, M.D. (East Carolina, 2003); Stacy H. Graham, M.D. (South Carolina, 2003); Miriam S. Jacob, M.D. (Virginia, 2003); Ngina A. Jemmott, M.D. (Maryland, 2003); Elizabeth Krakow, M.D. (McGill, 2003); Druenell E. Linton, M.D. (Morehouse, 2003); Michael G. Martin, M.D. (Tennessee at Memphis, 2003); Pankaj Merchia, M.D. (Harvard, 1998); Christopher G. Meyer, M.D. (Arizona, 2003); Lekshmi T. Nair, M.D. (Ohio State, 2003); Maxwell A. Prempeh, M.D. (Duke, 2003); Richard C. Redman, M.D. (Univ. of Washington, 2003); Nadia S. Sanford, M.D. (Med. Coll. Of Georgia, 2003); Harn-Cherng Shiue, M.D. (Texas at Dallas, 2003); Albert Y. Sun, M.D. (New Jersey, 2003); Niloufar Tabatabaei, M.D. (Utah, 2003); Christina A. Taulien, M.D. (Loyola, 2003); Lisa-Gail Thomas, M.D. (Duke, 2003); Sascha A. Tuchman, M.D. (Georgetown, 2003); Katie M. Twomley, M.D. (Duke, 2003); Richard N. Vest, M.D. (Alabama, 2003); Caroline A. Wang, M.D. (Duke, 2003); Patrick Weston, M.D. (Pittsburgh, 2003); Freddie M. Williams, M.D. (Harvard, 2003); Andrew I. Wolf, M.D. (Jefferson, 2003); Xin Yang, M.D. (Cambridge, 2001).

Junior Assistant Residents-Medicine/Pediatrics: Christopher D. Carter, M.D. (Med. Coll. Of Virginia, 2002); Reilly W. Coch, M.D. (Case Western, 2003); Matthew T. Harbison, M.D. (Texas at Houston, 2002); Kelly W. Koay, M.D. (Washington Univ., 2003); Krishelle Leong, M.D. (Case Western, 2003); Christian B. Ramers, M.D. (California at San Diego, 2003); Matthew C. Schwartz, M.D. (Hopkins, 2003); Sean P. Sharma, M.D. (Indiana, 2002); Jane V. Trinh, M.D. (Duke, 2002); .Jennifer M. Walker, M.D. (Med. Coll. Of Georgia, 2003).

Junior Assistant Residents-Medicine/Psychiatry: Xavier A. Preud'homme, M.D. (Universite Libre De Bruxelles, 1993); Sarah K. Rivelli, M.D. (Universite Libre de Bruxelles, 2001); Glen Xiong, M.D. (California, Davis, 2001).

Interns: Amer Ardati, M.D. (Michigan, 2004); Christina Barkauskas, M.D. (Duke, 2004); April Buscher, M.D. (Duke, 2004); Kevin Coleman, M.D. (Baylor, 2004); Angela Coscio, M.D. (Texas at Galveston, 2004); Matthew Crowley, M.D. (Dartmouth, 2004); Shannon Dunlay, M.D. (Iowa, 2004); Jason Eckel, M.D. (Oihio State, 2004); W. Colin Gallahan, M.D. (Virginia, 2004); Jeremy Goodwin, M.D. (Mercer, 2004); Ranjit Goudar, M.D. (Duke, 2004); Alice Gray, M.D. (Michigan, 2004); Daniel Hampton (Ohio State, 2004); Ryan Hick, M.D. (Duke, 2004); Kerry Hildreth, M.D. (Duke, 2004); Jerry Hsu, M.D. (Stanford, 2004); Melissa Huang, M.D. (Duke, 2004); Clarissa Jonas, M.D. (New York); Karen Joynt, M.D. (Duke, 2004); Amita Kamath M.D. (Duke, 2004); Amir Khan, M.D. (Arkansas, 2004); Michael Kiernan, M.D. (Connecticut, 2004); Jennifer Kraschnewski, M.D. (Wisconsin, 2004); Steve Leung, M.D. (Vanderbilt); Jason Linefsky, M.D. (Eastern Virginia, 2004); Jesse Liu, M.D. (Virginia, 2004); Emil Lou, M.D. (New York Upstate, 2004); A. Shawn Malone, M.D. (Case Western, 2004); W. Robert Mazzei, M.D. (Southern Illinois, 2004); Micah McClain, M.D. (Oklahoma, 2004); Gregory Metz, M.D. (Oklahoma, 2004); Cara O'Brien, M.D. (Washington University, 2004); John Petersen, M.D. (Florida, 2004); Angela Poppe Ries, M.D. (Duke, 2004); Vijaya Reddy, M.D. (Missouri-Kansas, 2004); Gordon Reeves, M.D. (North Carolina at Chapel Hill, 2004); John Rickard, M.D. (Georgetown, 2004); Brian Schneider, M.D. (Texas Southwestern, 2004); Meredith Sheedy, M.D. (University of Washington, 2004); Nathan Shores, M.D. (Med. Univ. of South Carolina, 2004); David Sommer, M.D. (Duke, 2004); Christopher South, M.D. (Ohio State, 2004); Michele Spencer-Manzon, M.D. (Massachusetts, 2004); F. Douglas Srygley, M.D. (Texas Southwestern, 2004); Gregg Stashenko, M.D. (Vanderbilt, 2004); Marvaretta Stevenson, M.D. (Med. Univ. of South Carolina, 2004); Rajesh Swaminathan, M.D. (Duke, 2004); Krishnakumar Udayakumar, M.D. (Duke, 2004); Anja Wagner, M.D. (Berlin, 1997); Heather Westmoreland, M.D. (Mercer, 2004); Janet Willoughby, M.D. (Vanderbilt, 2004); James Yau, M.D. (New Jersey Medical School, 2004); David Yoo, M.D. (Duke, 2004); Sunny Yung, M.D. (Alabama, 2004).

Interns-Medicine/Pediatrics: Christy Boling, M.D. (Hopkins, 2004); Carrie Herzke, M.D. (Virginia, 2004); Susan Hunt, M.D. (Michigan, 2004); Erika Lease, M.D. (University of Washington, 2004); Bijal Shah, M.D. (South Florida, 2004); Alyssa Stephany, M.D. (New York Upstate, 2004).

Interns-Medicine/Psychiatry: Christopher A. Kenedi, M.D. (Med. Coll. Of Ohio, 2003); Warren A. Kinghorn, M.D. (Harvard, 2003); Susanna L. Quasem, M.D. (Tennessee at Memphis, 2003); Joseph Zanga, M.D. (North Carolina, Chapel Hill, 2004).

Fellows: George L. Adams, M.D. (East Carolina, 2000); Timothy S.E. Albert, M.D. (California at San Francisco, 1999); Larry A. Allen, M.D. (Harvard, 2001); Srivani R. Ambati, M.D. (Univ of Health Sciences, Vijayawada, India, 1996); Ankie Marie Amos, M.D. (Duke, 2000); Albert M. Anderson, M.D. (North Carolina, 2000); Deverick J. Anderson, M.D. (Duke, 2001); Gregory B. Ang, M.D. (Hopkins, 2000); Stacy Ardoin, M.D. (Ohio 1997); Timothy Bael, M.D. (Pittsburgh, 1999); Diane Bai, M.D. (Texas Southwestern, 2000); Bryan C.

Batch, M.D. (North Carolina at Chapel Hill, 2000); Adam E. Berman, M.D. (Mississippi, 1998); James Birmingham, M.D. (Ohio State, 1998); Libbie Briley, M.D. (Duke, 1999); Rhonda B. Brosnan, M.D. (Med. Univ. of South Carolina, 1997); Paul Burke, M.D. (Rush, 2000); Brian J. Byrne, M.D. (Temple, 2001); L. Brett Caram, M.D. (Oklahoma at Tulsa, 2001); Steve S. Choi, M.D. (Flinders, 1999); Marisa D. Christensen, M.D. (Virginia, 2001); Vivian H. Chu, M.D. (Columbia, 2000); Alison S. Clay, M.D. (Chicago 1998); Timothy Collins, M.D. (Hopkins, 1994); Christopher E. Cox, M.D. (Med. Univ. of South Carolina, 1997); Anna L. Crowley, M.D. (Ohio State, 1998); Brooke Ratliff Daniel, M.D. (Tennessee, 1998); Davey Daniel, M.D. (Hopkins, 1999); Moahad Dar, M.D. (East Carolina, 1999); Nikki Daskalakis, M.D. (Pittsburgh, 2000); Fernando de la Serna, M.D. (Tucoman, Argentina, 1983); Brian Dobozi, M.D. (Loyola, 1999); Matthew Drake, M.D. (Washington Univ., 2001); Sarfraz A. K. Durrani, M.D. (Kashmir, 1992); Katja L. Elbert, M.D. (Michigan, 1999); William L. Fan, M.D. (North Carolina at Chapel Hill, 1999); Justin P. Favaro, M.D. (South Carolina, 2000); Terry A. Fortin, M.D. (Massachusetts, 1999); Camille G. Frazier, M.D. (Case Western, 1999); Melissa M. Garrett, M.D. (Virginia, 2000); Josh O. George, M.D. (Med. Coll. Of Ohio, 1999); Barbara Gillespie, M.D. (Hahnemann, 2001); Abhinav Goyal, M.D. (Northwestern, 1999); Daniel R. Guerra, M.D. (Harvard, 2001); Susan B. Gurley, M.D. (Washington Univ., 1998); Douglas W. Haden, M.D. (West Virginia, 2001); Daniel B. Haithcock, M.D. (Case Western, 2000); Abdul R. Halabi, M.D. (Montreal, 1996); Kimberly Hanson, M.D. (Northwestern, 1998); Jeremy Hardison, M.D. (Duke, 2000); Charles W. Hargett, M.D. (Virginia, 1999); Susan N. Hastings, M.D. (North Carolina at Chapel Hill, 1998); Richard J. Hatchett, M.D. (Vanderbilt, 1995); Douglas B. Hecox, M.D. (Hahnemann, 1999); Donald Hegland, M.D. (Florida, 1999); Dawn Hollins, M.D. (Wake Forest, 1997); Ian C. Horkheimer, M.D. (Wisconsin, 1999); Kim M. Huffman, M.D. (MUSC, 2000); S. David Hsu, M.D. (North Carolina at Chapel Hill, 2001); Jules Inrig, M.D. (Lona Linda, 2000); Catalina Ionita, M.D. (Craiova, 1988); Kevin P. Jackson, M.D. (Columbia, 2000); W. Schuyler W. Jones, M.D. (Arkansas, 2001); Stephen Kendall, M.D. (Albany, 1999); Richard P. Konstance, M.D. (Hahnemann, 1999); Jason I. Koontz, M.D. (Harvard, 2002); Wissam M. Kourany, M.D. (Beirut, 1998); Jean-Paul Kovalik, M.D. (Vanderbilt, 2001); Geoffrey A. Kunz, M.D. (Ohio State, 1997); Vipul T. Lakhani, M.D. (Vanderbilt, 2001); Gordon W. Lam, M.D. (Duke, 2001); Adrienne Landry, M.D. (Pittsburgh, 2001); Ngocdiep Le, M.D. (Stanford, 2000); Ruediger W. Lehrich, M.D. (Freie, 1995); Siyun Li, M.D. (Changwei, 1985); Lillian Lien, M.D. (Duke, 1999); Sauyu Lin, M.D. (Vanderbilt, 1999); William C. Logan, Jr., M.D. (North Carolina at Chapel Hill, 1992); Njira Lugogo, M.D. (Virginia, 2001); Sandra M. Malakauskas, M.D. (California at San Francisco, 2002); David W. Markham, M.D. (Emory, 1995); Maurice Markus, M.D. (Cornell, 2001); Jay R. McDonald, M.D. (Oregon Health Sciences, 1998); Heather L. McGuire, M.D. (Washington Univ., 1998); Trip J. Meine, M.D. (Duke, 1998); Carlos G. Micames, M.D. (Puerto Rico, 2000); James S. Mills, M.D. (Florida, 2000); Debashish Misra, M.D. (New Delhi, 1993); Robert G. Mitchell, M.D. (California at San Francisco, 1999); Cassandra N. Moore, M.D. (New Mexico, 1999); Michael Mugavero, M.D. (Vanderbilt, 1999); David M. Murdoch, M.D. (Med. Univ. of S.C., 1999); Marc D. Noble, (Texas at Dallas, 1999); Anthony Panettiere, M.D. (Uniformed Services, 1986); Manesh Patel, M.D. (Emory, 1997); Christian A. Perzanowski, M.D. (Pontifical Javeriana, 1997); Brian C. Pien, M.D. (Hawaii, 2000); Anil Potti, M.D. (Christian Med. Coll., 1995); Rajani Potu, M.D. (Christian Med. Coll, 1993); Patrick H. Pun, M.D. (Vanderbilt, 2001); Pablo M. Rabosto, M.D. (National Univ., 1996); Veshana S. Ramiah, M.D. (Witwatersrand, 1990); Anita Reddy, M.D. (Texas San Antonio, 2001); Cheryl A. Russo, M.D. (SUNY at Syracuse, 1998); Sith Sathornsumetee, M.D. (Mahidol, 1998); Christine N. Savage, M.D. (Maryland, 2001); Katalin Scherer, M.D. (Albert Szent-Gyorgyi, 1999); Tracy L. Setji, M.D. (Arizona, 2000); Svati H. Shah, M.D. (Washington, 1998); Hasan Shanawani, M.D. (Hopkins, 1997); Pallavi Sharma, M.D. (Patna, 1990); Rahul S. Shimpi, M.D. (North Carolina, 2001); Scott Shofer, M.D. (Boston, 2001); Jaspal Singh, M.D. (Illinois, 1999); Kanwar P. Singh, M.D. (McGill, 1999); Laurie D. Snyder, M.D. (Duke, 2000); JoEllen C. Speca, M.D. (Vermont, 2001); David E. Stickler, M.D. (West Virginia, 1999); Bundrarika Suwanawiboon, M.D. (Mahidol, 1998); Nadine D. Tanenbaum, M.D. (Miami, 1998); Teresa Tarrant, M.D. (Florida, 1999); Jennifer L. Taylor, M.D. (Duke, 1998); Kavita Thomas, M.D. (Miami, 2000); Kevin L. Thomas, M.D. (North Carolina, 1999); Trinh Tran, M.D. (University of London, 1994); Rita Tranquilli, M.D. (Illinois, 1991); Mark A. Trimble, M.D. (Oklahoma, 2001); Aslan T. Turer, M.D. (California at San Francisco, 2001); Anne Marie Valente, M.D. (Vermont, 1996); Carmel S. Verrier, M.D. (St. Louis, 2001); Tracy Y.P. Wang, M.D. (Harvard, 2001); Sam O. Wanko, M.D. (Virginia, 1997); Cary C. Ward, M.D. (Virginia, 1999); Richard E. Waters, M.D. (Vanderbilt, 1998); Matthew J. Wolf, M.D. (Washington Univ., 2000); Jonathan E. E. Yager, M.D. (Harvard, 1997); David Zaas, M.D. (Northwestern, 1998); David A. Zidar, M.D. (Duke, 1998); Frank J. Zidar, M.D. (Michigan, 1997).

DIVISION OF DERMATOLOGY

Jane S. Bellet, M.D. (Cincinnati, 2001); Vaishali G. Escaravage, M.D. (North Carolina, 2002); William Fangman, M.D. (North Carolina at Chapel Hill, 2001); Heidi Kong, M.D. (Baylor, 2001); Juan-Carlos, M.D. (Mayo, 2003); Jennifer M. Segal, M.D. (Duke, 2002); Scott H. Smith, M.D. (Harvard, 2002); Earl Stoddard, M.D. (Univ. of Washington, 2001); Joshua Tournas, M.D. (Southern California, 2003); Robert W. Walters, M.D. (Iowa, 2003).

DIVISION OF NEUROLOGY

Nuhad Abou Zeid, M.D. (Beirut, 2002); Robbie D. Buechler, M.D. (Chicago, 2001); Joseph Ferrara, M.D. (SUNY at Syracuse, 2003); Natan Khishchenko, M.D. (SUNY at Stony Brook, 2003); Bradley J. Kolls, M.D. (California at Irvine, 2001); Otakar Krcal, M.D. (Stony Brook, 2002); Fuhai Li, M.D. (Luzhou, 1986); Rukmini Menon, M.D. (Adichunchanaagiri, 2001); Paul C. Peterson, M.D. (Texas at Galveston, 1995); Andreas Runheim,

M.D. (Wake Forest, 2001); Dharmen S. Shah, M.D. (BJ Med. Coll., 1998); Khalid Tabbarah, M.D. (Beirut, 2000).

OB/GYN

Chief 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).

Senior 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).

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).

Junior Assistant Residents: Colleen Brownell (Harvard, 2001); Serina Floyd (North Carolina, 2001); John Hemmersmeir (Utah, 2001); Emily Jungheim (Loyola, 2001); Judith Lacy (Oregon, 2001); Angel Nieves (New Jersey, 2001); Michele Quinn (Duke, 2001).

Ophthalmology

Chief Resident: Sherman Reeves, M.D. (Johns Hopkins, 2001).

Residents: Saad Ahmad, M.D. (Washington Univ., 2002), Richard Awdeh, M.D. (Yale University, 2004), John Berdahl, M.D. (Mayo Medical School, 2004), Felix Chau, M.D., (University of Iowa, 2004), Janet Chieh, M.D. (Robert Wood Johnson, 2003), Annie Lee, M.D. (Washington Univ., 2004), Carrie Morris, M.D. (University of Alabama, 2003), Tamim Qaum, M.D. (Harvard, 2002), Rajeev Ramchandran, M.D. (University of Rochester, 2003), Henry Tseng, M.D. (Univ. of Pennsylvania, 2002), Adrienne Williams, M.D. (MCP Hahnemann School of Medicine, 2002), Tarra Wright, M.D. (Duke University, 2003).

Pathology

Chief Residents: John W. Turner, M.D. (Medical College of Virginia, 2002); Michael S. Waugh, M.D. (Duke, 2001)

Residents: Krystal L. Brown, M.D. (University of North Carolina, Chapel Hill, 2005l); John M. Childs, M.D. (Case Western Reserve, 2005); Jennifer H. Crow, M.D. (UMDNJ-New Jersey, 2005); Ali Khan, M.B.B.S. (Aga Khan, 2003); Maria Gallego Attis, M.D. (University of Miami, 2004); Frank Schneider, M.D. (Technische Universitat, 2003); Deborah W. Sevilla, M.D. (Eastern Virginia, 2004); Jennifer S. Warrington, M.D., Ph.D. (Tufts, 2004); M. Natalie Grunkemeier, M.D. (UCLA, 2002); Michael A. Huening, M.D., Ph.D. (UMDNJ, 2003); Ryan T. Mott, M.D. (South Florida, 2002); Teresa Tram Ngoc Pham, M.D. (Louisiana State-Shreveport, 2001); Gregory T. Ray, M.D.,(Duke, 2003), Ph.D. (Stanford, 2000); Laura E. Stewart, M.D. (Duke, 2003); Shannon J. McCall, M.D. (Duke

Fellows: Emily L. Howard, M.D.(Univ of Chicago Pritzker); Teresa Tram Ngoc Pham, M.D. (Louisiana State-Shreveport, 2001); Brian T. Pien, M.D. (Univ of Hawaii, 2000); Douglas J. Washing, M.D. (Ohio State 1998)

Pediatrics

Dennis A. Clements, M.D. (Rochester, 1973), M.P.H., Ph.D. (North Carolina, 1988, 1990), Interim Chairman.

Professors: Page A.W. Anderson, M.D. (Duke, 1963); George Bisset, III, M.D. (South Florida, 1975); Rose-Mary Boustany, M.D. (Amer. Univ. Beirut, 1979); Edward G. Buckley, M.D. (Duke, 1977); James B. Sidbury Professor Rebecca H. Buckley, M.D. (North Carolina, 1958); A. Wesley Burks, Jr., M.D. (Arkansas, 1980); Y.T. Chen, M.D. (Taiwan, 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); Samuel L. Katz Professor Michael M. Frank, M.D. (Harvard, 1960); Michael S. Freemark, M.D. (Duke, 1976); Henry S. Friedman, M.D. (SUNY-Syracuse, 1977); Ronald N. Goldberg, M.D. (California-Los Angeles, 1972); Edward C. Halperin, M.D. (Yale, 1979); Frank H. Kern, M.D. (Pennsylvania, 1982); Wilburt C. Davison Professor Thomas R. Kinney, M.D. (Duke, 1970); Margaret L. Kirby, Ph.D. (Arkansas, 1972); Joanne Kurtzberg, M.D. (New York Med. Coll., 1976); Darrell V. Lewis, Jr., M.D. (Minnesota, 1969); Martin H. Ulshen, M.D. (Rochester, 1969).

Clinical Professors: Wallace F. Berman, M.D. (Minnesota, 1969); Gail A. McGuinness, M.D. (Tufts, 1972); James A. Stockman III, M.D. (Jefferson, 1969); Norman S. Talner, M.D. (Michigan, 1949); David T.H. Tanaka, M.D. (Johns Hopkins, 1979); W. Samuel Yancy, M.D. (Duke, 1965).

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

Associate Professors: Kenneth A. Alexander, M.D. (Washington, 1989); Andrea Amalfitano, D.O., Ph.D. (Michigan State, 1990, 1989); Brenda E. Armstrong, M.D. (St. Louis, 1974); Roger C. Barr, Ph.D. (Duke, 1968); William Clayton Bordley, M.D. (Johns Hopkins, 1986); Philip P. Breitfeld, M.D. (Rochester, 1979); Ira M. Cheifetz, M.D. (Yale, 1989); Tony L. Creazzo, Ph.D. (Georgia, 1980); Coleen K. Cunningham, M.D. (SUNY, Syracuse, 1985); Sharon Freedman, M.D. (Harvard, 1985); Sridharan Gururangan, M.B.B.S. (Madras, 1981), M.R.C.P. (Royal Coll. of Physicians, 1988); Priya Kishnani, M.D., M.B.B.S. (Bombay, 1990, 1985); Jennifer Li, M.D. (Duke, 1987); John G. Looney, M.D. (Texas-Southwestern, 1969); M. Louise Markert, M.D., Ph.D. (Duke,

1982, 1991); Ross E. McKinney, Jr., M.D. (Rochester, 1979); Thomas M. Murphy, M.D. (Rochester, 1973); Neil Prose, M.D. (New York, 1975); David A. Reardon, M.D. (Tufts, 1986); Philip M. Rosoff, M.D. (Western Reserve, 1978); Laura E. Schanberg, M.D. (Duke, 1984); Scott Schulman, M.D. (George Washington, 1982); Judith A. Voynow, M.D. (Pennsylvania, 1982); Emmanuel B. Walter, M.D. (Maryland, 1983); Larry Williams, M.D. (Duke, 1977); Jo Rae Wright, Ph.D. (West Virginia, 1981); Sherri A. Zimmerman, M.D. (North Carolina, 1991).

Associate Clinical Professors: Richard Auten, M.D. (North Carolina, 1981); Jeffrey P. Baker, M.D. (Duke, 1984); Karen H. Frush, M.D. (Duke, 1986); 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); J. Marc Majure, M.D. (Mississippi, 1981); Delbert Wigfall, M.D. (Emory, 1979); Gordon Worley, M.D. (Harvard, 1973).

Assistant Professors: Daniel K. Benjamin, M.D. (Univ. Virginia, 1995); William D. Bradford, M.D. (Western Reserve, 1958); Terrill D. Bravender, M.D. (Michigan, 1992), M.P.H. (Harvard, 1999); Lisa W. Faberowski, M.D. (Ohio State, 1990); Herbert E. Fuchs, M.D., Ph.D. (Duke, 1984); Timothy M. George, M.D. (New York, 1986); Andrea M. Haqq, M.D. (Calgary, 1994); J. Rene Herlong, M.D. (Duke, 1989); Salim F. Idriss, M.D., Ph.D. (Duke, 1996, 1995); Dwight D. Koeberl, M.D. (Mayo Med. School, 1990), Ph.D. (Mayo Graduate School, 1990); Richard M. Kravitz, M.D. (Temple, 1984); Yin-Xiong Li, M.D. (Hunan Med. Univ., N/A), Ph.D. (Peking Union Med., Coll. 1991); Corinne M. Linardic, M.D., Ph.D. (Duke, 1995, 1993); Paul L. Martin, M.D., Ph.D. (Washington, 1987); Marie T. McDonald, M.D. (Trinity College, 1994); Erik N. Meyers, M.D. (California-San Diego, 1990); Vinod K. Prasad, M.D. (Lady Hardinge Med Coll., Delhi, 1986), MBBS (Maulana Azad Med. Coll., Delhi, 1981); John F. Rhodes, Jr., M.D. (Brody School of Med., 1993); Joseph L. Roberts, M.D. (Emory, 1981), Ph.D. (Duke, 1992); William J. Steinbach, M.D. (UNC, Chapel Hill, 1998); Paul Szabolcs, M.D. (Semmelweis, 1985); Robert J. Thompson, Jr., Ph.D. (North Dakota, 1971); Pedro Weisleder, M.D. (Universidad Nacional Autonoma de Mexico, 1985), Ph.D. (Univ. Washington-Seattle, 1991); Xiaoping Zhong, M.D. (First Military Med. Univ, Guangzhou, China, 1985), Ph.D. (Duke, 1997).

Assistant Clinical Professors: Piers C.A. Barker, M.D. (Cornell, 1995); Michael P. Carboni, M.D. (Northeastern Ohio Univ. Coll of Med., 1990): Jennifer K. Cheng, M.D. (Tufts, 1992); C. Michael Cotten, M.D. (Miami, 1986); Robert P. Drucker, M.D. (Duke, 1979); Laura B. Enyedi, M.D. (North Carolina, 1993); Nancy E. Friedman, M.D. (Med. Coll. of Virginia, 1975); Joseph D. Gunn, M.D. (Virginia, 1989); Susan D. Izatt, M.D. (Tufts, 1987); Peter M. Kilbridge, M.D. (Case Western Reserve, 1988); Martha Ann Keels, D.D.S., Ph.D. (North Carolina, 1984, 1990); Ave Maria Lachiewicz, M.D. (Minnesota, 1980); Elizabeth A. Landolfo, M.D. (Manitoba, 1988); Angelo S. Milazzo, Jr., M.D. (SUNY, 1996); Beatriz Morris, M.D. (Puerto Rico, 1988); John W. Moses, M.D. (Med. Univ. of South Carolina, 1983); Cynthia A. Neal, D.D.S. (North Carolina, 1996); Consuelo Diana Egla Rabinovich, M.D. (Southern Illinois, 1985), M.P.H. (North Carolina, 1991); Christine Rudd, Pharm.D. (North Carolina, 1973); Gail A. Spiridigliozzi, Ph.D. (Kansas, 1988); Deborah Squire, M.D. (Northwestern, 1978); Karen S. St. Claire, M.D. (Texas-Galveston, 1982); Suzanne Trzcinski Woods, M.D. (Med. Coll. of Ohio, Toledo, 1994).

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

Associates: Deanna W. Adkins, M.D. (Med. Coll. Georgia, 1997); Michelle L. Bailey, M.D. (SUNY, 1995); Timothy A. Driscoll, M.D. (Ohio State, 1990); Edward A. Evans, M.D. (UMDNJ, 1998); Ravi Jhaveri, M.D. (Mount Sinai, 1996); Jennifer Lawson, M.D. (Vermont, 1990); L. Scott Levin, M.D. (Temple, 1982); Laurie A. Lee, M.D. (Ohio State, 1992); Glenn T. Leonard, Jr., M.D. (St. George's Univ. School of Med, Grenada, West Indies, 1997); Aditee P. Narayan, M.D. (Duke, 2000); Thomas A. Owens, M.D. (SUNY-Buffalo, 1995); Suhag H. Parikh, M.B.B.S. (Government Med. Coll., Nagpur, India, 1988); Erica L. Peterson, M.D. (Duke, 2000); Hemant P. Sharma, M.D. (Columbia Univ Coll. Of Physicians & Surgeons, 2001); Jennifer L. Turi, M.D. (Massachusetts, 1995).

Clinical Associates: Patricia Lynn Ashley, M.D., Ph.D. (Texas-Southwestern, 1991, 1984); Joanne F. Band, M.D. (Yale, 1998); Kathleen W. Bartlett, M.D. (Duke, 2000); Myriam F. Bauer, M.D. (UNC, Chapel Hill, 2000); Margarita Bidegain, M.D. (Facultad de Medicina, Universidad de la Republica, 1984); Michael G. Camitta, M.D. (Univ. Texas Health Sci Center, San Antonio, 1996); Jennifer J. Crawford, M.D. (Duke, 1988); Jeffrey W. Delaney, M.D. (Creighton Univ, 1994); Muki W. Fairchild, M.S.W. (North Carolina, 1976); Robert D. Fitch, M.D. (Duke, 1976); Kathryn E. Gustafson, Ph.D. (Ohio, 1988); Kristina K. Hardy, Ph.D. (Duke, 2000); Carmen M. Herrera, M.D. (Chile, 1990); Edith Kocis, M.D. (NYU, 1993), MPH (Michigan, 1987); Michelle N. Kuperminc, M.D. (New York Med. Coll, Valhalla, NY, 2001); Edward F. Lueth, M.S.W. (North Carolina-Chapel Hill, 1982); William F. Malcolm, M.D. (Minnesota, 1998); Caren Mangarelli, M.D. (Illinois, 1996); Marcia Morgenlander, M.D. (Pittsburgh, 1988); Daniel A. Ostrovsky, M.D. (Univ. Massachusetts, 1999); Susan E. Owens, M.D. (SUNY-Buffalo, 1995); Sara P. Robert, M.D. (Loyola, 1999); William H. Schultz, P.A. (Duke, 1981); Jennifer W. Singleton, M.D. (Baylor, 2000); Martha A. Snyder, M.D. (Med. Coll. of Virginia, Richmond, 1999); Betty B. Staples, M.D. (Maryland, 1998); Yui-Lin Tang, M.D. (National Taiwan, 1983); A. William Taub, M.S.W. (North Carolina, 1981); Amy B. Tu, Ph.D. (Pennsylvania State, 1999).

Senior Research Scientist: Deeksha Sarihyan Bali, Ph.D. (Amritsar, 1987); Richard Neal Shepherd, Ph.D. (Duke, 1975); Robert D. Stevens, Ph.D. (London, 1969).

Research Scientists: Tirupapuliyur V. Damodaran, Ph.D. (University of Madras, India, 1990); Mary R. Hutson, Ph.D. (Medical College of Georgia, 1994); Florence G. Rothenberg, M.D. (Univ. Texas Southwestern

Medical School, 1991); Faustina N. A. Sackey, Ph.D. (Univ. Ottawa, Canada, 1995); Baodong Sun, Ph.D. (China Med. Univ., 1995); Junping Wei, M.D., MPH (Zhengzgou University, China, 1983, 1989); Sarah P. Young, Ph.D. (Inst. of Child Health, 1997); Haoyue Zhang, Ph.D. (Jilin University, China, 1989).

Research Associates: Radwan Abu-Issa, Ph.D. (Baylor, 2000); Mohamed Nagy Ahmed, M.D. (Suez Canal Univ., Egypt, 1987); Ramamani Arumugam, Ph.D. (Madras, 1998); Noah A. Byrd, Ph.D. (Wesleyan, 2002); Emil T. Chuck, Ph.D. (Case Western Reserve, 1998); Karim C. Lounes, Ph.D. (University of Rouen, France, 1999); Talal I. Mousallem, M.D. (American University of Beirut, Lebanon, 2003); Asako S. Okubo, Ph.D. (Niigata University, Japan, 2002); Laurent A. Pons, Ph.D. (Henri Poincaré University in Nancy, France, 2000); Olena A. Rusyn, M.D. (Ukrainian State Medical University, 1994), Ph.D. (Academy of Postgraduate Medical Training, Kiev, Ukraine, 1996); Lu Wang, Ph.D. (University of British Columbia, 1997); Hengtao Zhang, Ph.D. (SUNY, 2000); Shuo Zheng, Ph.D. (Cleveland State University, 2002).

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

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

Adjunct Associate Professors: Wayne M. Danker, M.D. (New York Med. Coll., 1981).

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

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

Assistant Consulting Professors: Clarence A. Bailey, M.D. (North Carolina, 1958); William L. Coleman, M.D. (New Mexico, 1979); John R. Edwards, M.D. (Univ. Florida, 1985); Alvin H. Hartness, M.D. (Bowman Gray, 1965); Cynthia R. Jackson-DiLiberti, D.O. (Univ. Osteopathic Medicine, Des Moines, 1989); Thomas M. McCutchen, Jr., M.D. (Vanderbilt, 1963); Kathy A. Merritt, M.D. (Duke, 1985); Daniel L. Moran, M.D. (Univ. Miami, 1988); John C. Pollard, M.D. (Virginia, 1968); Rupa Redding-Lallinger, M.D. (Cornell, 1980); James B. Rouse, M.D. (Duke, 1965); Leonard D. Stein, M.D. (Med. Coll. of Georgia, 1975); Fred R. Stowe, Jr., M.D. (North Carolina, 1958); Marjorie E. Tripp, M.D. (Yale, 1973).

Consulting Associates: Mark D. Baker, M.D. (Chicago, 1995); Krystal S. Bottom, M.D. (Florida, 1989); Carol A. Burk, M.D. (Pittsburgh, 1983); R. Meade Christian, Jr., M.D. (Western Reserve, 1967); Douglas W. Clark, M.D. (North Carolina, 1983); Maria Luisa Escolar, M.D. (Colombian Sch. Of Medicine, 1986); Lisa Piglia Ferrari, M.D. (Duke, 1994); Jean M. Findlay, M.B., Ch.B. (Aberdeen, 1970); Gregory A. Fisher, M.D. (South Florida, 1976); Michelle Forcier, M.D. (Connecticut, 1992), M.P.H. (North Carolina, 1997); Martha E. Gagliano, M.D. (Duke, 1982); Keith Gallaher, M.D. (Pennsylvania State, 1982); William M. Gay, M.D. (Eastern Virginia, 1980); James W. Grant, M.D. (Duke, 1979); Jeffrey D. Greene, M.D. (Duke, 1994), Ph.D. (Duke, 1992); Dana M. Hagele, M.D. (Rush, 1995), MPH (UNC Chapel Hill, 2000); 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 Sch. of Medicine, 1991); Jennifer L. Lail, M.D. (Kentucky, 1978); Charles W. Lallier, M.D. (Virginia, 1981); Stephen B. Leinenweber, M.D. (Rush, 1995); Pierre C. LeMaster, M.D. (Florida, 1971); Oveta B. McIntosh-Vick, M.D. (North Carolina, 1983); Ashok B. Mehta, M.D. (Baroda Med. Coll., 1974); Emad K. Salman, M.D. (American Univ. of Beirut, 1987); Charles A. Trant, Jr., M.D. (East Carolina, 1989).

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

Fellows: Plato J. Alexander, M.D. (Univ. Texas, Houston, 1993); Stacy P. Ardoin, M.D. (Ohio State, 1997); Evelyn M. Artz, M.D. (Louisiana State, 1998); Cindy S. Barrett, M.D. (Wake Forest, 2000); Andora L. Bass, M.D. (East Carolina, 1999); Donald T. Beam, M.D. (Louisiana State University Health Sciences Center, 1999); Pamela F. Bensimhon, M.D. (Pittsburgh, 1998); Ariana Buchanan, M.D. (Mercer Univ., 1998); Ana Del Carmen Burgos, M.D (Howard Univ., 2001); Megan Burke, M.D. (Colorado, 1999); Ivan Chinn, M.D. (Univ. Texas Southwestern, 2001); Amanda Cook, M.D. (Wake Forest, 2000); Christopher Curzon, D.O. (Kirsville Coll., 2001); Angela D'Alessandro, D.O. (Nova Southeastern Univ., 2001); Natalie E. Dixon, M.D. (Instituto de Ciencias de la Salud, 1994); Jeffrey M. Ferranti, M.D. (McGill University Faculty of Medicine, Montreal, Quebec, 2000); Marie D. Frazier, M.D. (Marshall, 2001); William B. Gallentine, D.O. (Philadelphia College of Osteopathic Medicine, 2000); Harmony P. Garges, M.D. (Duke, 1998); Todd D. Green, M.D. (Pittsburgh, 2001); David W. Hauswirth, M.D. (Medical College of Ohio, 1999); Vidya Krishnamurthy, MBBS (Kasturba Medical College, Manipal, India, 1984); Abby B. Kunz, M.D. (Duke, 2000); John Wells Logan (South Carolina, 1995); Vaishali S. Mankad, M.D. (University of Illinois, 1998); Benjamin E. Margolis, M.D. (Univ. Chicago Pritzker Coll of Med., 1993); Melissa A. Mazur, M.D. (Case Western Reserve, 2000); Sharad P. Menon, M.D. (Government Med. Coll., Nagpur, India, 1987); Timothy E. Mitchell, D.O. (Univ. of Hlth. Sci.-Kansas, 1994); Michael A. Moody, M.D. (Duke, 1999); Kricia P. Palmer, M.D. (Arkansas, 2001); Sydney P. Primis, M.D. (UNC-Chapel Hill, 2001); Shermini Saini, M.D. (Wisconsin, 2000); David Slade, M.D. (SUNY, 2000); Edward C. Smith, M.D. (Mississippi, 2002); P. Brian Smith, M.D. (Mercer, 2001); Jennifer L. Taylor, M.D. (Duke, 1998); Bhavya Trivedi, M.D., Ph.D. (Miami, 2001); Kenneth F. Tiffany, M.D. (East Carolina, 1999); Jutta Von Stieglitz, M.D., (Universitaet Hamburg, Germany, 1995); David A. Wilfret, M.D. (Univ. Florida, 2001); Angela T. Wratney, M.D. (Emory, 1998), Qing Yang, M.D.

(Third Medical Univ., China, 1983), Ph.D. (Med Coll of Ohio, 1994).

Psychiatry

Chief Residents: Christopher Aiken, M.D. (Yale, 1999); Jane Gagliardi, M.D. (Duke, 1998); Heidi Johnson, M.D. (Med. Coll. of Ohio, 1999); Edward McGonigle, M.D. (Temple, 1998); Carolyn Oates, M.D. (Vanderbilt, 1999); Eric Park, M.D. (Maryland, 1998); Victoria Payne, M.D. (Wake Forest, 1999); Joseph Sharpe, M.D. (Tennessee, 1999); Erin Silvertooth, M.D. (Texas, 1998); Michael Slifer, M.D. (Texas-San Antonio, 1999).

Fifth Year Residents: Jane Gagliardi, M.D. (Duke, 1998); Eric Park, M.D. (Maryland, 1998); Erin Silvertooth, M.D. (Texas, 1998).

Fourth Year Residents: Christopher Aiken, M.D. (Yale, 1999); Jonathan Halford, M.D. (Med. Univ. of South Carolina, 1996); Heidi Johnson, M.D. (Med. Coll. of Ohio, 1999); Patrick Keenan, M.D. (Kansas, 1995); Edward McGonigle, M.D. (Temple, 1998); Carolyn Oates, M.D. (Vanderbilt, 1999); Susan Padrino, M.D. (Maryland, 1999); Victoria Payne, M.D. (Wake Forest, 1999); Juandalyn Peters, M.D. (Miami, 1999); Joseph Sharpe, M.D. (Tennessee, 1999); Michael Slifer, M.D. (Texas, 1999); Lihui Tang, M.D., Ph.D. (Harbin Med., 1984).

Third Year Residents: Leslie Bronner, M.D., Ph.D. (Duke, 1999); Andrea Carlsen, M.D. (Vanderbilt, 1999); Sandra Carty, M.D. (Med. Coll. of Virginia, 2000); Kelly Clouse, M.D. (Iowa, 2000); Robert Guerrera, M.D. (Bologna, 1995); Elizabeth Kelly, M.D. (South Alabama, 2000); Joanne Pizzino, M.D. (Ohio State, 1982); Michelle Scargle, M.D. (Florida, 2000); Chanida Siripraparat, M.D. (Chulalongkorn, 1998); Hansen Su, M.D. (UMDNJ-R. W. Johnson, 2000); Rita Tranquilli, M.D. (Illinois, 1991); William Trost, M.D. (Med. Coll. of Wisconsin, 2000).

Second Year Residents: Thomas Conboy, M.D. (Buffalo, 2001); Harry Enderlin, M.D. (Boston, 2001); Quinne Farrington, M.D. (Eastern Virginia, 2001); Heidi Harrom, M.D. (Loma Linda, 2001); Rosario Hidalgo, M.D. (Buenos Aires, 1991); Alyson Kuroski, D.O. (Chicago Coll. of Osteopathic Med., 2001); Margaret Maytan, M.D. (UMEA, Sweden, 1996); Heath Penland, M.D. (Texas-Southwestern, 2001); Xavier Preud'homme, M.D. (Universite Libre de Bruxelles, 1993); Michael Raida, M.D. (Chicago, 2001); Sarah Rivelli, M.D. (Universite Libre de Bruxelles, 2001); Catherine Soriano, M.D. (Ohio State, 2001); Semone West, M.D. (Tufts, 2001); Glen Xiong, M.D. (California-Davis, 2001).

First Year Residents: Julie Adams, M.D. (Loma Linda, 2002); Rohan Calnaido, M.D. (Florida, 2002); Cynthia Feltner, M.D. (West Virginia, 2002); Jonas Hannestad, M.D., Ph.D. (Universidad de Oveido, Spain, 2000); Joseph Lee, M.D. (Oklahoma, 2002); Simone Litsch, M.D., Ph.D. (Albert-Ludwigs, Germany, 2001); Anandhi Narasimhan, M.B.B.S. (Sri Ramachandra Med. Coll., 2002); Peter Nicholls, M.D. (Columbia, 2002); Phillip Perez, M.D. (Case Western Reserve, 1997); Terri Randall, M.D. (George Washington, 2002); Frauke Schaefer, M.D. (Univ. of Cologne, Germany, 1999); Matthew Soulier, M.D. (Utah, 2002); Sandeep Vaishnavi, M.D., Ph.D. (Alabama, 2002);

Child Psychiatry Chief Resident: Douglas Kondo, M.D. (Utah, 1999).

Child Psychiatry Fellows: Cherry Chevy, M.D. (West Virginia, 1997); Anne Lin, M.D. (Utah, 1999); Eduardo Meza, M.D. (Cartagena, 1984); Jirpesh Patel, M.D. (BJ Med. Sch., 1993); Himabindu Ravi, M.B.B.S. (Osmania Med. Coll., 1995).

Geriatric Psychiatry Fellows: Thomas Patamia, M.D. (Georgetown, 1998); Mugdha Thakur, M.D. (Seth G.S. Med. Coll., 1994); Robert Williams, M.D. (East Carolina, 1998).

GlaxoWellcome Psychiatry Research Fellow: Kurian Abraham, M.D. (M.R. Med. Coll., India, 1983); Wei Zhang, M.D., Ph.D. (Shanghai Med., 1990).

Forensic Psychiatry Resident: Hans Stelmach, M.D. (SUNY-Buffalo, 1998).

Radiation Oncology

Chief Resident: Katie Raj, M.D. (Duke, 2001)

Residents: Junzo Cho, M.D. (Indiana, 2004); Christopher Kelsey, M.D. (Colorado, 2002), Dong Kim, M.D. (Loma Linda, 2003); Birdgeet F. Koontz, M.D. (Harvard, 2002), Jeffrey Meyer, M.D. (Chicago, 2003); Edward Miles, M.D.(Uniformed Services, 2000): John Nelson, M.D. (Uniformed Services, 1999): : David Yoo, M.D. (Duke, 2004)

Radiology

Residents: Anastacia Balius, M.D. (Duke, 2001); Garyun Blackmon, M.D. (Duke, 2001); Rebecca Borders, M.D. (Arizona, 2003); Matthew Brady, M.D. (Dartmouth, 2002); Adam Braithwaite, M.D. (New York Medical College, 2002); Jeffrey Browne, M.D. (Connecticut, 2002); Suzette Casal, M.D. (Duke, 2003); Dave Cottam, M.D. (Med. Coll. of Wisconsin, 2001); Shannon Daniels, M.D. (Duke, 2002); Courtney Coursey, M.D. (Columbia, 2003); T. Scott Dziedzic, M.D. (New York Med, 2003); Lisa El-Amin, M.D. (Pennsylvania, 2002); Michael Fisher, (Virginia, 2002); Jeff Gregg, M.D. (West Virginia, 2001); Ken Hirasaki, M.D. (Texas @ Houston, 2002); Ramsey Kilani,M.D.(Arizona,2002); Matthew Kirby, M.D. (UT Southwestern @ Dallas); Peter Kranz, M.D. (UNC, 2003); Ian Kurth, M.D. (Michigan State, 2001); Catherine Lerner, M.D. (Columbia, 2003); Val Liberace, M.D., (Temple, 2001); Shane McGonegle, M.D. (Cincinnati, 2003); Laura Meyer, M.D. (Duke, 2003); Tim Mihalovich, M.D. (Kansas, 2001; Micheal Paldino, M.D. (New York Med, 2003); David Schulz, M.D. (Michigan State, 2003); Jaime Seibel-Volkmann, M.D. (Colorado, 2002); Kush Singh, M.D. (Jefferson, 2001); Ben Smith, M.D. (Iowa, 2002); Sean Snodgress, M.D. (California-Irvine, 2002); Kevin Weber, M.D. (Cincinnati, 2001); Eric Whiting, M.D.

(Dartmouth,2001); David Williams, II, M.D. (Ohio State, 2000).

Surgery

DIVISION OF CARDIOTHORACIC SURGERY

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Cardiothoracic Fellows: William R. Burfeind, M.D. (Columbia Coll. of Physicians and Surgeons, 1994); Paul Chai, M.D. (Duke, 1994); Shu S. Lin, M.D. (Duke, 1994).

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Senior Assistant Residents: Edward Cantu, M.D. (Columbia, 2000), C. Denise Ching, M.D. (Duke, 2000), Jennifer G. Hall, M.D. (East Carolina, 2000), Steven Hanish, M.D. (Indiana, 2000); Jonathan A. Hata, M.D. (Duke, 2000), Melissa M. Poh, M.D. (Georgetown, 2000), Tanja C. Schuetz, M.D. (Med Fak Der Ludwig Maximilliams University, munchen, Bayern, 2000), Joseph W. Turek, M.D. (University of Illinois, 2002), Kelli R. Brooks, M.D. (Duke, 1999), Elizabeth S. Grubbs, M.D. (Duke, 1999); William Kendall, M.D. (Michigan, 1995); Aftab R. Kherani, M.D. (Duke, 1999); Jason A. Petrofski, M.D. (Johns Hopkins, 1999); Shiva Sarraf-Yazdi, M.D. (Duke University, 1999),Richard B. Thompson, M.D. (Columbia, 1999)

Research Fellows: Brian Lima, M.D. (Duke University, 2002), Mayur Patel, M.D. (Vanderbilt University, 2002), Rebecca A. Petersen-Prince, M.D. (Oregon Health Science University, 2002), Keshava Rajagopal, M.D. (University of Chicago Pritzker, 2002), Tamarah Westmoreland, M.D. (Brody School of Medicine, 2000), Jin Soo Yoo, M.D. (University of Virginia, 2002), James Z. Appel, M.D. (Jefferson, 2001); Matthew G. Hartwig, M.D. (Duke, 2001); Anthony Lemaire, M.D. (Yale, 2001), DuyKhanh Pham (Duke, 2001); Katherine Posther, M.D. (Duke, 2000), Jacob N. Schroder, M.D. (Georgetown, 2001)

Junior Assistant Residents: Keki Balsara, M.D. (Pennsylvania, 2003), Errol Bush, M.D. (Duke, 2003), Eugene Ceppa , M.D. (Johns Hopkins, 2003), Erich Huang, M.D. (Duke, 2003), Jeffrey Nienaber, M.D. (Nebraska, 2003), Srinevas Reddy, M.D. (Wisconsin, 2003), David Sindram, M.D. (University Leiden, Leiden, Netherlands, 2002), Christopher Tebbit, M.D. (Duke, 2001)

First Year Residents: Ana Benitez-Graham, M.D. (Duke, 2004), Mani Daneshmand, M.D. (), Sebastian de la Fuente, M.D. (University del Salvador, Buenos Aires, Argentina, 1998), Diana Diesen, M.D. (Virginia, 2004), Charan Gowda, M.D. (Duke, 2004), John Haney, M.D. (Duke, 2004), Vanessa Olcese, M.D. (Georgetown, 2004), Edward Rampersaud, M.D. (Duke, 2004), Immanuel Turner, M.D. (Wake Forest, 2004), Brian Untch, M.D. (Loyola, 2004)

Critical Care Fellow: Kumash Patel, M.D. (American Univ of the Caribbean, 1999); Endosurgical Fellow: Alison Fecher, M.D., Ketan Sheth, M.D., Ricardo Bonnor, M.D. , Transplant Fellow: Juan Palma-Vargas, M.D.

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Residents: Daniel A. Clayton (U. Colorado, 2003); Jason L. Cormier (LSUHSC, 2004); Peter M. Grossi (Duke, 2002); Ciaran J. Powers (Georgetown, 2003); Lee A. Selznick (Washington U., 2001); Keyne K. Thomas (U. Pittsburgh, 2001); Ben Waldau (Heidelberg, 2002); Lyman W. Whitlatch (Boston U., 2003).

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Residents: Samuel B. Adams, Jr., M.D. (Jefferson, 2004); Steven R. Anderson, M.D. (Wake Forest, 2002); James A. Browne, M.D. (Johns Hopkins, 2004); Joshua T. Carothers, M.D. (Cincinnati, 2002); Christopher M. Danney, M.D. (UT Houston, 2003); Samuel M. Davis, M.D. (Wake Forest, 2005); Michael S. Ferrell, M.D. (Med. Coll. VA, 2002); Grant E. Garrigues, M.D. (Harvard, 2005); Trevor R. Gaskill, M.D. (Kansas, 2005); Brett J. Gilbert, M.D. (Duke, 2003); Jeffrey T. Hodrick, M.D. (Penn State, 2002); Jason M. Hurst, M.D. (Georgetown, 2003); Wayne Kelley, Jr., M.D. (South Carolina, 2005); Brian A. Krenzel, MD. (Louisville, 2003); Robert K. Lark, M.D. (UNC, 2004); Connor R. LaRose, M.D. (Cincinnati, 2005); Milford H. Marchant, Jr., M.D. (Maryland, 2003); R. Charles Mather, III, M.D. (Duke, 2005); Daniel E. McBrayer, Jr., M.D. (Georgia, 2002); Michael J. Morris, M.D. (Jefferson, 2004); Diane E. Payne, M.D. (Kansas, 2004); Trevor R. Pickering, M.D. (Duke, 2002); Vani J. Sabesan, M.D. (Indiana, 2004); Jonathan R. Snyder, M.D. (Wake Forest, 2004); John M. Solic, M.D. (Pittsburgh, 2005); Thomas H. Vikoren, M.D. (Pittsburgh, 2002); David W. Wang, M.D. (Duke, 2003); Samuel S. Wellman, M.D. (Duke, 2002); M. Quinn Wickham, M.D. (Duke, 2003); S. Clifton Willimon, M.D. (Emory, 2005); Joseph B. Wilson, M.D. (Maryland, 2000); Jocelyn R. Wittstein, M.D. (Brody, 2004).

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DIVISION OF ORTHOPAEDIC SURGERY

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Residents: Samuel B. Adams, Jr., M.D. (Jefferson, 2004); Steven R. Anderson, M.D. (Wake Forest, 2002); James A. Browne, M.D. (Johns Hopkins, 2004); Joshua T. Carothers, M.D. (Cincinnati, 2002); Christopher M. Danney, M.D. (UT Houston, 2003); Samuel M. Davis, M.D. (Wake Forest, 2005); Michael S. Ferrell, M.D. (Med. Coll. VA, 2002); Grant E. Garrigues, M.D. (Harvard, 2005); Trevor R. Gaskill, M.D. (Kansas, 2005); Brett J. Gilbert, M.D. (Duke, 2003); Jeffrey T. Hodrick, M.D. (Penn State, 2002); Jason M. Hurst, M.D. (Georgetown, 2003); Wayne Kelley, Jr., M.D. (South Carolina, 2005); Brian A. Krenzel, MD. (Louisville, 2003); Robert K. Lark, M.D. (UNC, 2004); Connor R. LaRose, M.D. (Cincinnati, 2005); Milford H. Marchant, Jr., M.D. (Maryland, 2003); R. Charles Mather, III, M.D. (Duke, 2005); Daniel E. McBrayer, Jr., M.D. (Georgia, 2002); Michael J. Morris, M.D. (Jefferson, 2004); Diane E. Payne, M.D. (Kansas, 2004); Trevor R. Pickering, M.D. (Duke, 2002); Vani J. Sabesan, M.D. (Indiana, 2004); Jonathan R. Snyder, M.D. (Wake Forest, 2004); John M. Solic, M.D. (Pittsburgh, 2005); Thomas H. Vikoren, M.D. (Pittsburgh, 2002); David W. Wang, M.D. (Duke, 2003); Samuel S. Wellman, M.D. (Duke, 2002); M. Quinn Wickham, M.D. (Duke, 2003); S. Clifton Willimon, M.D. (Emory, 2005); Joseph B. Wilson, M.D. (Maryland, 2000); Jocelyn R. Wittstein, M.D. (Brody, 2004).

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Assistant Residents: Anthony Bruno, M.D. (Creighton University, 1998); Stephen Kovach, M.D. (George Washington University, 1997); Karl Schwarz, M.D. (University of Western Ontario, 1997); Brian Coan, M.D. (University of Chicago, 2000); Howard Levinson, M.D. (The University of Texas Medical Branch at Galveston, 1997); Kurtis Moyer, M.D. (Penn State College of Medicine, 1998).

DIVISION OF THORACIC SURGERY

Thoracic Residents: Biswas, Shankha, M.D. (Duke University, 1996); Shari Meyerson, M.D. (University of Chicago, 1996); David C. White, M.D. (University of Virginia, 1996); B. Zane Atkins, M.D. (Duke University, 1995); Sitaram Emani, M.D. (Harvard, 1997); Mark W. Onaitis, M.D. (Duke University, 1997); Jeffrey Gaca, M.D. (Columbia, 1998); Cyrus Parsa, M.D. (Albany Medical College, 1998);

Betty Tong, M.D. (Duke University, 1999).

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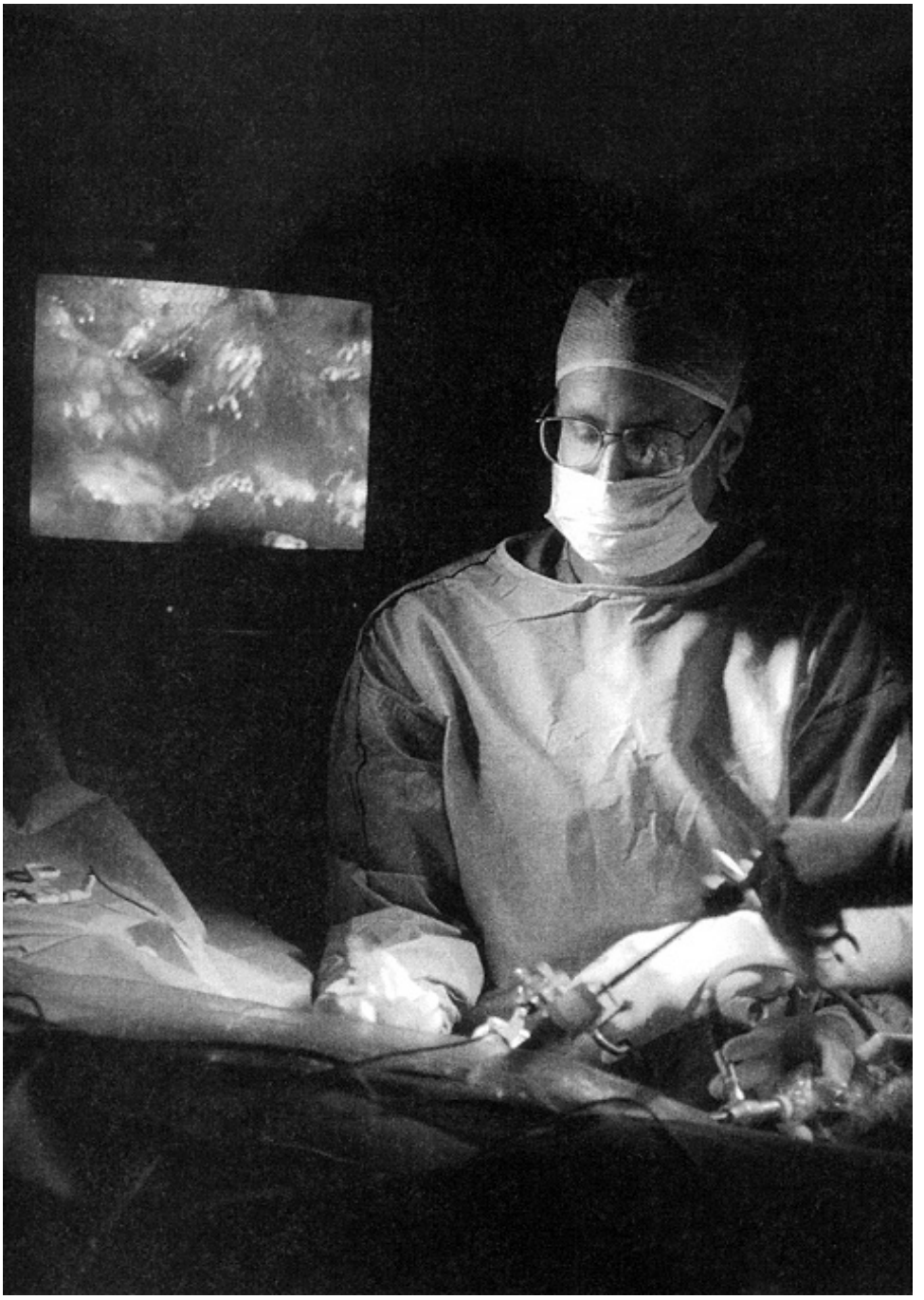
Continuing Medical Education



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