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*bulletin of*  
**Duke University**  
**2000-2001**

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*Medical Center*



## **The Mission of Duke University**

The founding Indenture of Duke University directed the members of the university to "develop our resources, increase our wisdom, and promote human happiness."

To these ends, the mission of Duke University is to provide a superior liberal education to undergraduate students, attending not only to their intellectual growth but also to their development as adults committed to high ethical standards and full participation as leaders in their communities; to prepare future members of the learned professions for lives of skilled and ethical service by providing excellent graduate and professional education; to advance the frontiers of knowledge and contribute boldly to the international community of scholarship; to foster health and well-being through medical research and patient care; and to promote a sincere spirit of tolerance, a sense of the obligations and rewards of citizenship, and a commitment to learning, freedom, and truth.

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

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Duke Medical Center Communications Office

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

The information in the bulletin applies to the academic year 2000-2001 and is accurate and current, to the best of our knowledge, as of February, 1999. 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.

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

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

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# University Administration

## GENERAL ADMINISTRATION

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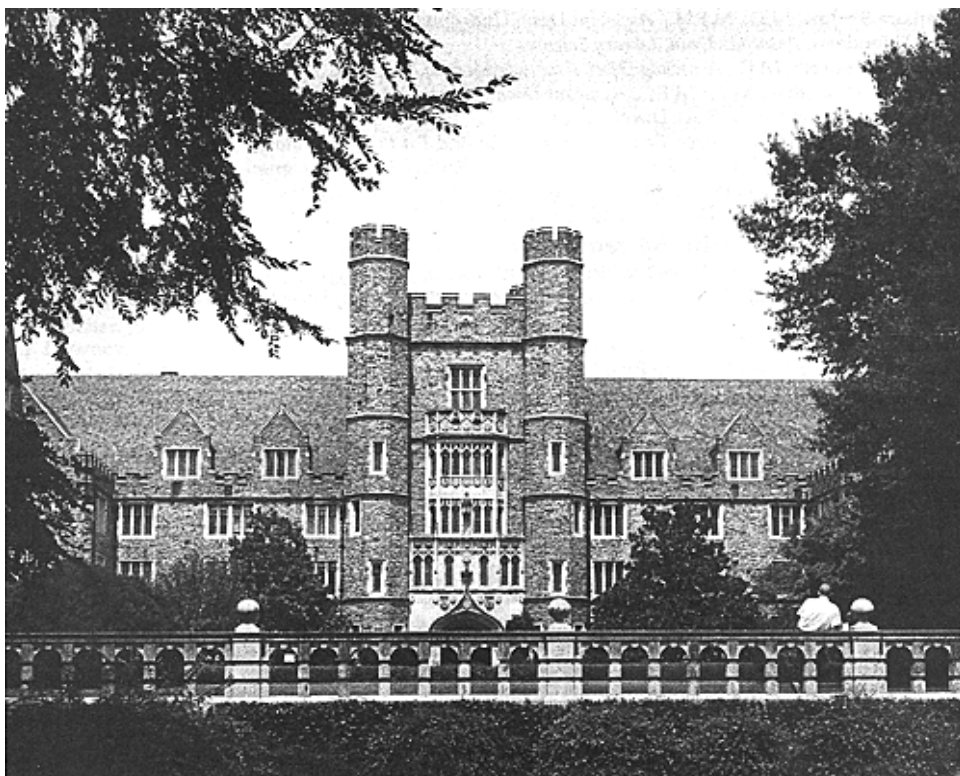
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Joseph Green, Ph.D., *Associate Dean, Continuing Medical Education*  
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Pat Thibodeau, *Associate Dean, Library Sciences*  
John L. Weinerth, M.D., *Associate Dean, Graduate Medical Education*  
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Carol G. Reilly, B.S., *Manager, Thomas D. Kinney Central Teaching Laboratory*  
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Justine Strand, M.P.H., PA-C, *Division Chief, Physician Assistant Education*  
Mary T. Champagne, Ph.D., *Dean, School of Nursing*

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Gary L. Stiles, M.D., *Vice-President and Chief Medical Officer*  
Kenneth C. Morris, M.P.A., *Vice-President and Chief Financial Officer*

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W. C. Budzinski, M.B.A., *Assistant Dean, Business and Finance*  
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Wayne Thompson, M.S.W., *Director, Office of Admissions and Student Services*  
Izy L. Obi, *Clinical Site Coordinator*

# Standing Committees of the Medical Center Academic Administration

## Admissions Medical School

Brenda Armstrong, M.D., *Chair*; Drs. Abou-Donia, W. B. Anderson, Augustine, Bradford, Bressler, Butterly, Campbell, J. Dawson, Drucker, Eck, Fridovich, Fuchs, George, Hahn, Halperin, Hanson, Harmel, Hardenbergh, C. Haynes, Herndon, Hershfield, Jackson, Kaprielian, King, Kravitz, Kraus, Krystal, Kudler, Mallon, Mannon, A. Meyer, Michener, Montana, Moon, Opara, Puckett, Reves, Rourk, Schanberg, D. Scott, Stein, Stolp, Swaim, Waite, Walls, Ward, J. Weinberg, E. Wright, C. Young, Yowell; Ms. Hendrix; Administrative Assistant: Ms. Franklin; Student Representatives: Messrs. Hsu, Murray, Richmond, Scannell; Mses. Kukes, McIntire, Minter, and Sarvis.

## Audit and Tissue

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

## Basic Science Appointments, Promotion, and Tenure

K. V. Rajagopalan, Ph.D., *Chair*; Drs. Caron, Cullen, Hylander, Kuhn, McClay, Simon; Dr. Hammes, *ex officio*.

## Basic Science Faculty Steering

Drs. L. Davis, J. Dawson, Graham, B. Hall, Kreuzer, McIntosh, Maas, Schwartz, and Swenson.

## Brain Death

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

## Clinical Cancer Education Program

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

## Clinical Sciences Appointments, Promotions, and Tenure

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## Clinical Science Faculty Council on Academic Affairs

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## Financial Aid

Stacey R. McCorison, M.B.A., *Chair*; Drs. Armstrong and Kaufman; Ms. Franklin; Student Representatives: Mr. Jeremy Hardison; and three OSR representatives.

## Hospital Ethics

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## Hospital Infection Control

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Anderson, Bonaventura, Borrás, Collins, Crowder, Dennis, R. Erickson, Feldman, Glander, Glower, Golding, Hawkins, Hershfield, Kaufman, Kirby-Smith, Klopfer, Levin, Linney, Lysterly, McCarty, McClay, McClellan-Green, McKay, Mills, Rahija, Reimer, Reynolds, Saling, Schomberg, Simpson, Steenbergen, Sullivan, Vaslef, Vigna, Williams, Ms. Howard, deGuehery, Dillon, Lundberg, Milich, and Sigman-Hendricks; Messrs. Gustafson, and McCaughan.

### **Institutional Biosafety Committee**

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### **Institutional Committee for Graduate Medical Education**

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### **Institutional Review Board for Clinical Investigations**

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### **Medical Center Safety Committee**

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### **Medical Student Research Scholarship**

Wendell Rosse, M.D., *Chair*; Drs. Anderson, Bastia, Kaufman, N. Kredich, Lowe, Mills, Pizzo, Reedy, and Williams.

### **Merit Awards**

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

### **Minority Affairs Committee for Undergraduate Medical Education**

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### **Misconduct in Research**

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

### **North Carolina Residence**

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### **Operations Committee for Undergraduate Medical Education**

Russel Kaufman, M.D., *Chair*; Drs. Anderson, Armstrong, Carter, Dawson, Gianturco, Haynes, Kredich, Petrusa, Puckett; Student Representatives: Clara Scott, Aerlyn Dawn; Ms. McCorison, Reilly and Sider.

### **Pediatric Brain Death**

Drs. Barnes, Boustany, DeLong, Lewis, and Morse.

### **Pharmacy and Therapeutics**

Peter S. Kussin, M.D., *Chair*; Drs. De La Paz, D'Ercole, Gianturco, Ginsberg, Hamilton, Hurwitz, Killam, Kurtzberg, Leight, Munoz, Patterson, Perfect, Rudd, and Serraf; Ms. Crouch, Hendrix, and

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### **Primary Care Committee for Undergraduate Medical Education**

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### **Senior Scholarships**

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### **Study Away**

Deborah W. Kredich, M.D., *Chair*; Drs. Gianturco, Kaufman, and Puckett; Ms. McCorison.

### **Undergraduate Medical Education – Curriculum**

Caroline Haynes, M.D., Ph.D. and J. Victor Nadler, Ph.D., *Co-chairs*; Drs. N. Anderson, Bradford, Cant, Cartmill, Corless, Dawson, Drucker, Ellinwood, Feinglos, Fitzpatrick, Fortney, Glower, Halperin, Hoffman, Hylander, G.A. Johnson, V. Kaprielian, K. King, Kuhn, McElhaney, McIntosh, Michener, Mitchell, Morgenlander, Neelon, Nevins, Petrusa, Rajagopalan, K. Reimer, B. Sheline, Sladen, Steenbergen, Strauss, Vigna, Ward, Wilkinson, and Wong; Student Representative: Mr. Gamard; Drs. HKaufman, Holmes, and Sebastian, Snyderman; Ms. Feinglos, Ms. McCorison, and Reilly, *ex officio*.

### **Veterans Administration Research and Development**

Jonathan A. Cohn, M.D., *Chair*; B. Thorne, *Program Assistant*; Drs. Annex, Dunn, Edelman, Madison, Mannon, McCarthy, and Wilson; Drs. Freeman, Olson, Phaup, Shelburne, and Young, *ex officio*.

### **Veterans Administration, Dean's**

Ralph Snyderman, M.D., *Chair*; Barton Haynes, M.D., *Vice-chair*; Drs. R. Anderson, Cohen, Corless, Epstein, Feussner, Frances, Grant, Halperin, Hammes, Kaufman, Newcomb, Pizzo, Ravin, Reves, Rotman, Scott, and Yarger; Ms. Bumgarten; Mr. Donelan.

## *General Information*



## History

I have selected Duke University as one of the principal objects of this trust because I recognize that education, when conducted along sane and practical, as opposed to dogmatic and theoretical, lines is, next to religion, the greatest civilizing influence.

I have selected hospitals as another of the principal objects of this trust because I recognize that they have become indispensable institutions, not only by way of ministering to the comfort of the sick, but in increasing the efficiency of mankind and prolonging human life.

*James Buchanan Duke, Indenture of the Duke Endowment, 1924*

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

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

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

Building on this heritage, Duke University Medical Center has grown and expanded over the years and now ranks as one of the world's outstanding health care centers. In education, its innovative medical curriculum features a generous measure of elective courses in the belief that all health professionals must be prepared for a lifetime of self education. The scientific grounding for that education is provided through participation in a wide variety of ongoing research programs. Now located in facilities

opened in 1980 and since expanded several times, Duke University Hospital draws patients from across the Carolinas, the Southeast, and much of the United States for diagnosis and treatment. In both basic and clinical research, Duke University Medical Center has grown into a premier biomedical research institution and is consistently one of the largest recipients of funding from the National Institutes of Health.

Today, in an era of rapid and substantial change in health care, Duke University Medical Center is evolving into an even broader health care institution, one that will be a model for health care in the twenty-first century. Rather than being a traditional academic medical center where patients are referred almost exclusively for specialty care, Duke is now building an integrated system of health care providers. This new Duke University Health System is composed of Duke Hospital and Clinics; Durham Regional Hospital; Raleigh Community Hospital; Triangle Hospice; WellPath, a joint venture managed care company; Chartwell Southeast, a home health agency; Duke University Affiliated Physicians, Inc.; and many other strategic relationships and programs.

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

## Medical Center Buildings and Facilities

The eighty-seven buildings and additions which make up the medical education, research, and patient care facilities are located on approximately 200 acres on the West Campus of the university.

The Clinic Zone is contiguous with the main quadrangle of the university and consists of the following: *Duke Clinic*—Ten contiguous buildings, including: *Clinic Reception Building*—Entrance lobby, clinics, food court and amphitheater. *Edwin A. Morris Building*—Clinics, diagnostic, treatment and support services, Department of Radiation Oncology administration, departmental research laboratories and offices. *Davison Building*—Department of Pathology administration, research laboratories and offices, Central Teaching Facility, Division of Audiovisual Education, Medical Center Administration, and School of Medicine Administration. *Original Hospital, 1940 and 1957 Additions*—Clinics, diagnostic, treatment, and support services including: Clinical Laboratories, Physical Therapy, Pharmacy, departmental offices, Medical School Admissions, Registrar, Financial Aid, and Central Teaching facilities. *Baker House*—Department of Obstetrics and Gynecology administration, clinics, diagnostic, treatment and support services including: Speech and Hearing, Oral Surgery, Pastoral Care and Counseling, and departmental offices. *Barnes Woodhall Building*—Psychiatry inpatient care unit, diagnostic, treatment, and support services, Radiology, departmental research laboratories and offices, and Hospital administration. *Diagnostic and Treatment Building*—Clinics, diagnostic, treatment, and support services, departmental research laboratories and offices. *Ewald W. Busse Building*—Center for the Study of Aging and Human Development, diagnostic, treatment, and support services, department research laboratories and offices. *Eugene A. Stead Building*—General Clinical Research Center (Rankin), departmental research laboratories and offices. *Clinical Research II*—Department of Psychiatry administration, departmental research laboratories and offices, hyperbaric medicine unit. Other buildings within the Clinic zone include the *Bell Building*—offices for the Departments of Surgery, Pediatrics, Radiology, Obstetrics and Gynecology, and Psychiatry, Medical Center Information Systems (MCIS), Gross Anatomy laboratories, and Brain Imaging and Analysis administration and research. *Marshall Pickens Building*—Clinics, Student Health Services, Employee Health Services and *Parking Garage I*.

The Hospital Zone consists of the following buildings: *Duke Hospital (Anlyan Tower and Ancillary Building)*—Inpatient care units, diagnostic, treatment and support services including surgical suite, cath labs, Emergency Department, Labor and Delivery suite, Operating and Recovery Suite, Full-Term Nursery, Radiology, Clinical Laboratories, Respiratory Therapy, Pharmacy, the Departments of Anesthesiology, Medicine, Pediatrics, Radiology, Surgery administration, Cardiology Division offices, and Brain Imaging and Analysis research. *Joseph A. C. Wadsworth Building (Eye Center)*—Department of Ophthalmology administration, clinic, diagnostic, treatment and support services including: operating rooms, recovery, research laboratories and offices. *Civitan Building and Child Development Center*—Clinics, laboratories, and offices for the Departments of Pediatrics and Psychiatry. *Hanes House and Nursing School Addition*—Physician Assistant Program, Clinical Research Program, Community and Family Medicine administrative and departmental offices, and School of Nursing administrative and departmental offices, Hospital Education and teaching facilities. *Seeley G. Mudd Communications and Library*—Medical Center Library, Offices of Communications, Office of Grants and Contracts, Medical Center Commons, and the Searle Center for Continuing Education. *Parking Garage II*—House Staff and Student Exercise Facility, Traffic & Parking office and Pathology laboratories.

The Research Zone consists of the following: *Joseph and Kathleen Bryan Research Building for Neurobiology*—Department of Neurobiology administration, Alzheimer's Disease Research Center, Pharmacology and Neurobiology departmental research laboratories and offices. *Nanaline H. Duke Medical Sciences Building*—Departments of Biochemistry and Cell Biology administration, departmental research laboratories and offices. *Alex H. Sands Medical Sciences Building*—Departments of Anesthesiology, Biological Anthropology and Anatomy, Cell Biology, Obstetrics and Gynecology, Ophthalmology, Medicine and Psychiatry research laboratories and offices. *Edwin L. Jones Basic Cancer Research Building*—Departments of Immunology and Microbiology administration, departmental research laboratories and offices. *Medical Sciences Research Building*—Comprehensive Cancer Center administration, Departments of Medicine, Obstetrics and Gynecology, Ophthalmology, Pathology, Pediatrics, Radiology, Radiation Oncology, Surgery and Cancer Center research laboratories and offices. *Clinical and Research Laboratory Building*—Department of Genetics administration, Howard Hughes Medical Institute, Departments of Cell Biology, Genetics, Medicine and Psychiatry research laboratories and offices. *Leon Levine Science Research Center*—Department of Pharmacology and Cancer Biology administration, research laboratories, and offices. *Surgical Oncology Research Building, Environmental Safety Building, Research Park Buildings I, II, III and IV*—Departments of Anesthesiology, Medicine, Pathology, Pediatrics, Radiology, Radiation Oncology and Surgery, research laboratories, offices and hospital clinic laboratories. *Vivarium*—Division of Laboratory Animal Resources and laboratory animal care facilities. *Cancer Center Isolation Facility*—Special containment facility for cancer research.

The West Zone consists of the *Lenox Baker Children's Hospital*—Children's rehabilitation, clinics, diagnostic, treatment and support services and departmental offices. *Dialysis Center*—Treatment facility. *Center for Living Campus*—four buildings including: *Sarah Stedman Nutrition Center*—Department of Medicine research laboratories and offices. *Andrew Wallace Clinic Building*—Clinics, diagnostic, treatment and support services and departmental offices. *Pepsico Fitness Center*—Exercise facilities including indoor track, exercise equipment, swimming pool. *Aesthetic Services and Dermatologic Surgery Clinic*—clinics, diagnostic treatment and support services and CFL administrative offices.

The North Campus Zone consists of the following buildings: *North Pavilion*—Ambulatory Surgery center, Adult and Pediatric Bone Marrow Transplant, Duke Clinical Research Institute (DCRI), Anesthesiology offices, Office of the University Counsel, and the Office of Continuing Medical Education. *Parking Garage III*, and *Elba and Elder Street Buildings*—Diagnostic and treatment services, offices for the

Departments of Pathology, Psychiatry and Medicine, the Center for the Study of Aging, Procurement Services, Hospital Emergency Services, Occupational and Environmental Safety, Medical Center Engineering and Operations, and the Academic Medical Center Consortium.

## Resources for Study

The goal of Duke University Medical Center is to provide leadership in fulfilling its core missions which are:

To provide the most advanced and comprehensive education possible; to prepare our students and trainees for lifetimes of learning and careers as leaders, practitioners, or researchers;

To perform biomedical research producing discoveries that add to understanding life processes and lead to preventing and curing disease and maintaining health;

To translate, to practice, and to make available to the public, with compassion, the benefits of the unique clinical and technological resources of the Medical Center and to support our educational and research missions.

To the maximum extent possible, we will apply our core missions in education, research, and health care delivery to develop the means to solve regional and national health care problems, including providing accessible, cost-effective health care of measurable quality.

**Library.** The Medical Center Library is located in the Seeley G. Mudd Building, midway between Duke Hospital and Duke Clinics.

The Medical Center Library attempts to provide informational services and collections necessary to further educational research, and clinical activities in the health sciences. The collection of approximately 290,000 volumes and 2,250 current journal subscriptions is freely available for use by Medical Center students and personnel; study accommodations for 500 readers includes extensive provisions for audiovisual and computer-assisted learning. The library also includes the Trent Collection which is unsurpassed in the southeast as a resource for study of the history of medicine. Traditional reference services are supplemented by mediated and self-service access to many computerized databases including MEDLINE and CURRENT CONTENTS.

The Medical Library Education Center (MLEC) opened in October 1995. It includes an electronic classroom, multimedia area, and help desk.

The Medical Center Library is open at the following times: Monday-Friday, 8:00 a.m.-midnight; Saturday, 10:00 a.m.-6:00 p.m.; Sunday, 12:00 noon-midnight. Summer and holiday hours are as announced.

Director: Patricia L. Thibodeau, M.L.S., M.B.A. (Rhode Island, 1976), (Western Carolina University, 1991); Head, Public Services: Eric D. Albright, M.A. (Chicago, 1990); Curator, Historical Collections: Suzanne Porter, M.L.S. (Columbia, 1966).

**Bookstore.** The Medical Center Bookstore offers a wide selection of medical reference books, textbooks, software, and instruments to the Duke University Medical Community. Clothing, including scrubs and uniforms, office supplies, and Duke gifts are also offered. Special orders are welcomed. The store is located in the Facilities Building adjacent to the PRT walkway between Duke Hospital North and Duke Hospital South and is open Monday through Friday from 8:30 a.m.-5:30 p.m., and Saturdays from 10:00 a.m.-4:00 p.m. The telephone number is 684-2717.

**Searle Conference Center.** The Searle Conference Center for Continuing Education in the Health Sciences provides elegant accommodations for conferences, symposia, lectures, and meetings to support the continuing education activities of the Medical Center and university. Additionally, banquet, dinners, weddings, receptions, and other private events may be held on a space available basis. Meeting space, audiovisual needs, catering, and assistance with event planning are all provided by the on-site staff. Please call 684-2244.

Director: 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, and reservations (684-5805), the Commons is located in the Searle Conference Center on the ground floor of the Seeley Mudd Building. The restaurant features gourmet salads, homemade soups, carved meats, hot entrees, and weekly specials. Prices range from \$6 to \$9. Private dining rooms are available as well as morning, evening, or weekend meeting and catering space. For additional information on these services, please call 684-2244.

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

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

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

*The DOSSIER Project.* Funding from the U.S. Department of Education supports a three year project to develop and test the feasibility of using educational contributions dossiers of faculty in medical education. Duke has already endorsed educational contributions as valid evidence on which to justify promotion by establishing new criteria for tenure and non-tenure positions.

*1st Year — Intro to Clinical Care.* Amalgamated Clinical Arts, Human Behavior, and Introduction to Clinical Medicine along with new topics such as health care policy and financing, nutrition, medical ethics, patients' end of life issues, and women's health issues. OMERD collaborated with clinical faculty in the development of course segments, educational guidelines for small group and clinical activities, use of laptop computers, formative and summative evaluation.

*2nd Year — Medical Practice and Health Care Systems.* OMERD was central in the development of this innovative clerkship that provides medical students with the opportunity to learn about health care policy, financing and the impact of economics on individual patients and the health care system. OMERD participates in the administration of CEC.

Director: Emil R. Petrusa, Ph.D.

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

Six unit laboratories, each accommodating sixteen to eighteen students, are devoted to instruction for the first year. All first year medical students are given space (which



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

Services provided by the Central Teaching Laboratory include in-house microscope cleaning and repair, exam grading, grade book maintenance, and course evaluation tabulation and reporting. Laptop imaging and support for medical students and physical therapy students are handled through Central Teaching. Room scheduling responsibility also includes two large conference rooms in South Hospital for groups of 70 to 90 persons.

Manager: Carol G. Reilly, B.S.

**Division of Educational Media Services.** As a Medical Center core technology support group, the Division of Educational Media Services has a mission to provide total media support to the teaching, research, patient care, and service missions of the university and Medical Center.

The Medical Art Section provides illustrations produced by various computer graphics and manual art production methods and techniques. Services rendered include surgical and anatomic drawings, schematic and mechanical drawings, diagrams, charts, graphs, designs, lettering, calligraphy, signs, websites, and poster exhibits, as well as other forms of illustrations.

The Medical Photography Facility is staffed and equipped to provide a full range of photographic 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. Black-and-white and color prints for publication, display, and poster session purposes are available also. Other services include daily processing of color prints and of Ektachrome slide film, location photography, and passport and application prints. An extensive computer graphics slide and print imaging service is offered for faculty and staff who create graphics on desktop computer systems.

The Instructional Television section also supports teaching, research, and patient-care programs of the Medical Center. Betacam SP and one-half inch VHS video formats are used for color recording of staff and patient education programs, lecture presentations, and surgical procedures as part of staff professional education. Other services include fully scripted videotape productions for promotional or informational uses, instructional design, and computer-based training. Audiotape services, projection services, and equipment rental are available.

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

Director: Thomas P. Hurtgen, M.B.A.

**Duke Hospital.** Duke Hospital, one of the largest private hospitals in the South, is part of Duke University Health System and currently is licensed for 1,124 beds. The hospital directs its efforts toward the three goals of expert patient care, professional education, and service to the community. It offers patients comprehensive diagnostic and treatment facilities and special acute care and intensive nursing units for seriously ill pa-

tients. More than 38,000+ patients are admitted annually. Surgical facilities include thirty-five inpatient operating rooms and eight ambulatory surgery rooms in which surgeons perform more than 27,000+ operative procedures annually. Approximately 3,000 babies are born each year in the delivery suite. Other special facilities for patients include a heart catheterization laboratory, hemodialysis unit, cancer research unit, medical and surgical intensive care units, hyperbaric oxygenation chamber, and cardiac care unit.

Duke's Home Care, Hospice and Infusion Services provide opportunities for continued care of patients after they leave Duke Hospital.

Ambulatory services include the outpatient clinics, ambulatory surgery, the employee health service, and the emergency department, with annual total patient visits of more than approximately 1,200,000. The clinical faculty of the Duke University School of Medicine participate in undergraduate and graduate medical education and practice medicine in the hospital and in the private diagnostic clinics.

Duke Hospital, with a house staff of approximately 800 is approved for residency training by the American Medical Association, The Accreditation Council for Graduate Medical Education, and is accredited with commendation by the Joint Commission on Accreditation of Healthcare Organizations.

**Veterans Administration Medical Center.** The Durham Veterans Administration Medical Center, with 435 beds, annually admits over 7,000 patients. The hospital is within walking distance from the School of Medicine and has closely integrated teaching and training programs for medical students and house staff. These programs are provided by the full-time professional staff who are members of the faculty of Duke University School of Medicine.

**Lenox Baker Children's Hospital.** On November 1, 1987 the Lenox Baker Children's Hospital became a part of Duke University Medical Center, entering a new phase in its development as an orthopaedic and rehabilitation outpatient center for the children of North Carolina. A full spectrum of outpatient orthopaedic and rehabilitation services is offered to identify and meet realistic goals and to educate, support, and assist families, schools, and communities in providing a rich environment for disabled children.

**Durham Regional Hospital.** On July 1, 1998, Durham Regional Hospital became a part of the Duke University Health System through a lease agreement with the County to operate the facility. Durham Regional Hospital is a 451-bed, general, short-term care community facility serving the residents of Durham and surrounding counties. This institution participates in many of the medical and health-related professional training experiences.

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

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

**Other Hospitals.** Various cooperative teaching and training programs are available for medical and allied health professional students and house staff at other hospitals including Asheville Veterans Administration Medical Center in Buncombe County, John Umstead Hospital in Butner, Fayetteville Area Health Education Center in Fayetteville, and Cabarrus Memorial Hospital in Concord, North Carolina.

# Student Life

## THE UNIVERSITY

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

Durham, with a population of 148,000, is in the Piedmont region of North Carolina and has easy access to the sea coast and mountains. It is one of the three cities bounding the Research Triangle Park where numerous private research laboratories and governmental agencies are located. Duke University is twenty-five miles from North Carolina State University in Raleigh, eight miles from the University of North Carolina at Chapel Hill, and is in the same city as North Carolina Central University.

## CONDUCT OF STUDENTS

Duke University expects and requires of all its students cooperation in developing and maintaining high standards of scholarship and conduct.

All students are subject to the rules and regulations of the university which are currently in effect or which, from time to time, are put into effect by the appropriate authorities of the university.

Any student, in accepting admission, indicates the willingness to subscribe to and be governed by these rules and regulations and acknowledges the right of the university to take such disciplinary action, including suspension and/or expulsion, as may be deemed appropriate for failure to abide by such rules and regulations or for conduct adjudged unsatisfactory or detrimental to the university.

## LIVING ACCOMMODATIONS

Duke University has two apartment facilities on campus. One is dedicated solely to graduate and professional students (Town House Apartments) and the other is a subset of the undergraduate housing on Central Campus. The apartments are available for either continuous or academic term occupancy, are fully furnished and wired for cable, telephone and DukeNet. Floor plans and furnishing lists are sent out in the housing application packet or an application may be found on the Housing Management website at <http://www.housing.duke.edu>.

The **Town House Apartments** are located approximately 3 blocks from the main East-West Campus bus line. These apartments are more spacious than other apartments on campus. Because of its location, residents find that these apartments offer more privacy and a change from the routine campus life and activities.

Each air-conditioned apartment includes a living room, a master bedroom, a second bedroom, a bath and a half and an all electric kitchen with dining room. Spacious closets and storage space are provided within each apartment. A swimming pool, located in the center of the complex, is open during the late spring and throughout the summer months.

All utilities— water, heat, air-conditioning, gas and electricity— are provided. Residents must make arrangements with Duke University OIT Residential Services to connect cable, voice and data services.

A portion of the **Central Campus Apartments** complex is set aside for graduate and professional students. Air-conditioned efficiency, two-bedroom and three-bedroom apartments are rented to students. Efficiency units are very limited in number and are generally not available to new students. All utilities— water, heat, and electricity— are provided. Telephone, cable and data jacks are provided in each apartment. Residents must make arrangements with Duke University OIT Residential Services to connect cable, voice and data services.

**Both facilities** house single and married students. Single students may choose their own roommates or the Department of Housing Management will assign students with similar interests and schedules together. Each single student pays rent per academic term to Duke University. Married rental rates are available on the website.

**Application Procedures.** When students are informed of their acceptance to the Medical School they also receive a postcard on which to indicate preference for university housing. This postcard may be returned to the Department of Housing Management and detailed information on the types of accommodations and application materials will be forwarded to the accepted student. Students may find it more convenient to review housing information and to apply for accommodations on-line through the Housing Management website: <http://www.housing.duke.edu/grad/>. In recognition of the unique challenges that face newly accepted international students, priority for assignment to graduate student housing is awarded to students who arrive from abroad on student visa status. Due to limited availability of space assignment to university housing cannot be guaranteed.

**Off-campus Housing.** The Department of Housing Management maintains a listing of rental apartments, rooms, and houses provided by property owners or real estate agencies in Durham. These listings are available in the department only; during the summer an assistant is available to answer questions and to aid students in their attempts to obtain housing off campus. Information on commercial complexes in the Durham area may be obtained by indicating a preference for off-campus housing on the postcard which students receive with their acceptance notices. Except for assuring that owners sign a statement of nondiscrimination, off-campus property is in no way verified and neither the university nor its agents negotiate between owners and interested parties.

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

**Dining Facilities.** In addition to the Medical Center cafeteria, a number of dining facilities are located within a short distance from the Medical Center. Duke Dining Services operates a variety of dining facilities including coffee bars, traditional cafeteria-style facilities, full-service restaurants, and fast food facilities. The many dining locations on campus give Duke students virtually unlimited dining options. For more information about campus dining options, contact Dining Services at 029 West Union Building, Box 90898, Durham, NC 27708-0898, 919/660-3900, [dining@mail01.adm.duke.edu](mailto:dining@mail01.adm.duke.edu).

## **SERVICES AVAILABLE**

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

**Duke Family Medicine Center.** The D.F.M.C. (684-3180), located on the corner of Erwin Road and Trent Drive in the Marshall Pickens Building, is the primary location for medical care. Students are seen by appointment Monday-Friday, 8:00 a.m.- 5:30 p.m. A wide variety of services are available: general medical care, health education, laboratory, pharmacy, travel and immunization, x-rays, cold/flu self-help table, allergy clinic, and nutrition counseling.

Students are encouraged to use the Duke Family Medicine Center as their portal of entry to other health resources when needed, including the specialty clinics at Duke University Medical Center. This helps with coordination of appropriate care.

For problems arising after hours and on weekends, students should call the Infirmary (684-3367). The nurse may advise the student to come to the Infirmary or to the Duke Emergency Department (684-2413) for further evaluation. In the event of an

obvious life-threatening emergency, students should go directly to the Emergency Department. If necessary, Duke Public Safety (call 911 or 684-2444) provides on-campus transportation to the Emergency Department or the Infirmary.

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

**Health Education.** This component of the Student Health Service is headquartered at Hanes Hall and at the Healthy Devil Health Education Center in House 0 on West Campus. Health education staff are available to assist students in making informed decisions that promote their health. Topics of concern include alcohol and other drug usage, eating and nutrition, sexual activity and sexually transmitted diseases, stress management, and others. Consult the Healthy Devil online at <http://healthydevil.stuaff.duke.edu>.

**Student Health Physical Therapy.** The Student Health Physical Therapy Clinic is located in the Wilson Recreation Center on West Campus in the basement of Card Gym. A physical therapist is available from 2:00 p.m.-5:00 p.m. weekdays when undergraduate classes are in session, on a walk-in basis, to assess exercise-related problems and to outline short-term treatment plans, aid recovery, and help prevent re-injury. Call 684-6480 during the summer months for hours.

**Confidentiality.** Information regarding the physical or mental health of students is confidential and is released only with the student's permission.

**Student Accident and Hospitalization Insurance.** Health insurance is essential to protect against the high cost of unexpected illnesses or injuries which would require hospitalization, surgery, or the services of specialists outside the Student Health Service. Therefore, all students are required to have such insurance. At the beginning of each fall semester, medical students must provide proof to the bursar's office of coverage under an accident and hospitalization insurance policy or purchase the Duke Student Accident and Hospitalization Insurance policy. This insurance policy provides protection twenty-four hours per day during the twelve-month term of the policy of each student insured and is specifically designed to complement the coverage provided by the student health fee (see below). Students are covered on and off the campus, at home, while traveling between home and school, and during interim vacation periods. Coverage for the student's spouse and dependent children also may be purchased. Further information about this plan can be obtained from Hill, Chesson, and Associates (489-7426).

**Health Fee.** All currently enrolled full-time students and part-time degree candidates are assessed a mandatory student health fee. This covers most services rendered within the Student Health Service during each enrolled semester. An optional summer health fee for students not enrolled in summer sessions is also available through the bursar's office.

**Services Covered by the Health Fee.** The health fee covers most of the services at Duke Family Medicine Center if medically indicated and rendered by a student health provider:

- medical care for acute and chronic illness and minor injuries
- one health maintenance examination every two years and most associated studies
- annual gynecological exam
- most routine laboratory and x-ray services
- allergy shots
- confidential pregnancy testing
- most medications required for short-term treatment of acute problems

- some immunizations required for programs receiving academic credit at Duke (note: a supplemental fee may be required for certain immunizations), excluding prematriculation immunizations

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

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

**Services not Covered by the Health Fee.** If you are unsure whether a service is covered, *please ask the staff of the Duke Family Medicine Clinic business office prior to receiving the service.* You are financially responsible for the following:

- medical care provided in the Emergency Department, hospital, or other non-student health facility
- care provided by specialist consultants, including those working within the student health facilities
- dental care
- pregnancy care or deliveries
- tests, procedures, prescriptions not medically indicated, not on the approved list, or not ordered by student health providers
- immunizations required for entrance to Duke or other universities or for personal travel
- medications not on the student formulary and those required for long-term use; contraceptives

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

**Counseling and Psychological Services.** Counseling and Psychological Services (C.A.P.S.) is located in Suite 214, Page Building on West Campus. C.A.P.S., a component of student services, provides a range of counseling and psychological services designed to address the acute emotional and psychological difficulties of Duke students.

The professional staff is composed of psychologists, clinical social workers, and psychiatrists experienced in working with college students. They provide direct services to students including evaluation and brief counseling/psychotherapy, issues such as self-esteem and identity, family relationships, academic performance, dating, intimacy, and sexual concerns. Ordinarily students are seen for counseling by appointment. If the concern requires immediate attention, a C.A.P.S. staff member assists with the emergency at the earliest possible time.

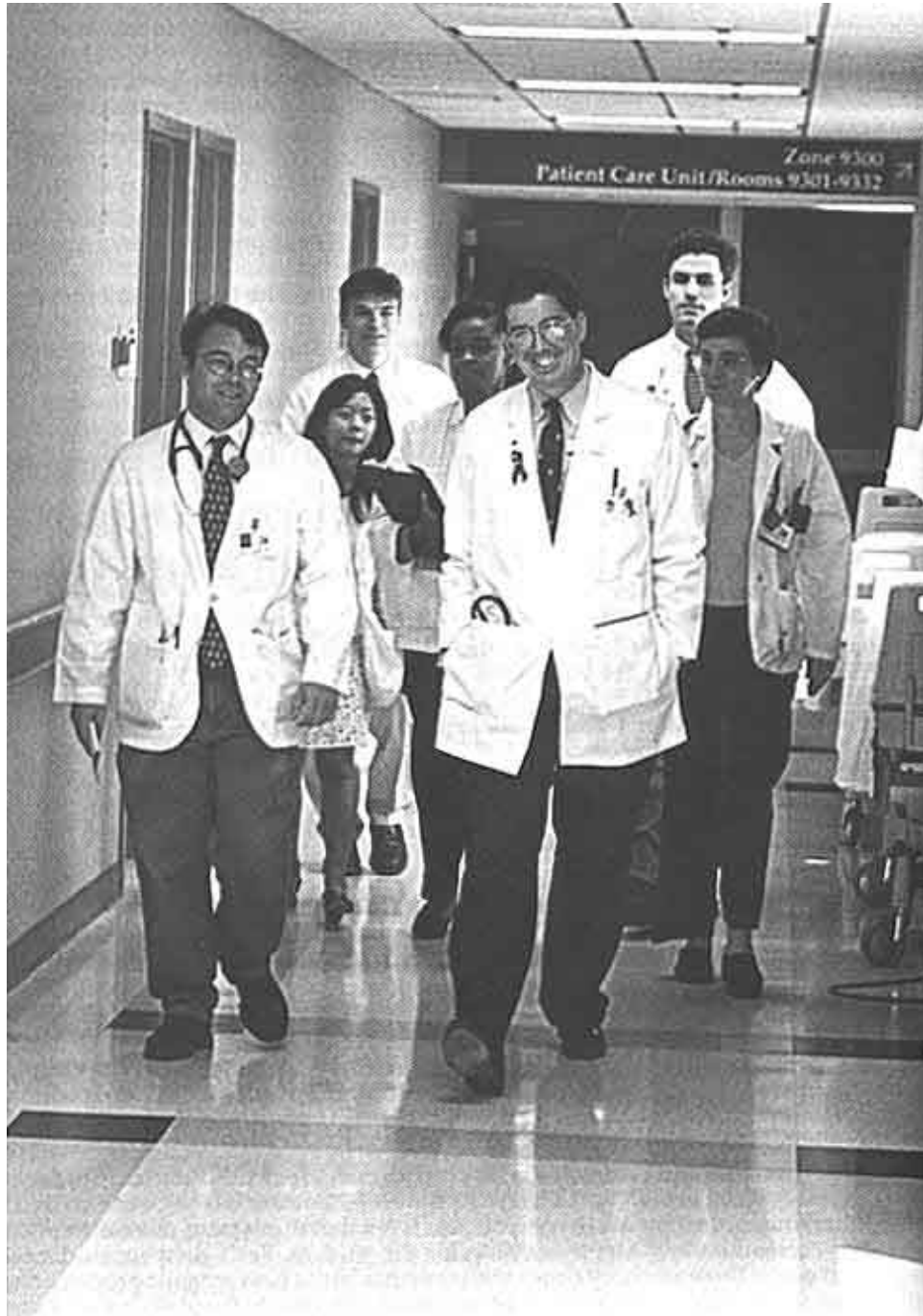
Each year C.A.P.S. offers a series of counseling, therapy, and support groups. These explore such interests as stress, relationships, awareness of diversity, and management of eating disorders. Support groups have been offered to graduate and professional school women and gay and lesbian students.

Another function of C.A.P.S. is to provide consultation regarding student development and mental health issues affecting not only individual students but the campus community as a whole. The staff works with other campus personnel including administrators, faculty, the student health staff, and student groups in meeting needs identified through such liaisons. Contact C.A.P.S. at 660-1000.

#### **Student Personal and Professional Advisory System for M.D. Program Students.**

One important objective of Duke University School of Medicine is to promote an informal, cordial student-faculty relationship. It also is felt that this type of relationship fosters better curriculum and career advising for the student. Each entering student is assigned to one of three advisory deans who oversees her or his academic progress and with whom the student meets in small groups and individually for personal advising, curriculum planning, and career counseling. A full-time associate dean is available to students on a strictly confidential basis for personal and crisis counseling or referral.

## *Doctor of Medicine Program*



# School of Medicine Calendar 2000-2001

## First Year (Freshmen) Students Fall Term 2000

<b>August</b>	
9-11	Wednesday-Friday - Begin orientation and 2000-2001 academic year
14	Monday, 8:00 a.m. - Begin Block I
<b>September</b>	
4	Monday, Labor Day holiday
<b>October</b>	
6	Friday, 6:00 p.m. - End Block I
10	Tuesday, 8:00 a.m. - Begin Block II
<b>November</b>	
21	Tuesday, 6:00 p.m. - Begin Thanksgiving holiday
27	Monday, 8:00 a.m. - Classes Resume
<b>December</b>	
15	Friday, 6:00 p.m. - End Block II and Fall 2000 Term

## Spring Term 2001

<b>January</b>	
2-12	Tuesday-Friday - Begin Practice course intensive learning period and Spring 2001 Term
15	Monday – Martin Luther King, Jr. holiday
16	Tuesday, 8:00 a.m. - Begin Block III
<b>February</b>	
9	Friday, 6:00 p.m. - End Block III
12	Monday, 8:00 a.m. - Begin Block IV
<b>April</b>	
18	Wednesday, 6:00 p.m. - End Block IV and begin spring vacation
30	Monday, 8:00 a.m. - Begin Block V
<b>June</b>	
29	Friday, 6:00 p.m.- End Block V and 2000-2001 academic year

## Second Year (Sophomore) Students Fall Term 2000

<b>July</b>	
31	Monday, 8:00 a.m. - Begin Practice course intensive learning period
<b>August</b>	
25	Friday, 6:00 p.m. - End intensive learning period
28	Monday, 8:00 a.m. - Begin classes in sections 81,41
<b>September</b>	
4	Monday, Labor Day holiday
20	Wednesday, 6:00 p.m. - End classes in section 41
25	Monday, 8:00 a.m. - Begin classes in section 42
<b>October</b>	
18	Wednesday, 6:00 p.m. - End classes in regular sections 81,42
23	Monday, 8:00 a.m. - Begin classes in sections 82,43
<b>November</b>	
15	Wednesday, 6:00 p.m. - End classes in section 43
20	Monday, 8:00 a.m. - Begin classes in section 44
22	Wednesday, 6:00 p.m. - Begin Thanksgiving holiday
27	Monday, 8:00 a.m. - Resume classes in section 82,44





#### December

16 Saturday, 6:00 p.m. - End classes in regular sections 82,44

#### Alternate Schedule for Psychiatry/Medical Practice, Fall 2000

81	PSC	August 28 – October 6
81	MPS	October 9 – October 20
82	PSC	October 23 – December 1
82	MPS	December 4 – December 15

#### Spring Term 2001

#### January

2 Tuesday, 8:00 a.m. - Begin classes in sections 81,41  
 15 Monday - Martin Luther King, Jr. holiday  
 24 Wednesday, 6:00 p.m. - End classes in section 41  
 29 Monday, 8:00 a.m. - Begin classes in section 42

#### February

21 Wednesday, 6:00 p.m. - End classes in regular sections 81,42  
 26 Monday, 8:00 a.m. - Begin classes in sections 82,43

#### March

21 Wednesday, 6:00 p.m. - End classes in section 43  
 26 Monday, 8:00 a.m., Begin classes in section 44

#### April

18 Wednesday, 6:00 p.m. - End classes in regular sections 82-44, and begin Spring vacation

#### Alternate Schedule for Psychiatry/Medical Practice, Spring 2001

81	PSC	January 2 – February 9
81	MPS	February 12 – February 23

82 PSC February 26 - April 6  
 82 MPS April 9 - April 20

### Summer Term 2001

#### April

30 Monday, 8:00 a.m. - Begin classes in sections 81,41

#### May

23 Wednesday, 6:00 p.m. - End classes in section 41  
 28 Monday, 8:00 a.m. - Begin classes in section 42

#### June

20 Wednesday, 6:00 p.m. - End classes in regular sections 81,42  
 25 Monday, 8:00 a.m. - Begin classes in sections 82,43

#### July

4 Wednesday - Independence Day holiday  
 18 Wednesday, 6:00 p.m. - End classes in section 43  
 23 Monday, 8:00 a.m. - Begin classes in section 44

#### August

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

#### Alternate Schedule for Psychiatry/Medical Practice, Summer 2001

81PSC April 30 - June 8  
 81MPS June 11 - June 22  
 82PSC June 25 - August 3  
 82MPS August 6 - August 17

### Third Year (Junior) and Fourth Year (Senior) Students

#### Summer Term 2000

#### May

8 Monday, 8:00 a.m. - Begin classes in sections 16,81,41

#### June

3 Saturday, 12:00 noon - End classes in section 41  
 5 Monday, 8:00 a.m. - Begin classes in section 42

#### July

1 Saturday, 12:00 noon - End classes in sections 81,42  
 4 Tuesday - Independence Day holiday  
 5 Wednesday, 8:00 a.m. - Begin classes in sections 82,43  
 29 Saturday, 12 noon - End classes in section 43  
 31 Monday, 8:00 a.m. - Begin classes in section 44

#### August

26 Saturday, 12:00 noon - End classes in sections 16,82,44

#### Fall Term 2000

#### August

28 Monday, 8:00 a.m. - Begin classes in sections 16,81,41

#### September

4 Monday, Labor Day holiday  
 23 Saturday, 12:00 noon - End classes in section 41  
 25 Monday, 8:00 a.m. - Begin classes in section 42

#### October

21 Saturday, 12:00 noon - End classes in sections 81,42  
 23 Monday, 8:00 a.m. - Begin classes in sections 82,43

#### November

15 Wednesday - Registration for Spring Term, 2001  
 18 Saturday, 12:00 p.m. - End classes in section 43  
 20 Monday, 8:00 a.m. - Begin classes in section 44  
 22 Wednesday, 6:00 p.m. - Begin Thanksgiving holiday  
 27 Monday, 8:00 a.m. - Classes resume in section 44

**December**

- 6 Wednesday - Late registration day for Spring Term, 2001
- 20 Wednesday - 12:00 noon - End classes in sections 16,82,44

**Spring Term 2001****January**

- 8 Monday, 8:00 a.m. - Begin classes in sections 16,81,41
- 15 Monday - Martin Luther King, Jr. holiday

**February**

- 3 Saturday, 12:00 noon - End classes in section 41
- 5 Monday, 8:00 a.m. - Begin classes in section 42

**March**

- 3 Saturday, 12:00 noon - End classes in sections 81,42. Begin spring vacation
- 5 Monday, 8:00 a.m. - Begin classes in section 82,43
- 14 Wednesday, Registration for Summer Term 2001 - rising fourth year students
- 28 Wednesday - Registration for Fall Term 2001 - rising third and fourth year students
- 31 Saturday, 12:00 noon - End classes in section 43

**April**

- 2 Monday, 8:00 a.m. - Begin classes in section 44
- 28 Saturday, 12:00 noon - End classes in sections 16,82,44

**May**

- 12-13 Saturday-Sunday - Graduation activities

**Summer Term 2001****April**

- 30 Monday, 8:00 a.m. - Begin classes in sections 16,81,41

**May**

- 26 Saturday, 12:00 noon - End classes in section 41
- 28 Monday, 8:00 a.m. - Begin classes in section 42

**June**

- 23 Saturday, 12:00 noon - End classes in section 81,42
- 25 Monday, 8:00 a.m. - Begin classes in sections 82,43

**July**

- 4 Wednesday - Independence Day holiday
- 21 Saturday, 12:00 noon - End classes in section 43
- 23 Monday, 8:00 a.m. - Begin classes in section 44

**August**

- 18 Saturday, 12:00 noon - End classes in sections 16,82,44

# Mission Statement and the Medical Curriculum

The mission of the Duke University School of Medicine is:

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

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

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

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

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

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

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

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

- Development of a core medical curriculum that is rigorous, efficient, integrative and forms a realistic base of knowledge for a physician;
- Integration of basic, clinical, psychosocial, and population information and skills throughout the four years of medical education;

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

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

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

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

## Doctor of Medicine Degree

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

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

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

In February, 1995, the Duke University School of Medicine was fully accredited for seven years by the Liaison Committee on Medical Education of the Association of American Medical Colleges and the Council on Medical Education of the American Medical Association.

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

The first year consists of instruction in the following:

<b>Semester 1</b>	<b>Credit</b>
BAA 200 - Gross Human Anatomy	4
BCH 200 - Biochemistry	4
CBI 200 - Cell Biology	2
CBI 201 - Microanatomy	2
CBI 202 - Medical Physiology	4
GEN 200 - Genetics	2
IND 201 - Intro to Clinical Care	1
<b>Total</b>	<b>19</b>
<b>Semester 2</b>	<b>Credit</b>
IMM 201 - Immunology	2
IND 201 - Intro to Clinical Care	2
MIC 200 - Microbiology	5
NBI 202 - Basic Neurobiology	4
PHR 200 - Pharmacology	4
PTH 200 - Pathology	5
<b>Total</b>	<b>22</b>

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

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

At the beginning of the second year, students take a four week course, Orientation to the Clerkship Year, that prepares them for the core clinical rotations that follow. The core courses include eight-week rotations in internal medicine, surgery, obstetrics/ gynecology, pediatrics, either an eight-week rotation in family medicine or a four-week rotation in family medicine and a four-week rotation in neurology, and a six-week rotation in psychiatry; a clinical rotation in medical practice and health systems lasting two weeks follows the psychiatry rotation.

In addition, after completing second-year clerkships all students must take and pass the Clinical Performance Examination (CPX). The CPX is a standardized test of clinical performance that was developed by faculty from all four medical schools in North Carolina and is now administered at all schools. The purpose of the CPX is to evaluate the effectiveness of the clinical curriculum and each student's ability to respond to patient problems and concerns. Skills relating to communicating with patients, history taking, physical examination, assessment, and follow-up plans are evaluated for fifteen different patients. Students performing below minimal

competency on the CPX are required to complete additional structured learning during their fourth year.

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

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

Two different avenues to satisfying third year requirements are available. The first, which is most commonly followed, requires the student to select a home base study program for the basic science elective experience. With the aid of advisers, the individual elective program is devised to include an area of scholarly work to pursue which may or may not be an independent research project. Any combination of: (a) research preceptorship, (b) tutorials, or (c) courses inside or outside the home base study program may comprise the overall basic science elective experience. The second path open to students is participation in a combined MD/master's degree program in clinical research, public health, or public policy. With rare exception, the elective experience should be taken as a block. During the third year, students are required to complete thirty-two basic science credits.

*Fourth Year.* The clinical elective experience, usually occurring in the fourth year, should be used to: (a) aid in decision making about the area of choice of postgraduate training, (b) obtain experiences in areas that would not be included in that postgraduate training and, above all, (c) pursue active experiences in patient care sufficient to provide the basic skills necessary for doctor-patient interaction. To satisfy requirements for the MD degree, students must complete thirty-two clinical science credits during the fourth year. Four of these credits must be completed in an elective requiring direct patient care.

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

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

In addition to performance directly related to course requirements, to maintain 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.

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

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

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

**Promotion.** Each student's record is reviewed periodically by promotions committees composed of course directors (or their designees) from the appropriate departments. Recommendations by these committees are made to the vice-dean for medical education who may select one of several options:

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

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

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

**Due Process Guidelines.** If a student decides to appeal a decision of a promotions committee, he or she must submit in writing to the vice-dean for medical education the reasons for the disagreement with the decision and any extenuating circumstances he or she wishes to identify within two weeks of receiving notice of the decision. Within a week of receiving the appeal, the vice-dean for medical education appoints a



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 DUMC staff who have pertinent information. The student may present her or his appeal in person and may bring a friend from the faculty or student body to assist. The Promotions Appeal Committee reports its decision to the vice-dean for medical education who presents this to the student. If the student still is dissatisfied and wishes to appeal further, he or she may request a review of the whole process by the dean of the School of Medicine, with all pertinent documentation is provided to that office. The dean's decision is binding.

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

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

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

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

*Fourth Year to Graduation.* Completion of thirty-two clinical science credits within one calendar year.

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

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

**Course Load.** In the first year, students typically complete certain required courses whose total weight equals 19 credits in the fall and 22 credits in the spring semester. During the second year, the normal registration for each sixteen week semester is two 8-week rotations or the equivalent, four credits for the OCY course, and a total of three credits for Practice. In the elective years, the normal registration for any term is sixteen credits with a maximum registration of eighteen credits; no more than five credits in any four-week period may be taken. Enrollment for credit above this limit must have the written approval of the advisory dean.

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

**Leave of Absence.** A student, after presenting a written request to his or her advisory dean, may be granted an official leave of absence for personal or academic reasons for two or more consecutive terms but not to exceed one calendar year. If approved, the advisory dean provides written notification including applicable beginning and ending dates to the student, the registrar, and the director of financial

aid. The student must apprise the advisory dean in writing of her or his wish to return to the Medical School or to extend the personal leave at least sixty calendar days prior to the anticipated date of re-entry. The student desiring an extension beyond one calendar year may be required to apply for readmission to the School of Medicine. When a leave of absence is taken, the vice-dean for medical education may require the student upon return to repeat some or all of her or his previously completed academic program. To be eligible for a voluntary leave of absence, a student must have met all financial obligations to the university.

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

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

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

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

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

The applicant is scheduled for two interviews with either administrative staff or faculty in the Medical School. After these meetings take place, a committee comprised of the vice-dean for medical education and the advisory deans convenes to review the information submitted by the applicant, the interview reports, and the student's previous, academic file and to determine if re-admission is appropriate. The decision of the committee, which is final, is provided in writing to the applicant and to the financial aid and registrar's offices.

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

**Interinstitutional Program.** Under an agreement with Bowman Gray Medical School, the East Carolina University School of Medicine, and the University of North Carolina-Chapel Hill School of Medicine, Duke Medical School allows students

participating in the elective program to take courses at participating institutions for grades and credit toward the MD degree at Duke. Courses taken usually are not available at the home institution or are not offered at times that can be accommodated by the student's schedule. Students enrolled in interinstitutional courses are charged the current Duke tuition and student health fees.

**Medical Licensure.** "The Federation of State Medical Boards (FSMB) and the National Board of Medical Examiners (NBME) have established a single, three-step examination for medical licensure in the United States. The United States Medical Licensing Examination (USMLE) provides a common evaluation system for applicants for medical licensure." (*USMLE 1997 Bulletin of Information*) Step 1 concentrates on basic science knowledge, Step 2 on fundamental clinical science knowledge, and Step 3 on advanced clinical science knowledge. Steps 1 and 2 can be taken in any order, but must be passed before applying to take Step 3. Of course, a full license requires also appropriate application procedures and fees for the state in which the license is issued.

Duke University School of Medicine does not use any step of this examination for evaluation of students for progress through the curriculum. Passing the examinations is the responsibility of the individual, and Steps 1 and 2 may be taken whenever the individual is prepared to do so. The curriculum is not directed toward preparing students for licensure examination, but successful performance in coursework should enable all students to pass each step. Computer-based exams began in May, 1999 and are given continuously throughout the year. Call the Central Teaching Lab Office, 684-5967, for more information. The USMLE website, <http://www.usmle.org> has information as well. Students typically take Steps 1 and 2 while in medical school. The Office of Medical Education assists students as they decide the most appropriate times during medical school to take these steps and with suggestions for preparing for the examination. Students must be enrolled in the School of Medicine to be eligible to take the USMLE and should speak with affected course directors at least two weeks prior to the test dates to make arrangements for the one or two-day absences.

**Visiting Students.** The School of Medicine provides opportunities for visiting students to enroll in elective courses for a maximum period of eight weeks. However, visiting students are permitted to enroll in courses only after the registration period for the applicable semester has concluded for Duke medical students. The School of Medicine does not offer long term or extensive clinical experience sufficient to satisfy the clinical educational requirements of foreign medical schools. Payment of a registration fee (currently \$50, subject to change) and a student health fee are required. For information write to: Coordinator, Visiting Students, Box 3878, Duke University Medical Center, Durham, North Carolina 27710, or access the Medical School's Registrar's Office at <http://www2.mc.duke.edu/som/romain.html>.

## Admission Procedures

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

**Application for Admission.** The Duke University School of Medicine participates in the American Medical College Application Service (AMCAS). Application materials may be obtained from a premedical adviser or by writing: American Medical College Application Service, Association of American Medical Colleges, Suite 201, 2450 N Street, N.W., Washington, D.C. 20037-1131.

Upon receipt of the application materials from AMCAS, if credentials indicate, a supplemental application and other information are mailed which serve as notification

of receipt of the application from AMCAS. Applications are received by AMCAS any time after June 15 until November 1, which is the deadline for all material to be received by AMCAS. Applicants are urged to file their applications as early as possible. Supplemental applications should be returned within two weeks of receipt by the applicants. The absolute deadline for the supplemental application is December 1. Upon receipt of the supplemental application, two faculty members determine whether or not to proceed with an interview.

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

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

**Transfer.** Duke University School of Medicine does not accept transfer students except in unusual circumstances.

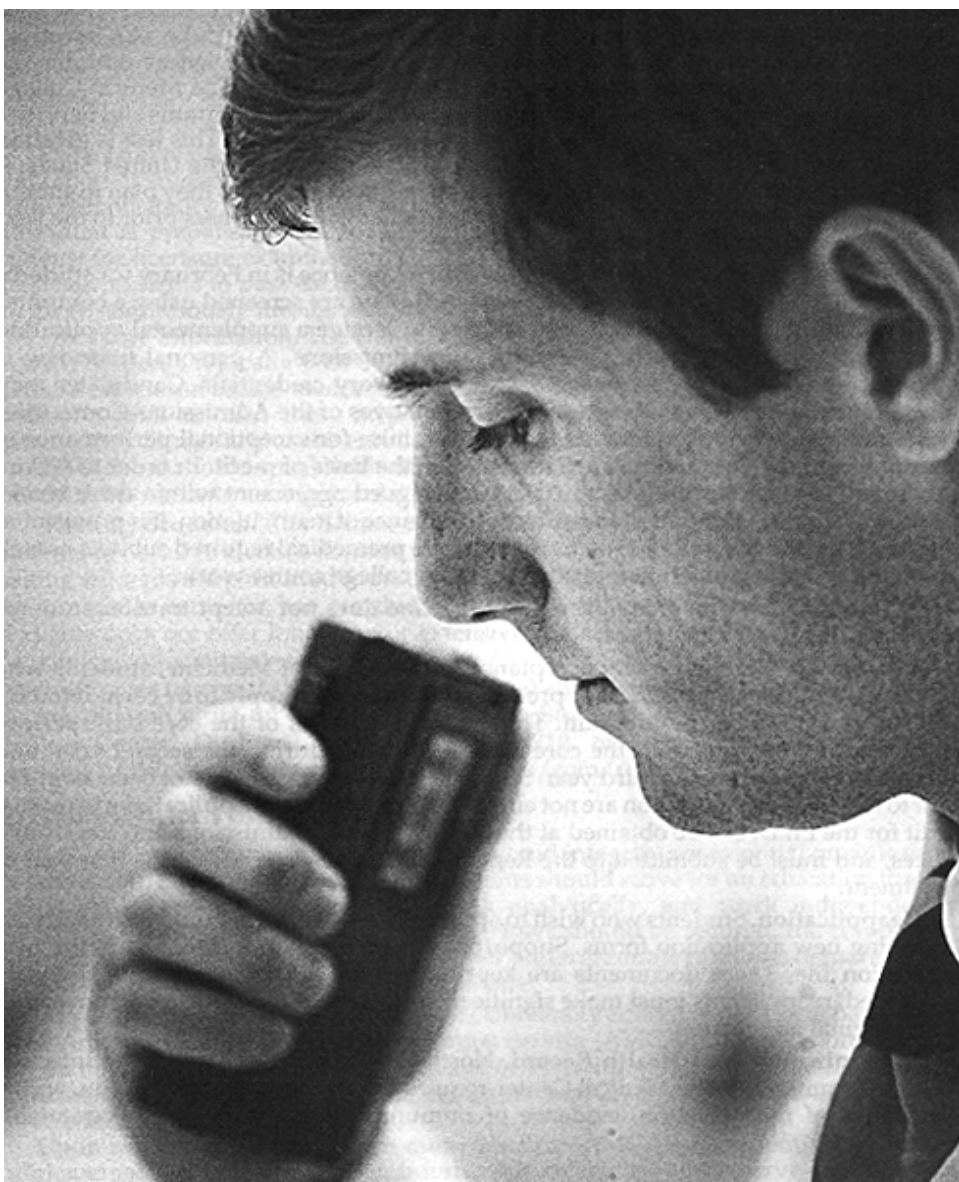
**Advanced Placement.** After acceptance to the School of Medicine, students who hold Ph.D. degrees in biomedical or preclinical sciences may apply to be considered for a three-year, M.D. degree program. This program consists of the core basic science courses during the first year, the core clinical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

**Reapplication.** Students who wish to apply for a second time should write AMCAS requesting new application forms. Supporting documents are transferred to the new application file. These documents are kept on file for three years. To be seriously considered, reapplicants must make significant additions of experience or coursework to the original application.

**Immunization And Health Record.** North Carolina State law and the Infection Control Committee at the Medical Center require all new students to provide, within thirty days of matriculation, evidence of immunity to certain vaccine-preventable

illnesses. Upon acceptance, students receive the Student Health Immunization Form and Report of Medical History which should be completed and returned to the Director of Student Health Services, Box 2899 DUMC, Duke University, Durham, North Carolina 27710.

**Summary.** Three years of college work, a sixty-five dollar (\$65) nonrefundable application fee, a signed agreement within three weeks of notification of acceptance, and the Medical College Admission Test are required. The estimated, first year class size for 2000-2001 is 100.



## Roster of Regional Representatives of Admissions Committee

Alabama:	<i>Birmingham</i> , Margaret M. Tarpey
Arizona:	<i>Phoenix</i> , Beth Ann Banks; <i>Scottsdale</i> , Andrew S. Jacob; <i>Sun City West</i> , Stanley Karansky; <i>Tucson</i> , Tracy W. Gaudet
Arkansas:	<i>Little Rock</i> , Karl Staub
California:	<i>Carlsbad</i> , Mark Landon; <i>Hillsborough</i> , Jerome M. Javer; <i>Irvine</i> , A. Brian Davis; <i>La Jolla</i> , Herman F. Froeb; <i>Los Angeles</i> , Jo Carol Hiatt; Douglas F. Smiley; <i>Monterey Park</i> , Jonathan L. Chang; <i>Oakland</i> , Krammie Chan; <i>Orange</i> , Timothy R. S. Harward, Cyril Leung; <i>Redwood City</i> , John B. Simpson; <i>Sacramento</i> , Sidney M. Gospe, Jr.; <i>San Diego</i> , Karen Van Hoesen; <i>San Francisco</i> , Laurens N. Garlington, Robert Kahn, R. Gray Patton, Henry Safrit, Katherine Young; <i>Santa Fe Springs</i> , Irwin Arluk, Richard A. Schatz; <i>Santa Monica</i> , J. Thomas Rosenthal; <i>Ventura</i> , Burt J. Averbach; <i>Walnut Creek</i> , David S. Forth
Colorado:	<i>Denver</i> , Frederick L. Grover, Michael J. Jobin, Alan Klein, York E. Miller; <i>Littleton</i> , David S. Shimm
Connecticut:	<i>Glastonbury</i> , Catherine C. Wiley, James F. Wiley, II; <i>New Haven</i> , G. P. Beardsley, David J. Goodkind, Stephen J. Huot; <i>Old Saybrook</i> , Richard L. Reece
District of Columbia:	Jonca C. Bull, Kurt D. Newman
Florida:	<i>Gainesville</i> , Jerry Berger; <i>Hollywood</i> , Norman Moskowitz; <i>Miami</i> , Leonard A. Kalman; <i>Miami Beach</i> , Stephen W. Unger; <i>Naples</i> , James Halikas; <i>Tampa</i> , Americo A. Gonzalvo, Douglas Reintgen
Georgia:	<i>Atlanta</i> , W. Scott James, Jr.
Hawaii:	<i>Honolulu</i> , Garrett F. Saikley; <i>Kealakekua</i> , Thomas E. Austin; <i>Wahiawa</i> , Ned Stoughton
Idaho:	<i>Boise</i> , Joann Leone
Illinois:	<i>Belvidere</i> , Febe I. Wallace; <i>Chicago</i> , John H. Buehler, Herbert Engelhard, George H. Gardner; <i>Elk Grove Village</i> , Gary E. Kay
Indiana:	<i>Indianapolis</i> , Gale McCarty
Kansas:	<i>Overland Park</i> , David L. Smith
Kentucky:	<i>Hopkinsville</i> , Robert B. Bressler; <i>Lexington</i> , Julia L. Stevens
Louisiana:	<i>Baton Rouge</i> , Karen H. Miller; <i>New Orleans</i> , Nancy Haslett
Maryland:	<i>Baltimore</i> , Robin E. Rutherford; <i>Chevy Chase</i> , James R. Gavin, III; <i>Olney</i> , Joseph Buffington
Massachusetts:	<i>Boston</i> , Christian T. Campos, Matthew W. Gillman, Paula Kadison, George L. King, Richard Kopelman, Brit Nicholson; <i>Brockton</i> , Desiree A. Carlson; <i>Hyannis</i> , Linda A. Bishop; <i>Jamaica Plains</i> , Jayne Trachman; <i>Natick</i> , Gregg C. Checani; <i>Newton</i> , Bernard Levy, Stephen A. Sohn; <i>Winchester</i> , K. Lea Sewell; <i>Worcester</i> , Katherine S. Upchurch
Michigan:	<i>Detroit</i> , John J. Fath; <i>Flint</i> , Melissa Hamp; <i>Grasse Pointe</i> , John M. Lesesne; <i>Troy</i> , C. Edward Coffey
Minnesota:	<i>Wacomia</i> , Paul W. Sperduto
Missouri:	<i>Fair Grove</i> , C. Norman Shealy; <i>Kansas City</i> , Gerald Wood; <i>St. Louis</i> , Scott J. Anderson, Sophia Chung, W. Edwin Dodson, William A. Gay, Jr.

Montana:	<i>Dillon</i> , Scott McKee
Nebraska:	<i>Omaha</i> , Linda K. Matson
Nevada:	<i>Las Vegas</i> , Thomas L. Lambert; <i>Reno</i> , Thomas Fyda
New Hampshire:	<i>Portsmouth</i> , Eric D. Lister
New Jersey:	<i>Hackensack</i> , John C. Alexander, Steven P. Honickman; <i>Moorestown</i> , Michael S. Entmacher; <i>Morristown</i> , Neal D. Shore; <i>Pompton Plains</i> , Charles W. Ross; <i>Princeton</i> , Timothy Patrick-Miller; <i>Summit</i> , Wayne S. Barber; <i>Watchung</i> , R. Christopher Stucky
New York:	<i>New York</i> , David L. Feldman, Margaret W. Hilgartner, Bruce Horten, Cynthia L. Krause, David L. Milbauer; <i>Portland</i> , J. Paul Lunas
North Dakota:	<i>Minot</i> , Jennifer L. Hunter
Ohio:	<i>Cincinnati</i> , Donald Rucknagel; <i>Cleveland</i> , Stephen E. Alpert; <i>Cleveland Heights</i> , Brenda P. Crownover, Richard L. Crownover; <i>Columbus</i> , Miles E. Drake, Jr.; <i>Elyria</i> , William L. Hassler
Oklahoma:	<i>Tulsa</i> , James A. Young
Oregon:	<i>Portland</i> , Marcia Freed
Pennsylvania:	<i>Johnstown</i> , W. Frederick Mayer; <i>Philadelphia</i> , Christopher V. Chambers, John J. Furth, David M. Goodner, James R. Harp, Richard I. Katz, Sheila M. Katz, Graham E. Quinn, Mona M. Shangold; <i>Pittsburgh</i> , Richard L. Green, Michelle Roberts; <i>Rydal</i> , Anthony J. Limerakis; <i>State College</i> , Richard H. Dixon, Donald F. Mandetta; <i>Wallingford</i> , Cathy Wiley, Jim Wiley
Rhode Island:	<i>Lincoln</i> , Henry G. Magendantz; <i>Providence</i> , Benjamin T. Jackson
South Carolina:	<i>Greenville</i> , Will Flanagan; <i>Charleston</i> , Angus McBride, Jr.
South Dakota:	<i>Sioux Falls</i> , Samir Abu-Ghazaleh
Tennessee:	<i>Chattanooga</i> , Roger G. Vieth; <i>Memphis</i> , Peter D. Jones, Susan P. Watson
Texas:	<i>Dallas</i> , Stephen R. Hammes; <i>Galveston</i> , J. Andrew Grant, Jr.; <i>Houston</i> , Madeline Duvic, Kenneth Gould, Jr., Barry N. Hyman, Eugenia Kleinerma, Leonard A. Zwelling
Utah:	<i>Provo</i> , Clark T. Bishop
Virginia:	<i>Alexandria</i> , Andrea M. Jackson; <i>Falls Church</i> , Thom A. Mayer
Washington:	<i>Auburn</i> , Joseph Gehrett; <i>Bellingham</i> , James M. Douglas, Jr.; <i>Kirkland</i> , David Pitkethly; <i>Renton</i> , Wallace H. J. Chang; <i>Seattle</i> , Gregory J. Raugi; <i>Woodinville</i> , Alice M. Ormsby
West Virginia:	<i>Morgantown</i> , Lisa Gangarose
Wyoming:	<i>Laramie</i> , Elizabeth Schreiner

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

*Financial Support.* Students admitted to the first year of the program receive a traineeship award (National Research Service Award) consisting of a stipend and full tuition allowance from the National Institutes of Health. Currently the annual stipend is \$16,300. Financial support from that award can be furnished for up to six years assuming normal progress. These six years need not be consecutive; this permits flexibility in funding in case more than six years are required for completion of the curriculum. Funding by the NIH is limited to citizens or permanent residents of the United States.

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

*Year 1—Core Basic Science Year.* This year consists of courses in anatomy, biochemistry, cell biology, genetics, immunology, microbiology, neurobiology, pathology, pharmacology, physiology, and Practice.

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



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

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

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

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

*Final Year—An Elective Year in Clinical Science.* In this year, which is entered only after completion of all requirements for the PhD 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 MD degree upon completion of the final year, great care is taken by the faculty to ensure that students are competent and knowledgeable in current concepts of patient care. It is hoped that the final year provides the student with an experience which is not repeated during the residency but serves to complement later phases of training. For example, future surgeons might be exposed to fields other than surgery, since they receive intensive training in that discipline during their residency programs.

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

1. The application form for the Duke University School of Medicine should be

completed and submitted as early as possible since acceptance into the Medical Scientist Training Program requires acceptance by both the Program Committee and the Medical School Admissions Committee. Applicants who cannot be accepted into the program are still fully eligible for acceptance to the Medical School if the Medical School Admissions Committee considers them qualified and desirable.

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

Additional information may be obtained by writing Salvatore V. Pizzo, MD, PhD, Director, Medical Scientist Training Program, Box 3712, Duke University Medical Center, Durham, North Carolina 27710 or emailing [paoburks@acpub.duke.edu](mailto:paoburks@acpub.duke.edu).

**The Medicine and Clinical Research Program.** The Clinical Research Training Program provides academic training in the quantitative and methodological principles of clinical research. The program offers courses in research design, statistical analysis, health economics, research ethics and research management as well as a mentored clinical research experience. The program is offered by the faculty of the Division of Biometry in the Department of Community and Family Medicine with the participation of other members of the Medical Center faculty having expertise in relevant areas. Upon completion of the program, students are awarded the Master of Health Sciences in Clinical Research degree as well as full credit for the third year of the medical school curriculum.

*Course of study.* The degree requires 24 units of graded course work and a research project for which 12 units of credit are given. Seven courses constituting 22 units are required for all degree candidates. 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.

*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 MHS degree should contact the Program Director, William E. Wilkinson, PhD, to discuss their interests and to obtain instructions regarding the application procedure.

**Primary Care Program.** In September 1994, Duke University School of Medicine instituted the Primary Care Program for medical students. The goal of the program is to develop leaders in primary care disciplines of medicine. Any student matriculating in the Medical School and expressing an interest in becoming a primary care physician can apply to join this program. The program functions much as an academic society, with periodic informal meetings of generalist faculty and program students. Students are encouraged to elect the eight-week family medicine clerkship during the second year. Though the third and fourth years remain elective years for all medical students, 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 MD/MBA, MD/MHS, MD/MPP, or MD/MPH. During the fourth year of clinical electives, students are encouraged to take the basic neurology clerkship, a generalist

subinternship, and at least one ambulatory care rotation in a generalist discipline such as community medicine or geriatric medicine. Throughout the four years, students are assigned a primary care mentor as well as an advisory dean. Students may join the program at any time during the first three years and may withdraw from the program at any time. Participation also does not necessitate a primary care career choice. The program is jointly sponsored by the Departments of Community and Family Medicine, Medicine, Obstetrics/Gynecology, and Pediatrics. Additional information may be obtained by contacting Barbara Sheline, MD, MPH, Box 3886, Duke University Medical Center, Durham, NC 27710, sheli002@mc.duke.edu.

**The Medical Historian Program.** The Medical Historian Program is conducted under the auspices of the School of Medicine and the Graduate School. Individuals earning the PhD degree in history from Duke may petition the dean for medical education to receive transfer credit that can be applied to the medical school degree if the major subject area is one that is related to the discipline of medicine, health policy, or public health. The combined MD/PhD program typically extends for six years. Students complete the first two academic years in the School of Medicine (the required, core basic and clinical courses) prior to taking a leave of absence to enroll in the Graduate School. A range of appropriate courses are available there through the Department of History. Following the completion of the PhD degree, the student resumes requirements for the MD 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, MD, PhD, Box 90719, Department of History, Duke University, Durham, NC 27708, meh@acpub.duke.edu.

**The Medicine and Business Administration Program.** The Duke School of Medicine and the Fuqua School of Business jointly sponsor a program of combined medical and business administration education. The program provides an opportunity to acquire a full basic study of the two fields within five years. Upon satisfactory completion of the required course of study, candidates are awarded both the MD and the MBA degrees.

*Course of Study.* The student in the MD/MBA program begins the program in the School of Medicine. As in the regular MD program, the first year is devoted to the basic medical sciences and the second year to the basic clinical disciplines. Upon successful completion of the second year, the student takes a leave of absence from the Medical School and enters the Fuqua School of Business where the first-year curriculum is the same as that of other MBA students. After the completion of two semesters, the student returns (commonly in the month of May) to the School of Medicine to begin the first half of an eight month scholarly experience through, typically, the Epidemiology and Public Health Study Program or the Clinical Research Study Program. In the fall of that year (the beginning of the fourth year), the student continues enrollment in the School of Medicine but returns to the School of Business to complete course work. During the spring of the fourth year, the student completes the second four months of the scholarly activity period. The fifth and final year is spent at completing the Medical School elective clinical work tailored to the student's specialized needs.

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

**Application Procedures.** Application forms for the Fuqua School of Business may be obtained by writing to the Office of Admissions, Duke University Fuqua School of Business, Box 90104, Duke University, Durham, NC 27706. Applications for the School of Medicine should be made by utilizing the MCATS procedure described in this bulletin.

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

For additional information, contact the MD/MBA advisor Steven J. Bredehoeft, MD, Box 2928, Duke University School of Medicine, Durham, NC 27710, brede001@mc.duke.edu and Sim B. Sitkin, PhD, Professor, Fuqua School of Business, Box 90120, Duke University, Durham, NC 27706, sbs4@mail.duke.edu.

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

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

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

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

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

For admission to the Medical School, the AMCAS application procedures should be completed. Upon receipt of the supplemental application form from Duke, the box

indicating MD/JD 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 MD/JD Advisor, Paul Lee, MD, JD, Box 3802, Duke University Medical Center, Durham, North Carolina 27710, lee00106@mc.duke.edu, (919) 681-2793.

**The Medicine and Public Health Program.** Students enrolled in the School of Medicine, after satisfactory completion of the first two years of the regular curriculum, may request approval to seek a Master of Public Health degree at the University of North Carolina, Chapel Hill. The program is designed to train physicians in epidemiology, biostatistics, maternal and child health, health policy and administration, environmental sciences, or in evaluating health care delivery systems. Upon receipt of the MPH degree, students are awarded a full year of basic science credit toward the MD degree.

For additional information contact the MD/MPH Advisor, Laurence G. Branch, PhD, Box 3003, Duke University Medical Center, Durham, North Carolina 27710, (919) 660-7554, lgbranch@geri.duke.edu.

**The Medicine and Public Policy Program.** This four-year program is offered to meet the growing demand for persons who combine medical skills and training with a capacity for analytic public decision-making. It aims at training those persons with the requisite talent to be leaders in the development and implementation of health policy at all levels of government. Such leadership might be provided as an elected or career public official, as a leader of medical professional organizations, or as a practicing physician or medical scholar active in public affairs.

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

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

During the first two years at Duke, students enroll in the normal course of study in the School of Medicine. In the third year, course work shifts to the Institute. In addition to the normal public policy curriculum, combined degree students are required to complete an epidemiology course. Between the third and fourth years, students have a twelve-week policy internship. During the fourth year, students complete their requirements in the School of Medicine and write a "master's memo" for the Institute. When they have completed all the requirements for the two programs, both the MD and Master of Public Policy (MPP) degrees are awarded.

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

**Applications.** Requests for applications and specific questions about the program should be addressed to the Director of Graduate Studies, Terry Sanford Institute of Public Policy, Box 90243, Duke University, Durham, North Carolina 27708-0243, mpp@pps.duke.edu. Inquiries can also be addressed to Laurence G. Branch, PhD, Box

3003, Duke University Medical Center, Durham, North Carolina 27710, (919)660-7554, email: lgbranch@geri.duke.edu.

# Financial Information

## TUITION AND FEES

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

**Tuition.** The following table represents an estimate of a student's necessary expenses in the School of Medicine. The total of these figures suggests a basic minimum budget of approximately \$35,890 for a fourth year student to \$44,960 for a first year student. These are estimated figures only. Tuition and fees are subject to change without notice. Allowances for recreation, travel, clothing, and other miscellaneous items must be added to this estimate with allowances for individual needs and tastes.

### 1999-2000 Cost of Education

Tuition	26,700
Accident and Sickness Insurance <sup>1</sup> (subject to change)	778
Laptop computer rental fee	1,650
First Year Fee <sup>2</sup> (includes microscope rental, first year only)	275
Annual Cost of Books and Supplies: first year	1,620
Annual Cost of Books and Supplies: second year	1,450
Annual Cost of Books and Supplies: third and fourth years	690
Lodging: first year	4,980
Lodging: second year	5,395
Lodging: third and fourth years	3,320
Board: first year	4,080
Board: second year	4,420
Board: third and fourth years	2,720
Student Health Service <sup>3</sup> (per semester)	222
Student Government <sup>4</sup> (Davison Society)	50
Continuation of Enrollment Fee <sup>5</sup> (per semester)	3,535
Graduate Student Fee <sup>6</sup>	19
Motor Vehicle Registration: car	120
Motor Vehicle Registration: motorcycle	31

1.Mandatory Fees.

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

3.Mandatory fees.

4.Mandatory fees.

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

6.Mandatory fees.

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

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

During those years comprised of two semesters (first, third, and advanced-standing fourth years), one-half of the annual tuition is assessed in July and the other one-half in November. During those years comprised of three semesters (second and standard fourth years), tuition is assessed three times annually. For second year, the first one-third of the annual tuition is assessed in July, the second one-third in November, and the remaining one-third in March. For fourth year, the first one-third of the annual tuition is assessed in March, the second one-third in July, and the remaining one-third in November. Disbursement of financial aid funds is scheduled to coincide with these billing cycles.

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

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

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

*Combined Degree Students.* Because of differing curricula and structures of the master's programs, tuition payment requirements vary according to the program in which a student participates.

- *Master of Health Science in Clinical Research and Master of Public Health Programs*  
Students register for these two programs at Duke for third year credit and are assessed the usual tuition and fees. The Medical School Registrar's Office reimburses UNC and the CRT Program for tuition and mandatory fees for participating students for a maximum period of one calendar year. Students who continue to enroll in courses in these master's programs after the expiration of one calendar year must request leaves of absence from the School of Medicine. During these periods, such students are billed directly by the master's programs at those programs' regular tuition rates and are responsible for making payment.

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

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

- *Juris Doctor and Master of Business Administration Programs*

Students in these programs are required to complete the entire Medical School curriculum, but are permitted to arrange their schedules such that third year requirements may not be satisfied during a continuous period of enrollment. Tuition for the required, basic science "year" is assessed twice for these students during the first two semesters of a minimum enrollment of 5 credits of third year work in the Medical School.

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

**Monthly Payment Option.** The Monthly Payment Option Plan allows students and their parents to pay all or part of the academic year's expenses in ten equal monthly payments from July 1 to April 1. The only cost is an annual, nonrefundable fee of \$90.00. The participation fee can be paid by Visa or MasterCard. Payments may be made by check or by bank draft. Questions regarding this plan should be directed to Tuition Management Services, 1-800-722-4867 or 401-849-1550. At renewal, the plan can be extended to twelve months. The monthly payments can be increased or decreased without additional cost.

**Late Payment Charge.** If the "Total Amount Due" on an invoice is not received by the invoice due date, the next invoice shows a penalty charge of 1 1/4 percent per month assessed on the past due balance regardless of the number of days past due. The "Past Due Balance" is defined as the previous balance less any payments and credits received on or before the late payment date and also any student loan memo credits related to the previous balance which appear on the invoice. The amount of the 1 1/4 percent penalty charge is the same regardless of the number of days payment is received after the late payment date.

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

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

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



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

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

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

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

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

**Transcripts.** Requests for transcripts of academic records should be directed to the Office of the Medical Center Registrar, Box 3878 DUMC. A fee of three dollars, payable in advance, is charged for each copy. However, the transcript fee is waived for financially needy students who require transcripts to apply for external funding. After graduation from the School of Medicine, transcripts of deans letters may also be obtained from the Office of the Registrar for the fee of one dollar per copy.

## LIVING ACCOMMODATIONS

**Housing Costs.** For the 2000-2001 academic year, rental rates and occupancy dates for the first-year medical student are available on the Housing Management website (<http://www.housing.duke.edu>). Utility charges, except telephone, are included in these rates. Rates are per person per academic year.

**Food and Other Expenses.** Duke Dining Services and Duke University Store operations are located on campus to service the needs of the Duke community. For the convenience of students, the university identification card, called The DukeCard, can be used to access prepaid accounts and make purchases in these facilities.

There are two kinds of accounts: the dining account, which can be used for food purchases only, and the flexible spending account, which can be used to purchase not only food, but any items sold by Duke stores, such as books, supplies, laundry services, health and beauty aids, and more. These campus retail operations also accept cash.

For more information about establishing an account, contact The DukeCard Office, 024 Union West, Box 90911, Durham, North Carolina 27708-0911, 919/684-5800 or visit our web site: <http://auxweb.duke.edu/Dukecard>.

## MOTOR VEHICLE REGISTRATION

Each motor vehicle operated on Duke University campuses by students enrolled in the School of Medicine must be registered at the Medical Center Traffic Office, PRT Lev-

el, Parking Deck II, within five days after operation on the campus begins, and thereafter must display the proper registration decal.

All students must pay an annual fee of \$120 for each four-wheeled motor vehicle and \$32 for each motorbike or motor scooter registered. Bicycles are registered free of charge at the Public Safety Department, 2010 Campus Drive.

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

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

## **MERIT AWARDS FOR MEDICAL STUDENTS**

The School of Medicine offers awards to students from the following scholarships based solely on academic excellence to support the Senior Scholarship and Dean's Tuition Scholarship Programs:

*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.

*Dr. Kenneth L. Pickrell Scholarship*, established February, 1984, by gift from the Department of Surgery, Duke University Medical Center, for an entering student.

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

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

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

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

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

## **MEDICAL STUDENT RESEARCH SCHOLARSHIPS**

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

Some have delegated the responsibility to the Medical School to select participants in the program, others have their own independent selection processes. For most

programs, a full twelve months is required for the research experience. These scholarships are coordinated through the Student Research Scholarship committee. Queries can be made through Ms. Catharine Hershey, 684-5901, email: [hersh003@mc.duke.edu](mailto:hersh003@mc.duke.edu) or Dr. Wendell Rosse, 684-3724, email: [rosse001@mc.duke.edu](mailto:rosse001@mc.duke.edu). All students applying to these programs prepare their applications and receive interviews during the second year of medical school. Announcement of the scholarship recipients is usually made in April.

### **Eugene A. Stead Student Research Scholarships**

This program has included sixty-one Duke students during its first fourteen years. Three of the scholarships have been endowed by grateful patients of Drs. James Clapp and Andrew Wallace, and one other is supported by the general Stead Scholarship fund. There is an annual Stead Breakfast Meeting during which Stead Scholars discuss their program with first year medical students. The McDaniel-Stead scholarship is intended for trainees in cardiovascular research. *All Stead Scholar preceptors must have an appointment in medicine or in a basic science department; research must be done at Duke*, (contact Dr. Rosse at 919-684-3724 or by e-mail [rosse001@mc.duke.edu](mailto:rosse001@mc.duke.edu)).

### **Four School Physician Scientist Program**

The Four Schools Physician Scientist Program includes one to two students from each of the following schools: Duke University, University of Pennsylvania, Washington University (St. Louis), Johns Hopkins University. The students selected travel together to visit laboratories at each of the four institutions. Following medical school graduation, the student is assured clinical internal medicine house staff training and guidance in securing a position for research training at one of the four institutions. This program is designed for individuals with a strong interest in academic career development in internal medicine.

All students applying to these programs prepare their applications and receive interviews during the second year of medical school. Announcements of the scholarship recipients are made in April.

In addition, there are other foundations which support student research scholarship programs and are approved for Duke University School of Medicine credit but have their own methods for evaluation and selection. Because of the unique nature of the Duke University School of Medicine curriculum, it has been highly successful in having students in the various programs. The Howard Hughes/National Institutes of Health Research Scholars Program requires that the student works in a particular institution away from their parent medical school. The Hughes/NIH program selects thirty students each year to live on the NIH campus and work in one of their basic science laboratories.

Several other opportunities for support of student research scholarship programs which are approved for Duke University School of Medicine credit are also available. These programs have their own selection process, but information about them can be obtained through Ms. Hershey or Dr. Rosse.

### **Howard Hughes Medical Institute Research Fellowships**

The Howard Hughes Medical Institute makes available fellowships for research either at Duke or at an approved institution and laboratory. The application requires the selection of a preceptor and project.

### **Howard Hughes Medical Institute/NIH "Cloisters" Fellowships**

In collaboration with the National Institutes of Health, the Howard Hughes Medical Institute offers research opportunities at the National Institutes of Health with residence on campus. The selection of recipients is made before preceptors are chosen by the recipients.

## **NIH Clinical Research Training Program Fellowships**

The NIH offers fellowships for training at the NIH in clinically related areas. Selection of preceptors is made after the award is given.

## **Sarnoff Society Endowment For Cardiovascular Science**

Stanley Sarnoff was Director of the Cardiac Physiology Laboratory at the NIH for many years before establishing the Survival Technology Corporation. The Society he founded in 1978 now includes 130 fellows from 30 medical schools. Ten new Sarnoff Cardiovascular Fellows are selected each year to work at any laboratory involved in cardiovascularly oriented research of their choice within the United States but outside their own medical school. There is a Sarnoff Society reception at each year's American Heart Association Meetings and funding for travel is provided. The Society meets each year for two days of scientific presentations and social events on the eve of the Spring Scientific Meetings in Washington, DC.

We have also been very successful in having our students in scholarship programs supported by the Few Foundation, Arthritis Foundation, the Pharmaceutical Manufacturers Foundation, and the Fight for Sight Foundation.

## **FINANCIAL AID**

The Duke University School of Medicine makes financial assistance available to accepted students who due to economic circumstances could not otherwise attend the university. The school recognizes, however, the responsibility of the individual and the family to provide funds to achieve the objective of a medical education. Thus, the school does not consider parents to have discharged the full financial obligation for the continuing education of their sons or daughters upon the latter's completion of the undergraduate degree. Additional information is available at the Financial Aid website: <http://www2.mc.duke.edu/som/finaid.html>.

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

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

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

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

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

**Financial Assistance to Upperclassmen.** Annual reapplication is required of all need based aid recipients. Upperclassmen seeking financial assistance for the first time may consult with the director of financial aid.

### **Duke University School of Medicine Endowed Funds.**

These are endowed scholarships used to supplement grants for need-based scholarships. There is no separate application process. Students will be selected in the fall semester. On occasion, students are asked to write a letter of appreciation to the donor and to attend an annual luncheon. The Financial Aid Office is grateful to those donors for their financial support.

*Barney Baker and Minnie P. Baker Endowed Scholarship Fund*, established March, 1992, by bequest of their son Barry Baker.

*Charles W. Banner Loan Fund*, established in 1953, by a gift from Mrs. Edward B. Benjamin.

*Germain Bernard Scholarship*, established in 1959, by the B. C. Remedy Company.

*Thomas C. Bost Scholarship*, established in 1965, by a gift from Dr. Thomas C. Bost, supplemented by subsequent gifts.

*Franklin and Louise Brown Medical Scholarship*, established March, 1992, by bequest of Franklin and Louise Brown.

*Elizabeth Burgess Bressler Memorial Scholarship Fund*, established in 1983, by her children: Garrett S. Bressler, M.D.; Robert B. Bressler, M.D.; Barbara B. Marques; Peter B. Bressler, M.D.

*Ortrude S. Busse Medical Scholarship Endowment*, established in 1993, by gift from her husband, Ewald W. Busse, M.D.

*James L. Clark Memorial Scholarship*, established in 1965, by a gift from Mr. and Mrs. Marvin D. Clark and supplemented by gifts from other donors.

*C. T. Council Scholarship*, established in 1959, by the B. C. Remedy Company.

*Helen M. Curtis Endowed Scholarship Fund*, established June, 1992, from the estate of Helen M. Curtis.

*John H. Dorminy Scholarship*, established in 1980, by gift from John H. Dorminy, Jr.

*Isobel Craven Drill Endowment for Medical School Scholarships*, established 1993, by Isobel Craven Drill.

*Herbert T. Dukes, M.D. Memorial Loan Fund*, established in 1983, by his classmates and friends.

*Doris A. Eagles Scholarship*, established in 1999.

*Eagles-Andrews Memorial Scholarship*, established in 1982, by a gift from Dr. and Mrs. William M. Eagles.

*Eleanor B. Easley Scholarship*, established in 1999 by gifts in memory of Dr. Easley.

*William F. Franck Memorial Scholarship*, established in 1958, by gift from William F. Franck, Jr. '39, and supplemented by additional gifts.

*Henry Garriss Scholarship Fund*, established 1995, from the estate of his widow Jean S. Garriss.

*Constance I. Gottwald Medical Scholarship*, established 1987, with preference for minority students, by gift from Constance I. Gottwald.

*Hazel Endowment Fund*, established 1984, by gift from Mr. and Mrs. William A. Hazel.

*Warren W. Hobbie Fund*, established in 1980, by trustees of the Warren W. Hobbie Charitable Trust.

*Earl P. Holt, Jr. Memorial Scholarship*, established 1986, by gift from family and friends, for first or second year medical students with preference given to minority students.

*George Lee Hundley and Rebecca Barnhill Hundley Fund*, established in 1980, by gift from George Lee and Rebecca Barnhill Hundley.

*H. B. and Adelaide F. Ingle Medical Scholarship*, established in 1976, by gift from Mr. and Mrs. Harry B. Ingle.

*B. Everett Jordan Scholarship*, established in 1974, by the late Senator B. Everett Jordan and his widow, Katherine Jordan.

*Thomas D. Kinney, M.D., Memorial Scholarship*, established in 1980, by gifts from his widow, Dr. Eleanor R. Kinney, and their children: Thomas R. Kinney, M.D.; Eleanor D. Kinney, J.D.; Hannah C. Kinney, M.D.; and Janet S. Kinney, M.D.

*Dr. John Haden Lane Memorial Scholarship*, established in 1968, by gift from Edward H. Lane Foundation.

*E. C. Langston Medical Scholarship*, established in 1979, by bequest of Mrs. Denzil L. Mosteller.

*Paul E. Leviton Medical Scholarship*, established in 1981, from the estate of Paul E. Leviton.

*James Cecil McGehee Memorial Medical Scholarship*, established in 1975, by gift from C. G. McGehee, Jr.

*Medical Alumni/Davison Scholarship*, established 1995.

*Medical Alumni Scholarship*, established in 1974, by Duke Medical Alumni.

*Medical School Annual/Alumni Gifts Scholarship*, established 1994.

*Medical School Faculty Wives Scholarship*, established in 1968, by a gift from the Medical School faculty wives whose source of funds is proceeds from the Nearly New Shoppe.

*John F. Ott Endowment Fund*, established in 1984, by bequest of John F. Ott, M.D., 1943.

*Henry A. Page Scholarship Fund*, established 1942, by gift from Henry A. Page, Jr., and Gertrude Wetherill Page.

*Physical Medicine Scholarship*, established in 1963, by gift from Central Carolina Convalescent Hospital, Inc., Greensboro, North Carolina.

*Queen Effat Muhammed Al Thenayan Medical Scholarship Endowment*, established 1993, by gift from Her Royal Highness Queen Effat Muhammed Al Thenayan.

*Radiological Science Medical Student Loan Fund*, established in 1980, by the Department of Radiology.

*Senior Class Gift*, established by graduates of classes of 1977 and 1978.

*Melvin D. and Judith N. Small Medical School Scholarship Fund*, established in 1976, by gift from Dr. Melvin D. and Mrs. Judith N. Small.

*Sigmund Sternberger Endowment Fund*, established in 1978, by gift from the Sigmund Sternberger Foundation, Inc., Greensboro, North Carolina.

*William E. Stevens, Jr. Scholarship*, established in 1983, by the Broyhill Foundation, Lenoir, North Carolina.

*B. W. Stiles Scholarship*, established in 1981, by gift from the Mary Duke Biddle Foundation.

*Francis and Elizabeth Swett Scholarship*, established in 1966, by gift from the late Dr. and Mrs. Swett.

*A.J. Tannenbaum, M.D., Medical Scholarship Endowment Fund*, established November, 1995, by the Trustees of the Sigmund Sternberger Foundation, Inc., Greensboro, North Carolina.

*Larry and Violet H. Turner Scholarship*, established 1977, by gift from Drs. Larry and Violet H. Turner.

*Dr. Hillory M. Wilder Memorial Scholarship*, established in 1962, by bequest from Celeste Wilder Blake and Kenneth M. Blake.

*Roland R. and Ray R. Wilkins Medical Scholarship Quasi Endowment*, established December 1995, from reserves of the Estate Planning Council.

*Sue Eggleston Woodward Memorial Scholarship*, established in 1966, by gifts from parents, relatives, and friends.

*Vivian Zirkle Memorial Scholarship*, established in 1981, by gift from Drs. Lewis and Sara Zirkle.

**Other Medical School Scholarships.** Mary Duke Biddle Foundation Scholarships,

Duke University School of Medicine Scholarships, State of North Carolina (tuition remission up to \$2,000), and the Lettie Pate Whitehead Foundation.

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

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

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

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

## Loans

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

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

## Loans From Outside The University

**North Carolina Student Loan Program for Health, Science, and Mathematics.** These loans provide financial assistance to North Carolina residents who demonstrate need as determined by the North Carolina State Education Assistance Authority. Loans are available for study in the medical fields, mathematics, and science programs that lead to a degree. The applicant must be a domiciliary of North Carolina and accepted as a full-time student in an accredited associate, baccalaureate, master's, or doctoral program leading to a degree. Loan recipients in some professional or allied health programs may cancel their loans through approved service in shortage areas, public institutions, or private practice. Medical students may receive up to \$8,500 per year for each of the four years; master's degree students are eligible for two loans of up to \$6,500 each; bachelor's degree students are eligible for three loans of up to \$5,000 each. For application forms and more information write: Executive Secretary, North Carolina Student Loan Program for Health, Science, and Mathematics, P. O. Box 20549, Raleigh, North Carolina 27619-0549, or telephone 919/571-4178.

**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, grad-

uate and professional students are financially independent of parents. The annual maximums for medical students are \$8,500 subsidized and \$30,000 unsubsidized. For current medical students, the total maximum unsubsidized loan is \$38,500. The aggregate maximums are \$65,500 subsidized and \$138,500 unsubsidized (minus the subsidized amount). The interest is paid by the federal government on the subsidized Federal Stafford Loan until repayment begins six months after graduation. On the unsubsidized Federal Stafford Loan, the borrower is responsible for the interest which may be paid or deferred during the enrollment period. Eligibility for the subsidized and unsubsidized Federal Stafford Loan is determined by the Financial Aid Office based on the Student Aid Report as a result of filing the F.A.F.S.A.

There is a two year deferment of repayment for residency training for those who first borrowed prior to July 1, 1993. First-time borrowers *after* July 1, 1993, are not eligible for the two-year deferment of repayment for residency training.

Effective July 1, 1994, the loan origination fee is 3 percent, paid by the borrower on the amount of the loan; the fee is deducted from loan disbursements. Also effective at the same time is a 1 percent insurance fee deducted from the loan disbursements.

When repayment begins, the interest for those who first borrowed prior to October 1, 1992 is 8 percent during the first four years and 10 percent beginning with year five of the repayment period. For first time borrowers after October 1, 1992, the interest rate is annual variable based on a 91-day Treasury Bill plus 3.10 percent capped at 9 percent. Those who first borrow after July 1, 1994 have an interest cap of 8.25 percent.

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

## Student and Professional Organizations

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

Duke University Chapter Councillor: Harvey Jay Cohen, M.D.

President: Garheng Kong

**Davison Society.** All medical students are dues-paying members of the Davison Society, named for the first dean of Duke University School of Medicine. The society is governed by the Davison Council which consists of elected officers (president, service vice-president, social vice-president, secretary, treasurer, and intramural sports chairman) and elected representatives from each class. Primary responsibilities of the council include: chartering of medical student groups, budgeting funds for student groups and medical school activities, organization of medical school activities and social events, appointment of medical students to Medical Center and university committees, coordinating the selection of faculty and resident awards for excellence in teaching, and representing student views to the pertinent faculty and administration. The Davison



Council also coordinates medical student projects with community service groups such as Habitat for Humanity, Share Your Christmas, Durham City Schools' Seventh Grade Sex Education Program, AIDS Volunteer Network, Durham Community Kitchen, and the North Carolina Museum of Life and Science Saturday Science Program.

Medical student groups affiliated with, and in the past funded by, the Davison Society include: the American Medical Student Association, the North Carolina Student Rural Health Coalition, the North Carolina Medical Society Student Chapter, the Student National Medical Association, *Shifting Dullness* (the medical student newspaper), the Christian Medical and Dental Society, the Asian-American Medical Student Association, and the Duke Jewish Medical Student Association.

Also: Student Curriculum Committee, Duke Comprehensive Cancer Center Volunteer Network, AIDS Education Roadshow, Lennox Baker Children's Hospital Program, Duke Medical Gleaning Program, Homeless Shelter Clinic, Children's Miracle Network Fair, Family Medicine Interest Group, Pediatric Cardiology Volunteer Program, Self Defense Workshop, the *Aesculapian* (yearbook), American Medical Women's Association, and the Mind-Body Interest Group.

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

President: Sunil Sudarshan  
Social Chairman-Vice-President: Shilpa Hattangadi  
Service Chairman-Vice-President: Jacob Laubach  
Secretary: R. Craig Castellino  
Treasurer: Jonathan Hata  
IM Chairman: Nathan Mick

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

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

**Duke Medical Alumni Association.** The Duke Medical Alumni Association seeks to support and promote the interests of Duke University Medical Center and its extended community and to nurture life-long relationships and learning. The Duke Medical Alumni Association contributes a framework through which the Medical Center family continues to thrive, alumni concerns are addressed, and alumni participation in the life and vitality of Duke University Medical Center is encouraged. Our membership reaches back to 1932 and embraces those just now beginning their first year in medical school. Today, the Duke Medical Alumni Association includes more than 5,000 Duke School of Medicine graduates and 6,500 former house staff members who live and work in every state across the nation and in 46 countries around the globe; encompasses future physician alumni - with a roster of some 400 current students and some 800 house staff officers; and seeks the involvement of nearly 1,000 faculty members at Duke University Medical Center. Each year the Duke Medical Alumni Association sponsors events and activities including the Duke Medical Alumni Association Fitness Center; Medical Parents Weekend; the Davison Ball; the "History of Duke Medicine", a program during Medical Alumni Weekend that focuses attention on the Medical Center's unique history; *Aesculapian*, the medical student yearbook; student orientation activities, including the annual Freshman Orientation Picnic as well as a copy of *Davison of Duke*, the mem-

oors of the medical school's first dean; and distribution of the publications, *Perspectives* and *Medical Alumni News*.

President: Robert L. Murrah, Jr., M.D. 1983, H.S. 1983-85, Winter Park, Florida  
President-Elect: William D. Bradford, M.D., H.S. 1965-66, Durham, North Carolina  
Ellen R. Luken, Executive Director, Medical Alumni Affairs

## Awards and Prizes

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

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

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

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

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

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

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

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

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

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

**Other Awards.** Throughout the year, Duke Medical School receives notification of awards consisting of books, money, and/or plaques or medals to be awarded to 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.

## Courses of Instruction

### ANESTHESIOLOGY

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

Professors: Peter B. Bennett, Ph.D., D.Sc. (Southampton, England, 1984); Frank H. Kern, M.D. (Pennsylvania, 1987); Richard E. Moon, M.D., C.M. (McGill, 1973), M.Sc. (Toronto, 1979); William J. Murray, Ph.D. (Wisconsin, 1955), M.D. (North Carolina, 1962); Mark F. Newman, M.D. (Louisville, 1985); Debra A. Schwinn, M.D. (Stanford, 1983); Bruno J. Urban, M.D. (Albertus Magnus, Germany, 1960); David S. Warner, M.D. (Wisconsin, 1980).

Clinical Professor: Norbertus P. de Bruijn, M.D. (Groningen, The Netherlands, 1976).

Associate Professors: Helene Benveniste, M.D., Ph.D. (Copenhagen, 1986, 1991); Cecil O. Borel, M.D. (Hahnnemann, 1977); Tong Joo Gan, M.B., B.S., F.R.C.A. (London Hosp. Med. College, 1986); Brian Ginsberg, M.B., Ch.B. (Witwatersrand, South Africa, 1975); Peter C. Huttemeier, M.D., Ph.D. (Copenhagen, Denmark, 1977, 1989); Madan M. Kwatra, Ph.D. (Montreal, Canada, 1977); Catherine K. Lineberger, M.D. (North Carolina, 1987); David A. Lubarsky, M.D. (Washington, 1984), M.B.A. (Fuqua Sch. of Business, Duke, 1999); Jonathan B. Mark, M.D. (Stanford, 1978); Joseph P. Mathew, M.D. (Southwestern, 1986); Jon N. Meliones, M.D. (Tufts, 1984); Donald H. Penning, M.D. (Queens, Canada, 1983); Robert L. Reed, M.D. (Virginia, 1976); Scott R. Schulman, M.D. (George Washington, 1982); Sidney A. Simon, Ph.D. (Northwestern, 1973); John T. Sum-Ping, M.B., Ch.B., F.R.C.A. (Manchester, England, 1978, Royal Coll. of Anesthetists, 1984).

Associate Clinical Professors: Fiona Clements, M.D. (Duke, 1975); Roy A. Greengrass, M.D., F.R.C.P.(C) (Manitoba, Canada, 1973); John C. Keifer, M.D. (North Carolina, 1979); Kerri M. Robertson, M.D., F.R.C.P.(C) (British Columbia, 1980); Dianne L. Scott, M.D. (North Carolina, 1978); Susan Steele, M.D. (Illinois, 1983).

Assistant Professors: Elizabeth A. Bell, M.D. (North Carolina, 1990); Terrance W. Breen, M.D. (British Columbia, 1985); John V. Booth, M.B., Ch.B. (Glasgow, 1989); Guy de Lisle, M.B., F.R.C.A. (St. George's Hospital, England, 1979); William T. Denman, M.B., Ch.B. (Aberdeen, England, 1985); Joel S. Goldberg, M.D. (Duke, 1977); Katherine P. Grichnik, M.D. (Tufts, 1987); Hilary Grocott, M.D. (Saskatchewan, 1991); Andrew K. Hilton, M.B., B.S. (New South Wales, Australia, 1983); Lewis R. Hodgins, M.D. (NY-Downstate, 1985); Stephen M. Klein, M.D. (New Jersey, 1992); Holly Muir, M.D., F.R.C.P. (C) (Dalhousie, 1983); Laura Niklason, M.D., Ph.D. (Chicago, 1988, Michigan, 1991); Claude Piantadosi, M.D. (John Hopkins, 1975); James D. Reynolds, Ph.D. (Queens, Canada, 1994); Allison L. Ross, M.D. (Marshall, 1988); Thomas F. Slaughter, M.D. (Duke, 1987); Jacques Somma, M.D. (Montreal, 1991); Mark Stafford Smith, M.D., C.M. (McGill, Canada, 1983); Bryant W. Stolp, M.D. (North Carolina, 1988); Barbara E. Tardiff, M.D. (Yale, 1983); Christopher C. Young, M.D. (New York Med. Coll., 1987).

Assistant Clinical Professors: Robert L. Coleman, M.D. (Virginia, 1984); Francine D'Ercole, M.D. (Med. Coll. Pennsylvania, 1989); Peter D. Dwane, M.D., C.M. (McGill, 1967); Jennifer T. Fortney, M.D. (Maryland, 1978); H. David Hardman, M.D. (Minnesota, 1981), M.B.A. (Fuqua Sch. of Business, Duke, 1999); Steven Hill, M.D. (Vanderbilt, 1986); Katherine E. King, M.D. (North Carolina, 1988); Nancy W. Knudsen, M.D. (Univ. of Missouri, 1991); Andrew F. Meyer, M.D. (New York-Downstate, 1969), M.B.A. (Fuqua Sch. of Business, Duke, 1998); Adeyemi J. Olufolabi, M.B., B.S. (Univ. of Ibadan, 1986); Stephen J. Parrillo, M.D. (Bologna, Italy, 1982); Ziaur Rahman, M.B., B.S. (Prince of Wales Med. Center, India, 1968); Jeffrey M. Taekman, M.D. (Wake Forest, 1991); Dana N. Weiner, M.D. (Duke, 1989).

Assistant Research Professors: Barry W. Allen, Ph.D. (Duke, 1984); Wayne A. Gerth, Ph.D. (California-San Diego, 1979); Lieju Liu, M.D., M.B., M.S. (Tongji Med. Univ., China, 1978, 1981); Jantje Margaretha (Marga) Oortgiesen, Ph.D. (Utrecht, 1989); Richard Vann, Ph.D. (Duke, 1976).

Associates: Alexis Carmer, M.D. (North Dakota, 1993); Terrence M. Calder, M.D. (Allegheny Univ. of the Hlth. Sciences, 1987); John B. Eck, M.D. (Duke, 1992); Anne Marie Fras, M.D. (Michigan, 1993); Maribel G. Gamoso, M.D. (Albany, 1995); Sheila F. Gardner, M.D. (St. George's, 1993); Veeraindar Goli, M.B., B.S. (Osmania, India, 1978); Alina M. Grigore, M.D. (Romania, 1989); Billy K. Huh, M.D., (Alabama, 1993), Ph.D. (Georgia Institute of Technology, 1985); Brian M. Ilfeld, M.D. (California-San Francisco, 1995); Richard Lee Jacobs, II, M.D. (Michigan, 1985); Stephen P. Kantrow, M.D. (Louisiana, 1988); Ellen M. Lockhart, M.D. (Texas, 1993); Eugene W. Moretti, M.D. (Temple, 1993); Mark L. Phillips, M.D. (Bowman Gray, 1980); Iain Sanderson, M.A., M.Sc., F.R.C.A. Anaes. (Oxford, 1985); Allan B. Shang, M.D. (Vermont, 1993); John R. Schultz, M.D. (Loma Linda, 1991); Gautam Sreeram, M.D. (Emory, 1993); Timothy O. Stanley, M.D. (FUHS/Chicago, 1995); Bo Wu, M.D. (China Medical Univ., China, 1985).

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

Visiting Associates: Daniel Bainbridge, M.D. (Saskatchewan, Canada, 1995); George N. Djaini, M.D., D.A., D.E.A.A., F.R.C.A. (Latvian Acad., 1986); John G. Ellingham, M.B., B.S. (Monash, Australia, 1989); Thomas Erb, M.D. (Basel, Switzerland, 1987); Charles R. Garcia-Rodriguez, M.B., B.S., F.R.C.A. (London, 1989); Stuart A. Grant, M.B., Ch.B., F.R.C.A. (Glasgow, 1989); Andrew J. Hartle, M.B., Ch.B. F.R.C.A. (Leeds, 1987); George Burkhard Mackensen, M.D. (Hamburg, Germany, 1994); David B.

MacLeod, M.B., B.S., F.R.C.A. (St. Mary's Hospital, London, 1987); Gavin Martin, M.B., Ch.B., F.R.C.A. (Cape Town, Assoc. Groote Schuur Hosp., South Africa, 1989); Brian James McCreath, M.B., Ch.B., B.Sc. (Hons) (Glasgow, England, 1992, 1995); John A.C. Murdoch, M.B., Ch.B. (Glasgow, 1991); Karen Nielsen, M.D. (Federal Do Parana, 1995); Madhav Swaminathan, M.B.B.S., M.D. (Coll. of Med. Sciences, India, 1990); Ian J. Welsby, B.Sc., M.B.B.S., F.R.C.A. (London) (Middlesex Hosp. Med. Sch., England, 1990); David R. Wright, M.B., Ch.B. (South Hampton, 1990).

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

Adjunct Associate Professors: Randall L. Carpenter, M.D. (Michigan, 1978); Mohammad Maroof, M.B., B.S., D.A. (LON), FFARCS (England) (Liaquat Med. Coll., 1964).

Adjunct Assistant Professors: Fritz F. Klein, Ph.D. (Duke, 1973); Neal W. Pollock, Ph.D. (Florida, 1996); Timothy J. H. Webb, M.D., Ph.D. (Texas-San Antonio, 1980, Texas A & M, 1974).

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

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

Research Associates: Petar J. Denoble, M.D. (Zagreb, 1975); Masaya Kudo, M.D. (Yamagata, 1990); Gregory A. Michelotti, Ph.D. (South Carolina, 1992); Carlos Luis Nebreda, M.D. (Venezuela, 1978); Barbara Phillips-Bute, Ph.D. (Duke, 1988); Mona A. Razik, Ph.D. (North Carolina, 1996); Huaxin Sheng, M.D. (Nantong Med. Col., 1984); Bo Wu, M.D. (China Med. Univ., 1985).

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

## Clinical Science Electives

**ANE-240C. Clinical Anesthesiology.** This course is designed to directly expose students to the clinical practice of anesthesiology. Throughout the rotation, each student is assigned on a weekly basis to an individual resident or attending physician who supervises the student's active participation in the pre-, intra-, and post-operative anesthetic care and management of patients. Opportunities exist for students to participate in the various subspecialty areas of anesthesiology including pediatric, obstetric, cardiac, and neurosurgical anesthesia as well as the recovery room, ICU, and pain clinic. While initial assignments are made prior to the first day of the rotation, there is flexibility with regard to students' particular areas of interest. The evaluation of patients pre-operatively is taught with emphasis placed upon formulating a plan of anesthetic management that is appropriate for the individual patient. The consequential impact of anesthetics and surgical procedures upon particular disease states is stressed also. Students review the clinical pharmacology of anesthetic and adjuvant drugs as well as apply the principles of pharmacology, physiology, and anatomy to the clinical anesthetic management of patients. Didactic information regarding principles of airway management including endotracheal intubation is presented and reinforced with application in the clinical setting. Participants are exposed to basic methods of administering anesthetics and monitoring the depth of anesthesia through physiologic responses of the patient. Instruction to the appropriate techniques and complications of obtaining vascular access for administering drugs and monitoring hemodynamic status is provided although not all cases may be suitable for student involvement in technical procedures. In addition to this clinical work, students attend various lectures including an introductory series (covering preoperative assessment, airway management, and anesthesia equipment), grand rounds and resident lecture series, and various subspecialty conferences (cardiac, pediatrics). No drops or adds are accepted during the week before the course begins. Students wishing to drop or add two weeks prior to the start of the course must contact the course director, Peter Dwane, M.D., (beeper #9433). The course is offered September to December; January, February, and March. Credit: 4. Enrollment: max 6, min 2. *Dwane and staff*

**ANE-241C. Surgical Intensive Care.** This course is designed to broaden the student's knowledge and experience in managing critically ill patients. Under supervision, students function as sub-interns in the Surgical Intensive Care Unit (SICU). Students re-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. 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 nutritional support. Students are formally evaluated by the SICU house staff and the attending physician. C-L: SUR 241C. Credit: 5. Enrollment: max 8. *Young and staff*

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

**ANE-245B or C. Physiology and Medicine of Extreme Environments.** Advanced topics in the physiology and medicine of ambient pressure, immersion, gravity, temperature, and gas composition. Environments considered include: diving and hyperbaric medicine; hot/cold terrestrial and water operations; microgravity and high-g acceleration; high altitude. Basic mechanisms and medical management of associated diseases are examined including: decompression sickness; altitude sickness; hypothermia and hyperthermia; hypoxia; carbon monoxide poisoning; oxygen toxicity. An optional laboratory includes topics in the design and operations of pressure vessels for human occupancy, life support equipment, and sham treatment of medical problems. Prerequisites: Human anatomy and physiology; diving techniques; equipment and procedures; diving physiology; dysbaric diseases; and treatments. Prerequisites may be met by previous training courses, or self-study with instructor permission. Permission of instructor is required. Credit: 3 without lab; 4 with lab. Enrollment: max 12, min 6. *Vann, Thalmann, Stolp*

## BIOCHEMISTRY

George Barth Geller Professor Christian R. H. Raetz, M.D., Ph.D. (Harvard, 1973), Chairman.  
 Professors: Patrick Casey, Ph.D. (Brandeis, 1986); James B. Duke Professor Irwin Fridovich, Ph.D. (Duke, 1955); Arno L. Greenleaf, Ph.D. (Harvard, 1974); Gordon G. Hammes, Ph.D. (Wisconsin, 1959); James B. Duke Professor Robert L. Hill, Ph.D. (Kansas, 1954); Tao-Shih Hsieh, Ph.D. (California at Berkeley, 1976); Nicholas M. Kredich, M.D. (Michigan, 1962); James B. Duke Professor Robert J. Lefkowitz, M.D. (Columbia, 1966); James B. Duke Professor Paul L. Modrich, Ph.D. (Stanford, 1973); James B. Duke Professor K. V. Rajagopalan, Ph.D. (Madras, India, 1957); David C. Richardson, Ph.D. (Massachusetts Inst. Tech., 1967); James B. Duke Professor Jane S. Richardson, M.S., M.S.T. (Harvard, 1966); Lewis M. Siegel, Ph.D. (Johns Hopkins, 1965); Leonard D. Spicer, Ph.D. (Yale, 1968); Deborah A. Steege, Ph.D. (Yale, 1974); Robert E. Webster, Ph.D. (Duke, 1965).  
 Associate Professors: Michael D. Been, Ph.D. (Washington, 1982); Lorena S. Beese, Ph.D. (Brandeis, 1984); Ronald C. Greene, Ph.D. (California Inst. Tech., 1954); Homme W. Hellinga, Ph.D. (Cam-

bridge, 1986); Russel E. Kaufman, M.D. (Ohio State, 1973); Terrence Oas, Ph.D. (Oregon, 1986); Eric Toone, Ph.D. (Toronto, 1988).

Assistant Professors: Daniel Gewirth, Ph.D. (Yale, 1988); Michael S. Herschfield, M.D. (Pennsylvania, 1967); Johannes Rudolph, Ph.D. (MIT, 1993); John York, M.D. (Washington Univ, 1993).

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

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

Research Associates: Dwayne Allen, Ph.D.; Shib Basu, Ph.D.; Ines Batinic-Haberle, Ph.D.; Laura Bazemore, Ph.D.; Ludmil Benov, Ph.D.; David Benson, Ph.D.; Keith Bjornson, Ph.D.; Russell Bishop, Ph.D.; Leonard Blackwell, Ph.D.; Karen Conklin, Ph.D.; Robert De Lorimer, Ph.D.; Derek Duckett, Ph.D.; Serena Farquharson, Ph.D.; Jochen Genschel, Ph.D.; Kendra Hightower, Ph.D.; Barbara Hindenach, Ph.D.; Chih-Chin Huang, Ph.D.; Jennifer Hunt, Ph.D.; Remy Kachadourian, Ph.D.; Margaret Kanipes, Ph.D.; Thomas Kirby, Ph.D.; Stefan I. Liotchev, Ph.D.; Simon Lovell, Ph.D.; Kevin Mason, Ph.D.; Donald Mika, Ph.D.; Daniel Morris, Ph.D.; Jeffrey Myers, Ph.D.; Somashe Niranjana, Ph.D.; Sean Parkin, Ph.D.; Juan Perez-Vilar, Ph.D.; Nanette Que, Ph.D.; Anthony Ribeiro, Ph.D.; Gregory Runyon, Ph.D.; Matthew Saderholm, Ph.D.; Yizhong Sha, Ph.D.; Cathy Silver-Key, Ph.D.; Claudia Spampinato, Ph.D.; Hope Taylor, Ph.D.; Gang Tong, Ph.D.; Rafael Tosado-Acevedo, Ph.D.; Ronald A. Venters, Ph.D.; Shuntai Wang, Ph.D.; Kim White, Ph.D.; Gene Wickham, Ph.D.; Margot Wuebbens, Ph.D.; Timma Wyckoff, Ph.D.; Jae-Sung Yu, Ph.D.; Zhimin Zhou, Ph.D.

Emeriti: Samson R. Gross, Ph.D.; Walter R. Guild, Ph.D.; Jerome S. Harris, M.D.; Kenneth S. McCarty, Sr., Ph.D.; Yashiko Nozaki, Ph.D.; Robert W. Wheat, Ph.D.

## Required Course

**BCH-200B. Biochemistry.** The core course given to all freshman medical students during a period of seven weeks in the first term emphasizes the relationship between structure and function of the major classes of macromolecules in living systems including proteins, carbohydrates, lipids, and nucleic acids. The metabolic interrelationships and control mechanisms are discussed as well as the biochemical basis of human diseases. Credit: 4. *Raetz*

## Electives

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

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

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

## BIOLOGICAL ANTHROPOLOGY AND ANATOMY

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

Professors: Matthew Cartmill, Ph.D. (Chicago, 1970); Kenneth Glander, Ph.D. (Chicago, 1975); William L. Hylander, D.D.S. (Illinois, 1963), Ph.D. (Chicago, 1972); James B. Duke Professor Elwyn L. Simons, Ph.D. (Princeton, 1956), D. Phil. (Oxford, 1959); Kathleen K. Smith, Ph.D. (Harvard, 1980); John Terborgh, Ph.D. (Harvard, 1963); Carel van Schaik, Ph.D. (Utrecht, 1985).

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

Assistant Professors: Frank H. Bassett III, M.D. (Louisville, 1957); Steven Churchill, Ph.D. (New Mexico, 1994); Christine M. Drea, Ph.D. (Emory, 1991); Theresa R. Pope, Ph.D. (Florida, 1989); Daniel Schmitt, Ph.D. (SUNY-Stony Brook, 1995).

Assistant Research Professors: Diane K. Brockman, Ph.D. (Yale, 1994); Leslie J. Digby, Ph.D. (California at Davis, 1994); Blythe A. Williams, Ph.D. (Colorado, 1994).

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

Adjunct Associate Professor: Patricia C. Wright, Ph.D. (New York, 1985).

Adjunct Assistant Professors: Thomas Anderson, Ph.D. (Duke, 1971); Deborah Overdorff, Ph.D. (Duke, 1991).

Research Associates: Friderun Ankel-Simons, Ph.D. (Copenhagen, 1963); Pierre Lemelin, Ph.D. (SUNY-Stony Brook, 1996); Rick Madden, Ph.D. (Duke, 1990); Christopher J. Vinyard, Ph.D. (Northwestern, 1999); Christine Wall, Ph.D. (SUNY-Stony Brook, 1995).

Research Scientists: Susan Crissy, Ph.D. (Maryland, 1985); Thomas Struhsaker, Ph.D. (California-Berkeley, 1965).

Associate in Research: Anne Weil, M.A. (Texas-Austin, 1992).

Instructor: Kirk Johnson, M.A. (Duke, 1981).

Lecturing Fellow: Prithijit Chatrath, B.S. (Punjab Univ., 1964).

## Required Course

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

## Electives

**BAA-214B. Anatomy of the Head and Neck.** This course is designed to be a review of the head and neck, emphasizing its phylogenetic and ontogenetic development along with clinically important features of the anatomy of this region. Credit: 2. Enrollment: min 5, max 12. *K. Smith and staff*

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

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

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

## CELL BIOLOGY

George Barth Geller Professor for Research in Molecular Biology Michael P. Sheetz, Ph.D. (California Inst. Tech., 1972), Chairman.

Associate Professor Daniel P. Kiehart, Ph.D. (Pennsylvania, 1979), Chief, Division of Developmental Biology.

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

Professors: G. Vann Bennett, M.D. (Johns Hopkins, 1976); Celia Bonaventura, Ph.D. (Texas at Austin, 1968); Joseph Bonaventura, Ph.D. (Texas at Austin, 1968); James B. Duke Professor Marc G. Caron, Ph.D. (Miami, 1973); James B. Duke Professor Harold P. Erickson, Ph.D. (Johns Hopkins, 1969); Diane L. Hatchell, Ph.D. (Marquette, 1968); Thomas J. McIntosh, Ph.D. (Carnegie Mellon, 1973); R. Bruce Nicklas, Ph.D. (Columbia, 1958); Michael K. Reedy, M.D. (Washington, 1962).

Associate Professors: Onyekwere E. Akwari, M.D. (Southern California, 1970); Nels C. Anderson, Ph.D. (Purdue, 1964); Frederick R. Cobb, M.D. (Mississippi, 1964); Jonathan Cohn, M.D. (Rockefeller, 1978); Joseph M. Corless, M.D., Ph.D. (Duke, 1972); Don Rockey, M.D. (Med. Coll. of Virginia, 1984); Frederick H. Schachat, Ph.D. (Stanford, 1974); David W. Schomberg, Ph.D. (Purdue, 1965); Steven R. Vigna, Ph.D. (Washington, 1978).

Assistant Professors: Page A. W. Anderson, M.D. (Duke, 1963); Lawrence Barak, M.D., Ph.D. (Michigan, 1982); Blanche Capel, Ph.D. (Pennsylvania, 1989); Marc K. Drezner, M.D. (Pittsburgh, 1970); Richard G. Fehon, Ph.D. (Washington, 1986); James M. Grichnik, M.D., Ph.D. (Harvard, 1990); John A. Klingensmith, Ph.D. (Harvard, 1993); William E. Kraus, M.D. (Duke, 1982); Haifan Lin, Ph.D. (Cornell, 1990); Brian S. McKay, Ph.D. (Medical College, Wisconsin, 1995); Erik Meyers, M.D. (California at San Diego, 1990); Christopher V. Nicchitta, Ph.D. (Pennsylvania, 1987); Patricia M. Saling, Ph.D. (Pennsylvania, 1979); Sean P. Scully, M.D. (Rochester, 1986); Jonathan S. Stamler, M.D. (Mt. Sinai, 1985); Bryant W. Stolp, M.D. (North Carolina, 1988), Ph.D. (Duke, 1985); William E. Yarger, M.D. (Baylor, 1971).

Associate Research Professors: Peter G. Aitken, Ph.D. (Connecticut, 1978); E. Ann LeFurgey, Ph.D. (North Carolina, 1976).

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

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

Emeriti: J. Joseph Blum, Ph.D.; Sheila J. Counce, Ph.D.; Frans F. Jöbsis, Ph.D.; Edward A. Johnson, M.D.; Thomas J. McManus, M.D.; George Padilla, Ph.D.; Jacqueline A. Reynolds, Ph.D.; Knut Schmidt-Nielsen, Dr.Phil.; George Somjen, M.D.

## Required Courses

**CBI-200B. Cell and Tissue Biology.** Lectures on the structure and function of the cells and tissues of the body. The laboratory provides practical experience with light microscopy studying and analyzing the extensive slide collection of mammalian tissues. Credit: 2. *McIntosh and staff*

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

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

## Electives

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

**CBI-219B. Preceptorship in Cell Biology/Physiology.** Guided independent study of original literature and/or research experience in cell biology and/or physiology. Prerequisites: consent of instructor and departmental director of medical studies. Credit: 1-16. *Staff*

**CBI-251B. Molecular Cell Biology.** Current research topics in cell biology presented in a lecture and discussion format based on recent research papers. Topics include: protein secretion and trafficking, the nucleus; cytoskeleton and cell motility, extracellular matrix and cell adhesion, growth factors and signaling, cell cycle. Credit: 1. *Erickson and staff*

**CBI-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. Credit: 1-3. Enrollment: max 8. *Staff*

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



## COMMUNITY AND FAMILY MEDICINE

Clinical Professor James L. Michener, M.D. (Harvard, 1978), Chairman.  
Professors: Truls Ostbye, M.D. (Univ. of Bergen, Norway, 1979), M.P.H. (Harvard, 1983); George R. Parkerson, Jr., M.D. (Duke, 1953), M.P.H. (North Carolina, 1977); Barbara K. Rimer, Dr. P.H. (Johns Hopkins, 1981).

Associate Professors: Colleen McBride, Ph.D. (Minnesota, 1990); Joellen Schildkraut, Ph.D. (Yale, 1987).

Assistant Research Professors: Patricia K. Fullagar, Ph.D. (North Carolina, 1989); Kathryn I. Pollock, Ph.D. (Houston, 1996)

Clinical Associates: Warren A. Blackburn, M.D. (Uniformed Svcs., Univ. of Hlth. Sciences, 1982); Philip E. Stover, M.D. (Eastern Virginia Med. School, 1980).

Research Associates: Marilyn F. Vine, M.P.H. (Yale, 1983), Ph.D. (North Carolina, 1988).

## DIVISION OF CLINICAL RESEARCH

Professor William E. Wilkinson, Ph.D. (North Carolina, 1968), Division Chief.

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

Associate Professors: Elizabeth R. DeLong, Ph.D. (North Carolina, 1979); Lloyd Edwards, Ph.D. (North Carolina, 1990); Kerry L. Lee, Ph.D. (North Carolina, 1974); Gary L. Rosner, Sc.D. (Harvard, 1985); Gregory Samsa, Ph.D. (North Carolina, 1988).

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

Assistant Professors: Terry Cox, M.D. (Kansas, 1975), Ph.D. (North Carolina, 1995); David M. DeLong, Ph.D. (North Carolina, 1977); Susan Halabi, Ph.D. (Texas, 1994); Bercedis L. Peterson, Ph.D. (North Carolina, 1986); Carl F. Pieper, Dr.P.H. (Columbia, 1990).

Assistant Research Professors: Habib El-Moalem, Ph.D. (North Carolina, 1995); Alaattin Erkanli, Ph.D. (Carnegie Mellon, 1991); Steven C. Grambow, Ph.D. (Kentucky, 1998); James E. Herndon, II, Ph.D. (North Carolina, 1988); Maragatha Kuchibhatla, Ph.D. (Texas A&M, 1992); Donna Niedzwiecki, Ph.D. (Yale, 1984); Lawrence H. Muhlbauer, Ph.D. (North Carolina, 1981); Jennifer Shoemaker, Ph.D. (NC State, 1998); Sandra Stinnett, Dr.P.H. (North Carolina, 1993).

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

## DIVISION OF COMMUNITY HEALTH

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

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

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

## DIVISION OF MEDICAL INFORMATION SCIENCES

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

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

## FAMILY MEDICINE PROGRAM

Clinical Professor Lloyd Michener, M.D. (Harvard, 1978), Division Chief and Chair.

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

Assistant Clinical Professor: Hershey S. Bell, M.D. (Toronto, 1982), Vice Chair.

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

Associate Clinical Professors: William Christmas, M.D. (Boston, 1965); Toni Cutson, M.D. (Med. College of Va, 1980); Joseph Green, Ph.D. (Illinois, 1975); Victoria Kaprielian, M.D. (Calif.-LA, 1985); Kimberly S. Yarnall, M.D. (Florida, 1985).

Assistant Clinical Professors: Joyce A. Copeland, M.D. (North Carolina, 1975); Margaret Gradi-son, M.D. (Cincinnati, 1981); Mary Lee Lobach, M.D. (Vanderbilt, 1984); Ronald P. Olson, M.D. (Cal-gary, 1986); William Purdy, M.D. (Case Western, 1977); Sarah Ro, M.D. (Loma Linda, 1991); Barbara L. Sheline, M.D., M.P.H. (North Carolina, 1984); Jonathan L. Sheline, M.D. (North Carolina, 1984); Amrit Singh, M.D. (West Virginia, 1990); Lawrence R. Wu, M.D. (Duke, 1982).

Assistant Research Professors: Veronica M. Hegarty, M.B., M.R.C.P.I. (Dublin, 1984); Linda S. Lee, Ph.D. (North Carolina, 1991).

Clinical Associates: Chika Akeru, M.D. (Univ. of Minnesota, 1995); Andrew A. Bonin, M.D. (Duke, 1975); Katie B. Dore, PA-C (Duke, 1991); Richard T. Ferro, M.D. (Robert Wood Johnson Med. School, 1994); Janet H. Keating, M.D. (Missouri, 1987); Janet Lehr, M.D. (Florida, 1982); James A. Mergy, M.D. (Calif.-San Francisco, 1987); Almaz Smith, M.D. (TX-San Antonio, 1992); David B. Tsai, M.D. (Temple, 1996); William T. Vaughan, R.Ph., R.P.A. (North Carolina, 1972).

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

## DIVISION OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE

Assistant Professor Samuel D. Moon, M.D. (Virginia, 1975), M.P.H. (North Carolina, 1991), Division Chief.

Professor: David G. Warren, J.D. (Duke, 1964).

Associate Clinical Professors: George W. Jackson, M.D. (Western Reserve, 1968); Jerry J. Tulis, Ph.D. (Catholic Univ., 1965).

Associate Consulting Professor: John Dement, Ph.D. (North Carolina, 1980).  
 Assistant Clinical Professors: Dennis Darcey, M.D., M.S.P.H. (North Carolina, 1986, 1988); Carol Epling, M.D. (Virginia, 1989), M.S.P.H. (Colorado, 1994); Gary N. Greenberg, M.D. (Northwestern, 1978), M.P.H. (North Carolina, 1983); Debra Hunt, Dr.P.H. (North Carolina, 1984); Craig R. Stenberg, Ph.D. (Denver, 1982); Woodhall Stopford, M.D. (Harvard, 1969), M.S.P.H. (North Carolina, 1980); Edward D. Thalmann, M.D. (Georgetown, 1970); Wayne R. Thomann, Dr.P.H. (North Carolina, 1983).  
 Assistant Research Professor: Hester J. Lipscomb, Ph.D. (North Carolina, 1995).  
 Associate: Thomas O. Brock, III, Ph.D. (Wake Forest, 1980).  
 Clinical Associates: Judith Holder, Ph.D. (Southern Illinois, 1995); David P. Siebens, M.D. (Washington, 1983); Andrew S. Silberman, M.S.W. (North Carolina, 1982).  
 Consulting Associate: Deborah Smith, M.S.W. (North Carolina, 1979).  
 Research Associates: Larry L. Cook, Ph.D. (North Carolina State, 1986); Norma A. Knutson, Ph.D. (North Carolina, 1991); James M. Schmidt, B.H.S. (Duke, 1974).

#### **DIVISION OF PHYSICAL THERAPY**

Professor of Practice Jan K. Richardson, Ph.D. (Pittsburgh, 1983), Division Chief.  
 Associate Professors: Margaret Schenkman, Ph.D. (Yale, 1974), M.S. (Boston, 1980); Elia E. Villanueva, P.T., A.M. (Duke, 1959, 1969).  
 Associate Clinical Professor: Janet L. Gwyer, Ph.D., P.T. (North Carolina, 1984, 1977).

#### **DIVISION OF PHYSICIAN ASSISTANT EDUCATION**

Clinical Associate Justine Strand, PA-C (Duke, 1981), Division Chief.  
 Assistant Clinical Professor: Joyce A. Copeland, M.D. (North Carolina, 1975), Medical Director.  
 Associate Clinical Professor: Reginald D. Carter, Ph.D. (Bowman Gray, 1970).  
 Assistant Clinical Professors: Lovest T. Alexander, M.H.S. (Duke, 1991); Patricia A. Dieter, M.P.A. (Pennsylvania State, 1983); Phillip Price, M.H.S. (Duke, 1991); Margaret Schmidt, Ed.D. (Duke, 1988); Jan Victoria Scott, M.H.S. (Duke, 1991).  
 Clinical Associates: Robert Giggey, PA-C (Maine Medical Center, 1991); Paul C. Hendrix, M.H.S. (Duke, 1991); Gloria Jordan, PA-C (Duke, 1988); John C. Lord, PA-C (Duke, 1981); Peggy R. Robinson, M.H.S., PA-C (Duke, 1992).

#### **DUKE DIET AND FITNESS CENTER**

Assistant Clinical Professor Howard Eisenson, M.D. (Duke, 1979), Division Chief.  
 Assistant Clinical Professor: Ronette L. Kolotkin, Ph.D. (Minnesota, 1978).  
 Clinical Associate: Lisa Giannetto, M.D. (Loyola, 1986).

#### **ADJUNCT FACULTY**

Adjunct Professors: Barbara S. Hulka, M.D. (Columbia, 1959), M.P.H. (Columbia, 1961); Anastasios A. Tsiatis, Ph.D. (Calif.-Berkeley, 1974).  
 Adjunct Associate Professors: Mark R. Conaway, Ph.D. (Minnesota, 1985); James F. Gifford, Jr., Ph.D. (Duke, 1969); Frank E. Harrell, Jr., Ph.D. (North Carolina, 1979).  
 Adjunct Assistant Professors: James D. Bernstein, M.H.A. (Michigan, 1968); Brian A. Boehlecke, M.D. (SUNY-Buffalo, 1970), M.P.H. (North Carolina, 1981); Patricia M. Eiff, M.D. (Med. Coll. Wisconsin, 1983); Joseph W. Hales, Ph.D. (Utah, 1991); Lars C. Larsen, M.D. (SUNY-Syracuse, 1973); Gina R. Petroni, Ph.D. (Michigan, 1990); Gretchen Purcell, M.D., Ph.D. (Stanford, 1996, 1997); Clare J. Snachez, M.D. (Colorado School of Med., 1975); Katherine M. Shea, M.D. (Oregon Health Sciences, 1978), M.P.H. (North Carolina, 1995); Bonnie Yankaskas, Ph.D. (North Carolina, 1982), M.P.H. (Yale, 1973).  
 Adjunct Associate: Susan Lief, Ph.D. (North Carolina, 1996).

#### **COMMUNITY FACULTY**

Assistant Clinical Professors: L. Allen Dobson, Jr., M.D. (Bowman Gray, 1980), Mt. Pleasant, NC; James M. Wetter, M.D. (SUNY-Buffalo, 1974), Fayetteville, NC.  
 Clinical Associates: James A. Mergy, M.D. (California, 1987), Fayetteville, NC; Lenard Salzberg, M.D. (Albany, 1988) Fayetteville, NC.  
 Consulting Professors: Roger O. McClellan, D.V.M. (Washington State, 1960), Durham, NC; Samuel W. Warburton, Jr., M.D. (Pennsylvania, 1969), Durham, NC.  
 Associate Consulting Professors: Linda Frazier, M.D. (Mount Sinai, 1980), M.P.H. (North Carolina, 1992), Douglas, KS; Kathryn Magruder-Habib, Ph.D. (North Carolina, 1987), Washington, DC; Albert A. Meyer, M.D. (SUNY-Brooklyn, 1975), Cary, NC; Sigrid J. Nelius, M.D. (Ludwig Maximilian, Germany, 1949), Durham, NC; Katherine M. Simon, Ph.D. (Iowa, 1979), St. Louis, MO.  
 Assistant Consulting Professors: Anne M. Akwari, M.D. (Howard, 1976), Durham, NC; Powell Anderson, M.D. (Duke, 1949), Waynesboro, VA; Daniel H. Barco, M.D. (Duke, 1972), Durham, NC; James S. Blair, Jr., M.D. (Maryland, 1947), Wallace, NC; Don W. Bradley, M.D. (Med. Coll. Virginia, 1976), Durham, NC; David K. Broadwell, M.D. (Baylor, 1976), M.P.H. (Texas, 1986), Charleston, NC; Susan E. Brown, M.D. (Georgetown, 1976), Durham, NC; Jack R. Cahn, M.D. (Penn. State-Hershey, 1972), Sparta, NC; Jane T. Carswell, M.D. (Med. Coll. Virginia, 1958), Lenoir, NC; John Cromer, Jr., M.D. (Nebraska, 1972), M.S.P.H. (North Carolina, 1980), Wilmington, NC; Bruce A. Dalton, Jr., M.D. (North Carolina, 1969), Research Triangle Park, NC; Charles Davant, III, M.D. (North Carolina, 1972),

Blowing Rock, NC; John D. Davis, Jr., M.D. (North Carolina, 1978), Blowing Rock, NC; Curtis J. Eshelman, M.D. (Michigan, 1971), Durham, NC; Lawrence L. Fleenor, Jr., M.D. (Virginia, 1966), Big Stone Gap, VA; Henry A. Fleishman, M.D. (Emory, 1974), Eden, NC; Raymond A. Gaskins, Jr., M.D. (North Carolina, 1975), Fayetteville, NC; Wilson Griffin, III, M.D. (Duke, 1977), Jonesville, NC; James K. Har-tye, M.D. (Vanderbilt, 1977), North Wilkesboro, NC; Paul O. Howard, M.D. (Virginia, 1955), Sanford, NC; Peter Jacobi, M.D. (Western Reserve, 1979), Durham, NC; Lane E. Jennings, M.D. (Miami, 1975) Port Orange, FL; Pamela H. Jessup, M.D. (Bowman Gray, 1977), Sanford, NC; Eric M. Johnsen, M.D. (Wayne State, 1977), Albermarle, NC; Charles W. Lapp, M.D. (Albany Med. Coll., 1974), Raleigh, NC; Walter L. Larimore, M.D. (Louisiana, 1977), Bryson City, NC; Lawrence Myers, Ph.D. (California-Berkeley, 1972), Research Triangle Park, NC; Melvin T. Pinn, Jr., M.D. (Virginia, 1976), Charlotte, NC; Jessica Sax-Schorr, M.D. (Tufts, 1977), Charlotte, NC; Evelyn D. Schmidt, M.D. (Duke, 1951), M.P.H. (Columbia, 1962), Durham, NC; Greg Stave, M.D., J.D. (Duke, 1984), M.P.H. (North Carolina, 1989) Research Triangle Park, NC; William B. Waddell, M.D. (Duke, 1962), Galax, VA.

Consulting Associates: Susan R. Andersen, M.D. (Southern Florida, 1992), Concord, NC; Paul E. Austin, M.D. (North Carolina, 1989), Durham, NC; Clarence H. Beavers, M.D. (West Virginia, 1982), Eden, NC; Peter K. Brady, M.D. (Mississippi, 1989), Durham, NC; Toby Brown, MHS, PA-C (Duke, 1992), Ashville, NC; Peter A. Cardinal, M.D. (Uniformed Services Univ. of the Hlth. Sciences, 1984), Fayetteville, NC; Sandra Carr, M.D. (Univ. of TX-Houston, 1996), Fayetteville, NC; Karol Cheek, M.D. (South Carolina, 1987), Concord, NC; Young S. Choi, M.D. (Oklahoma, 1985), Fort Bragg, NC; David L. Christopheron, M.D. (Michigan, 1974), Concord, NC; Bruce A. Cohen, M.D. (St. George's Hosp., 1981), M.P.H. (North Carolina, 1997), Durham, NC; Kiara S. Eily Cofield, M.D. (Bowman Gray, 1991), Durham, NC; Mark A. Crissman, M.D. (Temple, 1980), Mebane, NC; James F. Cummings, M.D. (Geor-getown, 1993), Fayetteville, NC; R. Joseph Cutler, PA-C (South Carolina, 1974, Kannapolis, NC; Terry G. Daniel, M.D. (West Virginia, 1988), Eden, NC; Douglas Degler, M.D. (Georgetown, 1995), Fort Bragg, NC; David J. Desilets, M.D. (Georgetown, 1990), Fayetteville, NC; Mary Carol Digel, M.D. (Duke, 1987), Sparta, NC; Tommy K. Earnhardt, PA-C (Emory, 1984), Mt. Pleasant, NC; William J. Edenfield, M.D. (Miami, 1992), Fort Bragg, NC; Nathan Erteschik, M.D. (George Washington, 1979), Fort Bragg, NC; Conrad L. Flick, M.D. (Duke, 1989), Raleigh, NC; Barnett T. Gibbs, M.D. (Med. Univ. of SC, 1995), Fort Bragg, NC; Lawrence L. Golusinski, M.D. (Med. Coll. Virginia, 1989), Atlanta, GA; Wil-liam Gunn, Ph.D. (Virginia Polytechnic, 1986), Concord, NC; Gordon S. Hardenberg, M.D. (Brown, 1991), Durham, NC; Ruppert A. Hawes, M.D. (Ohio State, 1991), Concord, NC; Jeffrey D. Hoffman, M.D. (North Carolina, 1984), Concord, NC; Kevin P. Howard, M.D. (Wayne State, 1982), Reidsville, NC; Richard Juberg, M.D. (East Carolina, 1982), Erwin, NC; Brenda L. Kaminski, PA-C (Univ. of WI at Madison, 1988), Rocky Mount, NC; Eugenie M. Komives, M.D. (Harvard, 1985), Durham, NC; Edward N. LaMay, M.D. (Bowman Gray, 1988), Durham, NC; Glen R. Liesegang, M.D. (Kentucky, 1983), Blow-ing Rock, NC; Jamil A. Malik, M.D. (Uniformed Svcs Univ. of Health Sciences, 1995), Fort Bragg, NC; Christopher Manasseh, M.D. (Kilpauk Medical College Univ. of Madras, 1992), Fayetteville, NC; Mat-thew M. McCambridge, M.D. (Georgetown, 1992), Fort Bragg, NC; James S. McGrath, M.D. (Tulane, 1980), Durham, NC; Ronald K. McLear, M.D. (Ohio State, 1975), Durham, NC; Ofelia N. Melley, M.D. (Guadalajara, 1984), Southern Pines, NC; Alicia R. Mercer, M.D. (Mercer, 1992), Ft. Bragg, NC; Rich-ard Michal, M.D. (Duke, 1980), Rocky Mount, NC; David Nave, Jr., M.D. (Bowman Gray, 1981), San-ford, NC; J. T. Newton, M.D. (North Carolina, 1981), Clinton, NC; Sandra J. Newton, M.D. (Wayne State, 1984), Durham, NC; Malcolm H. Pannill, B.H.S. (Bowman Gray, 1988), Fayetteville, NC; Ronald A. Pollack, M.D. (Med. Coll. Virginia, 1986), Charlotte, NC; Gwendolyn Powell, M.D. (Miami, 1981), M.P.H. (North Carolina, 1986), Durham, NC; John A. Powell, M.D. (USUHS, 1987), Fort Bragg, NC; Michael A. Rave, M.D. (USUHS, 1989), Fort Bragg, NC; Michael Reil, D.O. (Univ. Health Sci., Kansas, 1984), Fort Bragg, NC; Charles W. Rhodes, M.D. (Bowman Gray, 1980), Mt. Pleasant, NC; Rebecca S. Rich, M.D. (Brow, 1983), Durham, NC; Sarah Cornwell Ringel, M.D. (Duke, 1985), Durham, NC; Mark D. Robinson, M.D. (Pennsylvania, 1983), Concord, NC; Paul W. Sasser, M.D. (California-Los Angeles, 1984), Eden NC; Lori J. Seymour, PA-C (Duke, 1992), Mt. Pleasant, NC; Ronald Sha, M.D., Ph.D. (Min-nesota, 1972, 1993), Durham, NC; Christopher Snyder, III, M.D. (Virginia, 1975), Concord, NC; Erika A. Steinbacher, M.D. (North Carolina, 1992), Kannapolis, NC; Loretta Stenzel, M.D. (Duke, 1986), Durham, NC; Dennis O. G. Stuart, M.D. (Med. Coll. Virginia, 1982), Elkin, NC; Edward Taylor, M.D. (Hahnemann, 1982), Lumberton, NC; Michael J. Trombley, M.D. (Rochester, 1991), Concord, NC; Ter-esa Vanderlinde, D.O. (Philadelphia Coll. Pharm. And Sci., 1989), Fort Bragg, NC; Albert A. Verilli, III, M.D. (Case Western Reserve, 1984), Faison, NC; Mark A. Vincent, M.D. (Virginia, 1992), Concord, NC; Eugene Wade, M.D. (Howard, 1981), Burlington, NC; Jeffrey L. Warhaftig, M.D. (Pittsburgh, 1994), Ft. Bragg, NC; Karen L. Weaver, M.D. (Michigan, 1993), Wilmington, NC; Samuel Weir, M.D. (Duke, 1982), Morrisville, NC; Paul H. Wiegand, M.D. (Bowman Gray, 1982), Durham, NC; Gwendolyn R. Whitley, M.D. (South Carolina, 1987), Concord, NC; Theodore E. Wilson, M.D. (Med. College of Ohio, 1991), Wilson, NC; Carol R. Young, Jr., M.D. (Georgetown, 1992), Fort Bragg, NC.

## Duke University Affiliated Physicians

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

Assistant Consultant Professors: John B. Anderson, M.D. (Cincinnati, 1980); Philip Singer, M.D. (Duke, 1975); Richard Taylor, M.D. (North Carolina, 1962); William Tucker, M.D. (North Carolina, 1966).

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

Consulting Associates: Ginetta Archinal, M.D. (Univ. of New South Wales, 1982); Gillian A. Aylward, M.D. (Canada, 1983); Katherine Bliss, M.D. (North Carolina, 1989); Anita Blosser, M.D. (Kentucky, 1991); William Borgos, M.D. (Johns Hopkins Univ., 1995); W. Kevin Broyles, M.D. (Florida, 1986); Joseph Bruckert, M.D. (Dusseldorf, 1982); Isa Cheran, M.D. (Bowman Gray, 1988); Daniel Crummett, M.D. (Wayne State, 1982); Delora Cummings, M.D. (Albany Med. College, 1989); Kathleen de la Cruz, M.D. (Johns Hopkins, 1996); Kati Dessauer, M.D. (North Carolina, 1985); Jenny Franczak, M.D. (West Virginia, 1988); Joanne Fruth, M.D. (Med. Coll. Ohio, 1987); Sarah Gerritz, M.D. (Rochester, 1994); Parul Harsora, M.D. (Univ. of Western Ontario, 1992); Jon Paul Heiderscheidt, M.D. (North Carolina, 1995); Craig A. Hoffmeier, M.D. (Louisiana State, 1986); Robert Juer, M.D. (Tennessee, 1979); Joel R. Kann, M.D. (Eastern Virginia, 1989); Patrick Kavanaugh, M.D. (East Carolina, 1995); Richard Kennedy, M.D. (Illinois, 1983); David Klein, M.D. (North Carolina, 1986); Thomas Koinis, M.D. (Case Western Reserve, 1980); Soon Kwark, M.D. (Louisiana State, 1984); Thomas Lynn, M.D. (Georgetown, 1987); Rhonda Matteson, M.D. (Cincinnati, 1988); Janet McKeown, M.D. (Univ. of Toronto, 1990); John Mills, M.D. (Bowman Gray, 1982); George H. Moore, M.D. (East Carolina, 1981); Jane Murray, M.D. (North Carolina, 1984); Corey Musselman, M.D. (Florida, 1991); T. Andrew O'Donnell, M.D. (Medical College of Ohio, 1993); Coin Page, M.D. (North Carolina, 1983); Jane Satter, M.D. (Rochester, 1977); Carols Sotolongo, M.D. (Univ. Autonoma De Guadalajara, 1981); Tamra H. Stall, M.D. (Case Western Reserve, 1987); Margaret Stetson, M.D. (Rochester, 1977); Amy Walsh, M.D. (Georgetown, 1997); Kelvin E. Wynn, M.D. (Howard, 1988).

Emeriti: Robert Charles Bartlett; E. Harvey Estes, Jr., M.D.; Michael A. Hamilton, M.D.; Siegfried H. Heyden, M.D.; Dorothy E. Naumann, M.D.

## Required Courses

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

**CFM-205C. Family Medicine.** This basic course in family medicine consists of an eight-week clinical clerkship in the second year. The course goal is to provide students with an understanding of the principles of family medicine and how these apply in community practice. The course emphasizes continuous and comprehensive health care for people of both sexes and all ages within the context of their social groups and communities. Particular attention is paid to the diagnosis and treatment of common medical problems and to health maintenance, ambulatory care, continuity of care, and the role of consultants in primary care. Other topics covered include social factors such as the doctor-patient relationship, the role of the physician in the community, and the economics of health care delivery.

Students are placed with community-based faculty who are practicing family physicians in communities outside of Durham, principally within North Carolina. Most of these preceptorship sites are in rural communities, providing students with exposure to many issues of rural health care such as farming and other occupational injuries, transportation difficulties, and local customs. The eight week sites are scheduled based on the availability of the preceptors. These sites may not be available every rotation. Students gain extensive experience in diagnosing and managing patient problems in an ambulatory care setting under the guidance of the department's faculty. In addition, the clerkship provides students with opportunities to see patients in a variety of other settings including home, nursing home, and community hospital. There is also the opportunity for medical students to be paired with physician assistant students at a community practice site for the purpose of working with mid-level practitioners in a team practice setting. Note: CFM-205C is strongly recommended for all students in the primary care program. Changes in the rotation are not made less than eight weeks prior to the start of the rotation. Credit: 8. *J. Copeland*

**CFM-207C. Family Medicine Preceptorship.** Students not enrolled in the Primary Care Program may opt for a shorter Family Medicine experience. This course is similar to CFM-205C, described above, but lasts only four weeks. This shorter clerkship provides good exposure to the diagnosis and treatment of common problems in ambulatory family medicine; due to time limitations, less experience is available in prevention, community medicine, and continuity of care. Preceptorship sites are located across the state of North Carolina. Availability of sites is dependent upon approval of the preceptor.

Most sites involve living in the community for the duration of the clerkship. Students are expected to complete this clerkship outside of Durham. Changes in the rotation are not made less than eight weeks prior to the start of the rotation. Credit: 4. *J. Copeland*

### **Basic Science Electives**

**CFM-238B. Tutorial in Community and Family Medicine.** An individually arranged experience in which the student participates in the research program of a faculty member. The subject matter, course credit, and meeting time 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. *G. Parkerson*

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

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

### **Clinical Science Electives**

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

**CFM-251C. Integrative Medicine: Research and Clinical Perspectives.** The purpose of the course is to familiarize Duke students with the large variety of complementary and alternative medicine techniques that many of their patients are likely using in the triangle community and to provide a rigorous scientific review of clinical effects. Duke faculty members will be responsible for guiding students in critically evaluating these practices and the available literature on the possible benefits and risks. Community clinicians will be invited to participate as guest lecturers to explain what patients might expect to experience in dealing with a complementary practitioner. It is expected that the rigorous and balanced course outlined will facilitate communication between the students and their patients in the future. Credit: 3. Enrollment: min 28, max 70. *Burk*

**CFM-254C. Community Medicine.** This elective combines patient care with study of community health issues and a population-based approach to treatment. Students develop an intervention plan for a problem they perceive and that is perceived by the community. Student also practice study design and implementation via a quality assurance project. This elective may be taken in Madison County in western North Carolina, or in Durham through the Division of Community Health. Credit: 3. Enrollment: max: 1. *B. Sheline and staff*

**CFM-255C. Health Promotion and Disease Prevention.** This elective is an intensive clinical experience in health promotion and disease prevention. Students see patients in the Duke Family Medicine Center and participate in a variety of activities designed to help them provide excellent health maintenance care. Specific content areas addressed include counseling skills in nutrition, safe sex practices, and smoking and alcohol cessation, as well as screening tests and immunizations. Prerequisites: permission of instructor. Credit: 4. Enrollment: min 2, max 6. *Yarnall and staff*

**CFM-256C. Ethical Issues in Medicine.** This seminar examines ethical questions raised by modern medical science and technology with special attention to their implications for primary care practitioners. It includes both historical and systematic philosophical analyses of these questions. Among topics for consideration are ethical methods (e.g., clinical ethics, philosophical ethics, and public policy), as well as selected practice-related issues (e.g., truth-telling, confidentiality, informed consent). Credit: 1. Enrollment: min 6, max 12. *Keating*

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

**CFM-259C. Advanced Clerkship in Family Medicine.** This course provides intensive instruction and practice in the care of primary care patients in the community setting. Students may select from three sites: the Duke Family Medicine Center on the Duke campus, the Duke-FAHEC Family Medicine Center in Fayetteville or the Duke-Cabarrus Family Medicine Residencies in Concord. This course has an outpatient focus and is recommended for students who would like to improve their skills in the care of ambulatory patients, especially those with common problems. Students are involved with day to day patient care under the supervision of family physician faculty and residents. Because of restrictions on the number of students allowed at each site preference is given to those students entering Family Medicine Residencies. Students are advised to contact the department as early as possible for course approval (at least eight weeks in advance). No drops are permitted within sixty days of the first day of the rotation. Prerequisites: permission of instructor. Credit: 2-8. Enrollment: max 4. *Gradison and staff*

**CFM-260C. Subinternship in Family Medicine.** This course provides senior medical students with an intense inpatient clinical rotation with responsibilities and autonomy similar to that of an intern. The student acts as the primary medical provider for inpatients on the family medicine service at Durham Regional Hospital and follows outpatients at the Duke Family Medicine Center in the setting of a residency program. Clinical instruction and supervision on each patient encounter are afforded by senior level housestaff and faculty members of the Department of Community and Family Medicine. Individual reading on patient problems encountered in the daily work routine is expected. Frequent balanced feedback is provided to students. Students are advised to contact the department as early as possible for course approval (at least eight weeks in

advance). No drops are permitted within sixty days of the first day of the rotation. Prerequisites: permission of instructor. Credit: 4. Enrollment: max 2. *Bell and staff*

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

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

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

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

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

Occupational and Environmental Medicine	Sam Moon, MD Carol Epling, MD
Community Health	Kathryn Andolsek, MD, MPH Victoria Kaprielian MD
Sports Medicine	Rich Ferro, MD Andrew Bonin, MD
Obesity Treatment	Howard Eisenson, MD
Geriatrics	Amrit Singh, MD
Managed Care	Victoria Kaprielian, MD Lloyd Michener, MD

All interested students should contact the coordinator of Medical Student Programs

at 681-3066 to arrange a rotation in their area of interest. Because of the necessity for site approval and prior arrangements with preceptors, it is essential that this contact be made as soon as possible and at least 3 months prior to the desired rotation. Drops are not accepted. Prerequisites: permission of instructor. Credit: 4. *Kapriellan and staff*

#### **DIVISION OF BIOMETRY**

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

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

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

**CRP-242B. Principles of Clinical Research.** General principles and issues in clinical research design. Formulating the research objective and the research hypothesis; specifying the study population, the experimental unit and the response variable(s). Classification of studies as experimental or observational, prospective or retrospective, case-control, cross-sectional, or cohort; their relative advantages and limitations and the statistical methods used in their analysis. Emphasis is placed on the traditional topics of clinical epidemiology such as disease etiology, causation, natural history, diagnostic testing, and the evaluation of treatment efficacy. Prerequisites: CRP-241B. Credit: 4. *Staff*

#### **DIVISION OF MEDICAL INFORMATION SCIENCES**

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

**MIS-234B. Artificial Intelligence in Medicine.** An introduction to basic concepts of Artificial Intelligence (AI) and an in-depth examination of medical applications of AI. The course includes heuristic programming, a brief examination of the classic AI programming languages (LISP and PROLOG), and a study of rule-based systems and cog-



nitive 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*

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

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

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

## GENETICS

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

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

Associate Professors: Mariano Garcia-Blanco, M.D., Ph.D. (Yale, 1988); Joseph Heitman, Ph.D. (Rockefeller, 1989), M.D. (Cornell, 1992); Jeffery Vance, Ph.D. (Indiana, 1979), M.D. (Duke, 1984).

Assistant Professors: Hubert Amrein, Ph.D. (Univ. Zurich, 1988); F. Andrew Futreal, Ph.D. (North Carolina, 1993); Joseph Heitman, Ph.D. (Rockefeller, 1989), M.D. (Cornell, 1992); Daniel Lew, Ph.D. (Rockefeller, 1990); Douglas A. Marchuk, Ph.D. (Chicago, 1985); Andrew S. Peterson, Ph.D. (Harvard, 1988); Bruce Sullenger, Ph.D. (Cornell, 1990); Robin P. Wharton, Ph.D. (Harvard, 1986).

## Required Course

**GEN-200B. Genetics.** A course designed for first year medical students that focuses on the principles of genetics as they apply to human disease. The course emphasizes molecular aspects of gene structure and expression, experimental systems for genetic analysis, and various aspects of human genetics including population genetics and genetic epidemiology, the use of genetic analysis for the identification of disease causing genes, cytogenetics, and genetic diagnosis and counseling. Credit: 2. *Nevins*

## Elective

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

## IMMUNOLOGY

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

Professors: R. Randall Bollinger, M.D. (Tulane, 1970), Ph.D. (Duke, 1977); Rebecca H. Buckley, M.D. (North Carolina at Chapel Hill, 1958); Jeffrey R. Dawson, Ph.D. (Case Western Reserve, 1969); Michael M. Frank, M.D. (Harvard, 1960); Eli Gilboa, Ph.D. (Weizmann Inst., 1977); Barton F. Haynes, M.D. (Baylor, 1973); Garnett Kelsoe, D.Sc. (Harvard, 1979); David R. McClay, Jr., Ph.D. (North Caro-

lina, 1971); David S. Pisetsky, Ph.D. (Albert Einstein, 1972); Wendell F. Rosse, M.D. (Chicago, 1958); Hilliard F. Seigler, M.D. (North Carolina at Chapel Hill, 1960); Ralph Snyderman, M.D. (SUNY, 1965); Frances E. Ward, Ph.D. (Brown, 1965).

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

Associate Research Professors: Andrew E. Balber, Ph.D. (Rockefeller, 1971); Carolyn Doyle, Ph.D. (New York at Stony Brook, 1985); Kay H. Singer, Ph.D. (Duke, 1977).

Assistant Professors: Russell P. Hall, M.D. (Missouri, 1975); Philip Hanna, Ph.D. (Pittsburgh, 1990); Maureane Hoffman, M.D., Ph.D. (Iowa, 1982); Herbert Kim Lyerly, M.D. (California at Los Angeles, 1983); Mary Louise Markert, M.D. (Duke, 1982), Ph.D. (Duke, 1981); Michael G. McHeyzer-Williams, Ph.D. (Melbourne, 1991); Dhaval Kumar D. Patel, M.D., Ph.D. (Duke, 1989); Clay Smith, M.D. (Texas-Southwestern, 1984); J. Brice Weinberg, M.D. (Arkansas, 1969); Yuan Zhuang, Ph.D. (Yale, 1989).

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

Research Associates: Gabriel Bikah, Ph.D.; Alice P. Bradney, Ph.D.; Juan Carabana, Ph.D.; Shui Cao, M.D.; Mei-Fang Dai, M.D.; Chandrika Ediriwickrema, Ph.D.; Sandra Foster, Ph.D.; Manabu Fujimoto, M.D.; Shuhua Han, M.D.; Minoru Hasegawa, M.D.; Scott Langdon, Ph.D.; Xuan Li, Ph.D.; John Mikszta, Ph.D.; Patricia G. Murphy, Ph.D.; Jon Poe, Ph.D.

Emeriti: D. Bernard Amos, M.D.; Charles E. Buckley, III, M.D.; Richard S. Metzgar, Ph.D.

## Required Course

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

## Electives

**IMM-252B. General Virology and Viral Oncology.** The first half of the course is devoted to a discussion of the structure and replication of mammalian and bacterial viruses. The second half deals specifically with tumor viruses which are discussed in terms of the virus-cell interaction, the relationship of virus infection to neoplasia, and the application of retroviruses in molecular and developmental biology. Permission of the instructors is required. C-L: MIC-252B; Graduate School. Credit: 4. Enrollment: min 5. *Keene and staff*

**IMM-291B. Comprehensive Immunology.** An intensive course in the biology of the immune system and the structure and function of its component parts. Major topics discussed are: properties of antigens; specificity of antibody molecules and their biologic functions; cells and organs of the lymphoid system; structure and function of complement; inflammation and non-specific effector mechanisms; cellular interactions and soluble mediators in lymphocyte activation, replication, and differentiation; regulation of immune responses, neoplasia and the immune system; molecular structure and genetic organization of immunoglobulins, histocompatibility antigens, and T cell receptor. C-L: MIC-291B; Graduate School. Credit: 4. Enrollment: max 10. *Krangel and staff*

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

## INTERDISCIPLINARY COURSES

### Required Course

**IND-206C. Medical Practice and Health Systems/MPS.** This two-week required clerkship uses lectures, small group discussions, practical projects, and readings to improve students' awareness and understanding of the complexity of the physician's role in rapidly changing systems of healthcare delivery. The course emphasizes the profes-

sional and ethical tensions that emerge while striving to optimize care for individuals and the populations of individuals. Consideration of cost focuses on the nature and behavior of costs relevant to healthcare and explores the ambiguities inherent in assessing cost effectiveness of interventions from the divergent viewpoints of payors, managed care organizations, physicians and individual patients. Interdepartmental faculty additionally provide perspective on past and present patterns of medical practice and offer possible models of future physician practices. Credit 2. *Bredehoeft, L. Branch, and staff*

### **Basic Science Electives**

**IND-307B. 20th Century American Medicine.** This course in medical history will examine how some of the major trends in American medicine in the twentieth century have changed the doctor-patient relationship. Topics will include: technology, therapeutics, practice organization, genetics, and changing patterns of disease. Credit: 1/2. Enrollment: min 1. *English*

**IND-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 an opposed to abortion. The seminar will draw also from the practices of Britain, Europe, and Japan. Credit: 1/2. Enrollment: min 1. *English*

**IND-309B. Medicine Before 1900.** This course in medical history will explore the history of medicine before the twentieth century. It will include discussions of ancient, medieval, and Renaissance medicine as well as the origins of scientific medicine in the eighteenth and nineteenth centuries. A major part of this course will be using the Josiah Charles Trent Historical Collection of Rare Medical Books. Credit: 1/2. Enrollment: min 1. *English*

**IND-310B. 20th Century Epidemics.** This course in medical history will explore some of the major "plagues" of the twentieth century. Included will be influenza, polio, rheumatic fever, heart disease, cancer, anorexia nervosa, shell shock, and AIDS. Credit: 1/2. Enrollment: min 1. *English*

### **Clinical Science Electives**

**IND-302C. Exploring Medicine: Cross-Cultural Challenges to Medicine in the 21st Century.** The purpose of this course is to promote understanding of the cultural background that frames how the practice of medicine can benefit the people of Honduras. The course content is designed to facilitate the understanding of art, history, literature, music, philosophy, and religion and the impact these factors have on medical care in a foreign country. The seminar is designed to facilitate understanding the meaning of medicine for the student and for different cultures. The course will highlight understanding the cultural aspects of medicine in Honduras and classes will be given by multidisciplinary faculty. A trip to Honduras is planned for spring break with a limited number of students invited. They will meet Honduran students and faculty as well as offer medical care to patients during the visit. Spanish is not required but recommended. The course will be held as two hours semesters with the trip to Honduras as an optional laboratory experience. There will be approximately 20 hours of instruction. Credit: 2. Enrollment: Maximum 12. *Clements*

**IND-304C. Medicine in the Third World: A Haitian Perspective.** This course is divided into a didactic period conducted between September and December followed by one week in Haiti in early January. The didactic portion of the course will involve seven to ten two-hour sessions to discuss history, medicine, religion, culture, and travel in the third world. In addition, some rudimentary knowledge of the Kreyol language will be introduced. During the didactic portion each student will read a book on a topic relating

to Haiti and lead a group discussion related to their reading. While in Haiti, the student will participate as a member of a mission team involving members of the medical and divinity schools. Each student will keep a journal while in Haiti. Four weeks after the trip, each student will turn in a short paper dealing with a topic of personal interest that incorporates all of their experience in the course. Goals of the course: (a) exposing students to health care in the third world; (b) an appreciation for physical diagnosis skills developed by physicians trained without the use of Western technologies and; (c) an appreciation for the natural progression of disease in an environment where health care resources are limited to absent. Credit: 2. *Walmer*

## MEDICINE

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

### DIVISION OF CARDIOLOGY

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

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

Associate Professors: Brian H. Annex, M.D. (Yale, 1985); Christopher B. Granger, M.D. (Connecticut, 1984); Augustus O. Grant, M.D. (Edinburgh, 1971); Robert A. Harrington, M.D. (Tufts, 1986); J. Kevin Harrison, M.D. (New York, 1984); Michael B. Higginbotham, M.D. (Melbourne, 1973); Mitchell W. Krucoff, M.D. (George Washington, 1980); Kenneth Morris, M.D. (Ohio, 1972); Christopher M. O'Connor, M.D. (Maryland, 1983); E. Magnus Ohman, M.D. (Royal Coll. of Surgeons, 1981); Eric D. Peterson, M.D. (Pittsburgh, 1988); Howard A. Rockman, M.D. (McGill, 1983); Robert A. Rosati, M.D. (Duke, 1967); Michael H. Sketch, M.D. (Creighton, 1984); Martin J. Sullivan, M.D. (Ohio State, 1980); James Tcheng, M.D. (Johns Hopkins, 1988); Galen S. Wagner, M.D. (Duke, 1965); Robert Waugh, M.D. (Pennsylvania, 1966); J. Marcus Wharton, M.D. (Vanderbilt, 1980); James P. Zidar, M.D. (Loyola, 1985).

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

Assistant Professors: Tristram D. Bahnson, M.D. (California-San Francisco, 1984); Michael A. Blazing, M.D. (California-San Francisco, 1987); Neil J. Freedman, M.D. (Harvard, 1985); Ruth Ann Greenfield, M.D. (Duke, 1985); M. Dee Gunn, M.D. (Southwestern, 1983); James G. Jollis, M.D. (Ohio, 1986); Christopher D. Kontos, M.D. (Medical College of Virginia, 1989); William E. Kraus, M.D. (Duke, 1982); Carolyn K. Landolfo, M.D. (Texas, Southwestern, 1988); Kenneth W. Mahaffey, M.D. (Washington, 1989); L. Kristin Newby, M.D. (Indiana, 1987); Gail E. Peterson, M.D. (Michigan, 1991); Stuart D. Russell, M.D. (Washington, 1991); Robert A. Sorrentino, M.D. (Albany Med. Coll. 1985); Andrew Wang, M.D. (Duke, 1990).

Assistant Clinical Professor: Richard L. Callihan, M.D. (Marshall, 1989).

Assistant Research Professors: Patricia A. Cowper, Ph.D. (California-Davis, 1984); Eric L. Eisenstein, D.B.A. (Cleveland State, 1995); Lan Mao, M.D. (Beijing Medical Univ., 1979); Karsten Peppel, Ph.D. (SUNY at Albany, 1990); Doris A. Taylor, Ph.D. (Texas, Southwestern, 1987).

Associates: Karen P. Alexander, M.D. (Duke, 1992); James J. Crowley, M.B. (University College Galway, 1985); Michael S. Cuffe, M.D. (Duke, 1991); Matthew T. Roe, M.D. (Duke, 1993); Chen Y. Tung, M.D. (Ohio State, 1992).

### DIVISION OF DERMATOLOGY

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

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

Associate Professors: Claude S. Burton, M.D. (Duke, 1979); John C. Murray, M.D. (Duke, 1977); Neil S. Prose, M.D. (New York, 1975).

Assistant Professors: Jonathan L. Cook, M.D. (Med. Univ. of South Carolina, 1992); James M. Grichnik, M.D. (Harvard, 1990); Sarah C. Myers, M.D. (Duke, 1989).

Associate: Maria Mariencheck, M.D. (Washington Univ., 1994).

### DIVISION OF ENDOCRINOLOGY, METABOLISM, AND NUTRITION

Associate Professor Francis A. Neelon, M.D. (Harvard, 1962), Acting Chief.

Professors: Marc K. Drezner, M.D. (Pittsburgh, 1970); Mark N. Feinglos, M.D. (McGill, 1973); Jerome M. Feldman, M.D. (Northwestern, 1961).

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

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

Assistant Professors: Ann J. Brown, M.D. (Stanford, 1988); Louis Luttrell, M.D. (Virginia, 1989).  
Assistant Clinical Professors: Leslie J. Domalik, M.D. (Pittsburgh, 1986); Diana B. McNeill, M.D. (Duke, 1982).  
Associates: Jennifer B. Green, M.D. (Virginia, 1993); Thomas J. Weber, M.D. (Pritzker, 1989).

#### **DIVISION OF GASTROENTEROLOGY**

Professor Rodger A. Liddle, M.D. (Vanderbilt, 1978), Chief.  
Professors: Paul G. Killenberg, M.D. (Pennsylvania, 1963); Michael McLeod, M.D. (Duke, 1960); Joanne A. P. Wilson, M.D. (Duke, 1973).  
Clinical Professor: Naurang M. Agrawal, M.B.B.S. (Grant Med. Coll., India, 1968).  
Associate Professors: John Baillie, M.B. (Glasgow, 1977); M. Stanley Branch, M.D. (Med. Coll. of Georgia, 1984); Scott R. Brazer, M.D. (Case Western Reserve, 1981); Jonathan A. Cohn, M.D. (Rockefeller, 1978); Paul S. Jowell, M.D. (Univ. of Capetown, 1983); Thomas T. Long, M.D. (Wake Forest, 1966); Don C. Rockey, M.D. (Med. Coll. of Virginia, 1984).  
Assistant Professors: Wendy Z. Davis, M.D. (Duke, 1989); Peter J. Mannon, M.D. (Boston, 1983); John F. O'Connor, M.D. (National Univ. of Ireland, 1983); Jane E. Onken, M.D. (George Washington, 1987); Dawn Provenzale, M.D. (Albany, 1984); Michael A. Shetzline, M.D. (Ohio State, 1991).  
Assistant Clinical Professors: Frank Pancotto, M.D. (Chicago, 1975); David A. Tendler, M.D. (Yale, 1993).  
Assistant Research Professor: Richard T. Premont, Ph.D. (City Univ. of New York, 1992).  
Associates: Michael Heneghan, M.D. (Univ. College Dublin, 1992); Kevin McGrath, M.D. (Jefferson, 1992); Poonputt Chotiprasidhi, M.D. (Chulalongkorn Univ., 1993); Mark W. Swaim, M.D. (Duke, 1990).

#### **DIVISION OF GENERAL INTERNAL MEDICINE**

Associate Professor Eugene Z. Oddone, M.D. (Colorado, 1985), Chief.  
Professor: David B. Matchar, M.D. (Maryland, 1980).  
Associate Professors: Kevin Schulman, M.D. (NY Univ., 1988); David L. Simel, M.D. (Duke, 1980); Jeremy Sugarman, M.D. (Duke, 1986).  
Associate Research Professor: Ronnie D. Horner, Ph.D. (Ohio State, 1984).  
Assistant Professors: Lori A. Bastian, M.D. (Emory, 1987); David E. Edelman, M.D. (Baylor, 1991); Jaya K. Rao, M.D. (Florida, 1987); Douglas C. McCrory, M.D. (Miami, 1986); James A. Tulskey, M.D. (Illinois, 1987); Eric C. Westman, M.D. (Wisconsin, 1986); John D. Whited, M.D. (West Virginia, 1990).  
Assistant Clinical Professors: Charles O. Beauchamp, M.D. (Duke, 1975); Lawrence H. Greenblatt, M.D. (Northwestern, 1990); Faith H. Holcombe, M.D. (Washington Univ., 1980); Scott V. Joy, M.D. (Pittsburgh, 1992); Judith M. Kramer, M.D. (North Carolina, 1977); Lynn E. Keplinger, M.D. (West Virginia, 1990); Evangeline R. Lausier, M.D. (Vermont, 1979); Lia S. Logio, M.D. (Johns Hopkins, 1992); Robert W. Paterson, M.D. (Duke, 1979); Zeses C. Roulidis, M.D. (Virginia, 1986); Kathleen A. Waite, M.D. (Duke, 1990).  
Assistant Research Professors: Hayden B. Bosworth, Ph.D. (Pennsylvania State, 1996); Carol Smith Hammond, Ph.D. (Florida, 1993).  
Associates: Cheryl A. Baker, M.D. (Albany 1995); Cedric M. Bright, M.D. (North Carolina, 1990); S. Tublu Chatterjee, M.D. (Boston, 1990); Rowena J. Dolor, M.D. (Duke, 1991); Marisa R. D'Silva, M.D. (North Carolina, 1992); Lisa A. Giannetto, M.D. (Loyola, 1986); Kenneth C. Goldberg, M.D. (Med. Coll. Wisconsin, 1994); Nicole E. Jelesoff, M.D. (Georgetown, 1991); Sheri A. Keltz, M.D. (Mount Sinai, 1991); Felicia S. Lacksen, M.D. (UMDNJ, 1994); Michael W. Meredith, M.D. (North Carolina, 1994); Daniel A. Nikcevic, M.D. (Rush Medical, 1995); John L. Petersen, M.D. (Washington, 1995); Cathy A. Petti, M.D. (Duke, 1995); Delia Roddy, M.D. (Georgetown, 1995); Amy J. Rosenthal, M.D. (Medical College of Virginia, 1987); Amy W. Shaheen, M.D. (Washington Univ., 1989); Jeannette F. Stein, M.D. (North Carolina, 1981); Kevin B. Waters, M.D. (New Mexico, 1984); Eugene E. Wright, M.D. (Duke, 1978).  
Clinical Associate: Linda H. Harpole, M.D. (Duke, 1992).

#### **DIVISION OF GERIATRICS**

Professor Harvey Jay Cohen, M.D. (SUNY, 1965), Chief.  
Professor: Kenneth W. Lyles, M.D. (Med. Coll. of Virginia, 1974).  
Associate Professor: Kenneth E. Schmader, M.D. (Bowman Gray, 1980).  
Associate Clinical Professor: Byron B. Hamilton, M.D. (SUNY, Syracuse, 1959).  
Associate Research Professors: Connie Bales, Ph.D. (Tennessee, 1981); Elizabeth Clipp, Ph.D. (Cornell, 1984).  
Assistant Professors: Anthony N. Galanos, M.D. (South Alabama, 1986); Helen Hoenig, M.D. (Arizona, 1985); Robert E. Martell, M.D. (Wayne State, 1993); Heidi K. White, M.D. (Washington, 1989).  
Assistant Clinical Professor: Jack I. Twersky, M.D. (Hahnemann, 1982).  
Assistant Research Professors: Pao-Hwo Lin, Ph.D. (Texas, Austin, 1990); Miriam Morey, Ph.D. (North Carolina, 1997); Christine Ruby, Pharm.D. (Pittsburgh, 1994); Gregory A. Taylor, Ph.D. (Duke, 1995).

#### **DIVISION OF HEMATOLOGY**

Professor Marilyn J. Telen, M.D. (New York, 1977), Chief.

Professors: Charles S. Greenberg, M.D. (Hahnemann, 1976); J. Brice Weinberg, M.D. (Arkansas, 1969).

Associate Professors: Scott D. Berkowitz, M.D. (Jefferson, 1979); William H. Kane, M.D. (Washington Univ., 1982); Thomas L. Ortel, M.D. (Indiana, 1985).

Assistant Professor: Murat O. Arcasoy, M.D. (Aegean Univ., 1987).

Assistant Research Professors: Dipak K. Ghosh, Ph.D. (Calcutta, 1984); Thung Lai, Ph.D. (Kent State, 1990).

Associate: Laura M. De Castro, M.D. (Autonoma de Santo Domingo, 1986).

#### **DIVISION OF INFECTIOUS DISEASES**

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

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

Associate Professor: John A. Bartlett, M.D. (Virginia, 1981).

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

Assistant Professors: J. Andrew Alspaugh, M.D. (Duke, 1991); Gary M. Cox, M.D. (Virginia, 1989); Richard Frothingham, M.D. (Duke, 1981); Carol Dukes Hamilton, M.D. (Utah, 1985); Alison E. Heald, M.D. (Pennsylvania, 1986).

Assistant Research Professor: Dena L. Toffaletti, Ph.D. (North Carolina, 1977).

Associates: Barbara D. Alexander, M.D. (East Carolina, 1993); Vance G. Fowler, Jr., M.D. (North Carolina, 1993).

#### **DIVISION OF MEDICAL ONCOLOGY**

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

Professors: O. Michael Colvin, M.D., William W. Shingleton Professor of Cancer Research, (Washington Univ., 1961); Jeffrey Crawford, M.D. (Ohio State, 1974); Jon P. Gockerman, M.D. (Chicago, 1967); Andrew T. Huang, M.D. (Taiwan, 1965); Russel Kaufman, M.D. (Ohio, 1973); Joseph O. Moore, M.D. (Johns Hopkins, 1971).

Associate Professors: Nelson J. Chao, M.D. (Yale, 1981); Michael R. Cooper, M.D. (Duke, 1983); Clayton A. Smith, M.D. (Southwestern, 1984); James J. Vredenburgh, M.D. (Vermont, 1983).

Associate Clinical Professor: Gwynn D. Long, M.D. (Bowman Gray, 1983).

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

Assistant Professors: Carlos de Castro, M.D. (Southwestern, 1985); Jennifer L. Garst, M.D. (Med. Coll. of Georgia, 1990); Herbert I. Hurwitz, M.D. (Jefferson, 1988); Michael Kelley, M.D. (Michigan, 1985); Michael Morse, M.D. (Yale, 1990); David Rizzieri, M.D. (Rochester, 1991); Linda M. Sutton, M.D. (Massachusetts, 1987).

Assistant Clinical Professor: William P. Petros, Ph.D. (Philadelphia Coll. of Pharm., 1987).

Assistant Research Professors: Michael P. Gamcsik, Ph.D. (Edinburgh, 1983); Ying-Fu Su, Ph.D. (Colorado, 1979).

Associates: Darrel P. Cohen, M.D. (Boston, 1992); Cristina Gasparetto, M.D. (Rome, 1986); Scott G. Lilly, M.D. (Medical College of Ohio, 1991); Weei-Chin Lin, M.D. (National Taiwan Univ., 1986); Susan J. Littman, M.D. (Albany, 1989); P. Kelly Marcom, M.D. (Baylor, 1989); Kellie E. Rizzieri, M.D. (Rochester, 1991); Heather S. Shaw, M.D. (Duke, 1993).

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

#### **DIVISION OF NEPHROLOGY**

Professor Thomas M. Coffman, M.D. (Ohio, 1980), Chief.

Professors: James R. Clapp, M.D. (North Carolina, 1957); Steve J. Schwab, M.D. (Missouri, 1979); William E. Yarger, M.D. (Baylor, 1963).

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

Associate Professors: William F. Owen, Jr. (Tufts, 1980); L. Darryl Quarles, M.D. (Alabama, 1979); Stephen R. Smith, M.D. (Duke, 1985); Robert F. Spurney, M.D. (Ohio, 1983); Laura P. Svetkey, M.D. (Harvard, 1979).

Assistant Professors: Krairerk Athirakul, M.D. (Univ. Prince of Songkla, 1986); Michael S. Berkoben, M.D. (Pennsylvania, 1986); David W. Butterly, M.D. (Duke, 1987); Russ P. Carstens, M.D. (Yale, 1990); Olafur S. Indridason, M.D. (Univ. of Iceland, 1987); Eugene C. Kovalik, M.D. (McGill, 1987); Roslyn B. Mannon, M.D. (Duke, 1985); Michael I. Oliverio, M.D. (West Virginia, 1990); Lynda A. Szczech, M.D. (Jefferson Med., 1991).

Associate: Michelle P. Winn, M.D. (East Carolina, 1992).

Visiting Instructor: Matthew J. Oliver, M.D. (Western Ontario, 1993).

#### **DIVISION OF NEUROLOGY**

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

Professors: Janice M. Massey, M.D. (Georgetown, 1978); James O. McNamara, M.D., Carl R. Deane Professor of Neuroscience, (Michigan, 1968); Margaret Pericak-Vance, Ph.D. (Indiana, 1978); Rodney A. Radtke, M.D. (Northwestern, 1980); Donald B. Sanders, M.D. (Harvard, 1964).

Clinical Professor: S. Clifford Schold, M.D. (Arizona, 1973).

Associate Professors: Mark J. Alberts, M.D. (Tufts, 1982); Larry B. Goldstein, M.D. (Mt. Sinai, 1981); Barrie H. Hurwitz, M.D. (Witwatersrand, 1968); Shashidhar H. Kori, M.B.B.S. (Kasturba, 1970); Marvin Rozear, M.D. (Duke, 1966); Donald Schmechel, M.D. (Harvard, 1974); Jeffery M. Vance, M.D. (Duke, 1984).

Associate Research Professors: John R. Gilbert, Ph.D. (North Carolina, 1982); Michael P. Vitek, Ph.D. (Dartmouth, 1983).

Assistant Professors: James R. Burke, M.D. (New York at Brooklyn, 1985); Ilkcan Cokgor, M.D. (Hacettepe, 1989); Carmelo Graffagnino, M.D. (West-Ontario, 1985); Daniel T. Laskowitz, M.D. (Duke, 1991); Martin J. McKeown, M.D. (Toronto, 1990); Joel C. Morgenlander, M.D. (Pittsburgh, 1986); Jeremy N. Rich, M.D. (Duke, 1993); Kevan VanLandingham, M.D. (Virginia, 1985).

Assistant Clinical Professors: J. Thaddeus Coin, M.D. (Duke, 1984); Richard W. Tim, M.D. (California-San Diego, 1986).

Assistant Research Professors: Elizabeth Hauser, Ph.D. (Michigan, 1998); Michael A. Hauser, Ph.D. (Johns Hopkins, 1990); Xiao-Ping He, Ph.D. (Shanghai, 1987); Eden R. Martin, Ph.D., Medical Genetics (North Carolina State, 1997); Ram S. Puranam, Ph.D. (Indian Institute, 1986); Ann Saunders, Ph.D. (Duke, 1987); William K. Scott, Ph.D. (South Carolina, 1996); Marcy Speer, Ph.D. (Duke, 1993); Patrick M. Sullivan, Ph.D. (North Carolina, 1993).

Associates: Gregory N. Barnes, M.D. (Kentucky, 1992); Vani R. Chilukuri, M.D. (Andhra Med. 1982); Aatif M. Husain, M.D. (Rawalpindi, 1989); Burton L. Scott, M.D. (Miami, 1990).

Clinical Associate: E. Wayne Massey, M.D. (Texas at Galveston, 1970).

## **DIVISION OF PULMONARY AND CRITICAL CARE MEDICINE**

Professor Neil R. MacIntyre, M.D. (Cornell, 1972), Acting Chief.

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

Research Professor: Fredrick J. Miller, Ph.D. (North Carolina State, 1977).

Associate Professors: Rodney J. Folz, M.D. (Washington Univ. 1989); Peter S. Kussin, M.D. (Mount Sinai, 1985); Victor F. Tapon, M.D. (Hahnemann, 1982).

Assistant Professors: Martha S. Carraway, M.D. (Wake Forest, 1988); Joseph A. Govert, M.D. (California-Irvine, 1989); Douglas G. Kelling, M.D. (Harvard, 1972); Timothy J. McMahon, M.D. (Tulane, 1993); Michael L. Russell, M.D. (North Carolina, 1985); Karen Welty-Wolf, M.D. (Duke, 1986).

Assistant Clinical Professor of Medicine: Mark P. Steele, M.D. (Illinois, 1982).

Assistant Research Professors: Barbara Buckley, Ph.D. (Johns Hopkins, 1985); Andrew J. Gow, Ph.D. (Temple, 1995); Alfred Hausladen, Ph.D. (Virginia Polytechnic, 1992); Yun Zhao, Ph.D. (Shanghai Med. Univ., 1990).

Associates in Medicine: John P. Connolly, M.D. (Rochester, 1982); Jerry Eu, M.D. (Chicago, 1992); Harvey E. Marshall, M.D. (Wake Forest, 1991); Scott M. Palmer, M.D. (Duke, 1993); Loretta G. Que, M.D. (Chicago-Pritzker, 1989); Ernst-Gilbert Schreiber, M.D. (Cologne, 1987).

## **DIVISION OF RHEUMATOLOGY, ALLERGY AND CLINICAL IMMUNOLOGY**

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

Professors: Nancy B. Allen, M.D. (Tufts, 1978); Michael S. Hershfield, M.D. (Pennsylvania, 1967); Barton F. Haynes, M.D., Frederic M. Hanes Professor (Baylor, 1973); Edward W. Holmes, M.D., Walter Kemper Professor of Medicine (Pennsylvania, 1967); Nicholas M. Kredich, M.D. (Michigan, 1962); Ralph Snyderman, M.D., James B. Duke Professor of Medicine, (New York, Downstate, 1965).

Associate Professors: Peter Bressler, M.D. (Duke, 1981); David S. Caldwell, M.D. (Wake Forest, 1967); Dhavalkumar Patel, M.D. (Duke, 1989); John R. Rice, M.D. (Miami, 1968); E. William St. Clair, M.D. (West Virginia, 1980).

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

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

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

Assistant Research Professors: S. Munir Alam, Ph.D. (Glasgow, 1992); Haribabu Bodduluri, Ph.D. (Indian Inst., 1984); Hua-Xin Liao, Ph.D. (North Carolina, 1991); M. Richardo Richardson, Ph.D. (Barcelona, 1988); Herman F. Staats, Ph.D. (South Alabama, 1992).

Associate in Medicine: John S. Sundy, M.D. (Hahnemann, 1991).

## **ADJUNCT FACULTY**

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

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

Adjunct Associate Professors of Medicine: David A. Hosford, M.D. (Emory, 1983); John S. Penta, Ph.D. (Purdue, 1967); Walter J. Rogan, M.D. (California, San Francisco, 1975); Sandra L. White, Ph.D. (Michigan, 1974).

Adjunct Assistant Professors of Medicine: Edward Breitschwerdt, D.V.M. (Georgia, 1974); Linda A. Charles, M.D. (North Carolina, 1991); Tony Huang, M.D. (National Taiwan Univ., 1983); Richard Kent, M.D. (California-San Diego, 1975); Michael E. McCullough, Ph.D. (Virginia Commonwealth, 1995); Jack A. Taylor, M.D. (Wisconsin, 1984).

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

### CONSULTING FACULTY

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

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

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

Consulting Associates: Fred H. Allen, M.D. (Columbia, 1959); David J. Ahr, M.D. (Georgetown, 1969); Russell D. Anderson, M.D. (Duke, 1984); Faye T. Banks, M.D. (Virginia, 1982); L. Thomas Barber, M.D. (George Washington, 1982); Habib Bassil, M.D. (St. Joseph, 1980); Polly A. Beere, M.D. (Chicago, 1986); Alfonso E. Bello, M.D. (Chicago, 1990); Ira M. Bernstein, M.D. (Wake Forest, 1970); Alan M. Blaker, M.D. (Maryland, 1984); Charles R. Bokesch, M.D. (Emory, 1973); James F. Boyd, M.D. (Duke, 1974); Garrett Bressler, M.D. (Duke, 1978); Louis L. Brunetti, M.D. (Mount Sinai, 1983); Robert A. Buchanan, M.D. (Wake Forest, 1969); A. Gray Bullard, M.D. (North Carolina, 1985); Dwayne D. Callwood, M.D. (Medical Coll. of Virginia, 1989); Paul Campbell, M.D. (Temple, 1985); Stefani L. Capone, M.D. (Tulane, 1991); John F. Carr, M.D. (Tennessee, 1968); Raul G. Castillo, M.D. (Ponce Sch. of Medicine, 1985); Charles J. Cattano, M.D. (SUNY at Syracuse, 1982); Geoffrey S. Chapman, M.D. (California at San Francisco, 1975); Ambrose Chiang, M.D. (Taipei Med. Coll., 1981); Timothy A. Collins, M.D. (Wayne State, 1988); Paul R. Conkling, M.D. (Ohio, 1982); Henry Y. Chow, M.D. (Eastern Virginia, 1991); James H. Cooke, M.D. (Duke, 1976); Thomas A. Dalton, M.D. (Maryland at Baltimore, 1987); James D. Daniels, M.D. (Med. Coll. of Virginia, 1966); Manuel H. Enriquez, M.D. (East-Ramon Mag-saysay, 1979); Richard B. Everson, M.D. (Rochester, 1972); Kenneth A. Fath, M.D. (Ohio State, 1986); Richard Goulah, M.D. (St. George, 1982); James N. Harris, M.D. (Emory, 1973); Douglas L. Hill, M.D. (Vanderbilt, 1987); John D. Hunter, M.D. (Duke, 1976); Dennis C. Kabasan, M.D. (Graz, 1977); Roger Karam, M.D. (Los Andes, 1980); Shaukat A. Khan, M.D. (King Edward Med. Coll., 1986); Gerrit A. Kimmey, M.D. (South Carolina, 1979); Joseph M. Kmonicek, M.D. (Jefferson, 1980); Fred M. Krainin, M.D. (Boston, 1981); Bruce J. Kowalski, M.D. (Marshall, 1991); Gail A. Leget, M.D. (Faculte Libre de Medecine, 1992); Stanley Levy, M.D. (Georgetown, 1971); Richard N. Lind, M.D. (Illinois, 1977); Robert P. Lineberger, M.D. (North Carolina, 1984); Linda F. Lukman, M.D. (St. George, 1990); Martin D. Mark, M.B., Ch.B. (Cape Town, 1979); Elisabeth A. McKeen, M.D. (Albany, 1974); Gary P. Miller, M.D. (Virginia, 1976); David C. Molthrop, Jr., M.D. (Louisiana State, 1987); Alexander Paraschos, M.D. (Med. Coll. of Virginia, 1986); Robert E. Pryor, M.D. (Baylor, 1986); Michael A. Rave, M.D. (Uniformed Ser-



vices, 1989); Veronica J. F. Ray, M.D. (North Carolina, 1979); David F. Rhodes, M.D. (Vanderbilt, 1985); David N. Robinson, M.D. (Florida, Gainesville, 1989); Vera Ann Rose, M.D. (East Tennessee, 1985); Neal A. Rothschild, M.D. (UMDNJ, 1981); Manfred Rothstein, M.D. (Duke, 1974); Peter Rubin, M.D. (Calgary, 1988); Augustin J. Schwartz, M.D. (Jefferson, 1971); Roger L. Seagle, M.D. (Wake Forest, 1979); Jeffrey T. Seder, M.D. (CETEC Univ., 1982); Willie J. Sessions, M.D. (Tufts, 1985); Daniel L. Spitz, M.D. (Med. Univ. of South Carolina, 1980); Robert K. Stack, M.D. (Wayne State, 1981); Thomas A. Stefens, M.D. (Tufts, 1982); Jean-Francois Tanguay, M.D. (Montreal, 1987); Thomas F. Trahey, M.D. (Wake Forest, 1984); Janet K. Vasey, M.D. (Indiana, 1983); Robert A. Warner, M.D. (SUNY at Syracuse, 1969); Diane M. Williams, M.D. (Minnesota, 1987); Boshra George Zakhary, M.D. (Ain Shams Univ. 1981); William J. Zimmer, M.D. (Wisconsin, 1986).

Consulting Associates (Duke University Affiliated Physicians): Lori C. Abel, M.D. (South Florida, 1994); Martha B. Adams, M.D. (Virginia, 1976); Nurum Erdem, M.D. (Michigan, 1996); Ron D. Fleming, M.D. (Vanderbilt, 1984); Paul E. Kile, M.D. (Tufts, 1982); Carlton David Miller, M.D. (North Carolina, 1987); A. Dean Morgan, M.D. (Duke, 1975); Colleen P. Ramsey, M.D. (New Jersey Medical School, 1992); Michael B. Shipley, M.D. (Duke, 1974); Robert D. Stewart, M.D. (West Virginia, 1974); Raymond J. Toher, M.D. (Duke, 1975); William F. Uthe, M.D. (Med. Coll. of Ohio, 1974); Susan T. Weaver, M.D. (Duke, 1987); John W. Whelan, M.D. (Jefferson, 1990).

Consulting Associates (Community Pdc Physicians): Russell Anderson, M.D. (Duke, 1984); James C. Cook, M.D. (Tulane, 1976); Kimberly E. Edwards, M.D. (Miami, 1996); David E. Guyer, M.D. (Case Western, 1972); Sydney G. Short, M.D. (West Virginia, 1983); Brian C. Torgerson, M.D. (Minnesota, 1978).

#### EMERITI

C. Edward Buckley, M.D.; Walter L. Floyd, M.D.; John T. Garbutt, M.D.; J. Cautie Gunnells, M.D.; Albert Heyman, M.D.; Jacqueline C. Hijmans, M.D.; Charles Johnson, M.D.; Yi-Hong Kong, M.D.; Johannes A. Kylstra, M.D.; Harry T. McPherson, M.D.; Barbara Newborg, M.D.; Thomas F. Newcomb, M.D.; Richard M. Portwood, M.D.; Wendell F. Rosse, M.D. Florence McAlister Professor of Medicine; Herbert A. Saltzman, M.D.; Herbert O. Sieker, M.D.; Harold R. Silberman, M.D.; Eugene A. Stead, Jr., M.D.; Ara Tourian, M.D.; Malcolm P. Tyor, M.D.; James B. Wyngaarden, M.D.

#### Required Courses

**MED-205C. Medicine.** The second year clerkship in medicine provides students with the basic humanistic and clinical skills as well as some of the factual information used in the practice of medicine. It is a time for students to consolidate what has been learned during the first year and apply it to the study of their "own" patients. Since it is not possible to cover systematically the entire body of internal medicine during the next eight weeks, students are provided with a series of representative learning experiences based on the case-study method. The goals are to teach a method of patient evaluation and care and to provide a firm foundation in medical problem-solving that will be helpful throughout the student's future careers. It is specifically expected that students will: (1) Perform and record a complete history and physical examination on each patient they admit. (During the first four weeks, this should be a minimum of two patients per week; thereafter **at least** three patients per week). (2) Discuss their plans(s) for the evaluation and care of the patient after the resident has also assessed the patient with both returning to the bedside to resolve any discrepant historical or physical examination findings. (3) Have their complete work-up including analysis of primary data (e.g. peripheral blood smear, urinalysis, sputum gram stain, ECG, etc.) in the chart by **8:00 a.m.** the next day. It is important during the clerkship to learn to evaluate primary data in timely fashion. (4) Take primary responsibility for the care of their patients, following them daily, writing progress notes in the chart, knowing what has happened to their patients since last seen, as well as knowing the rationale for and outcomes of all diagnostic tests and therapeutic interventions. (5) Participate in various diagnostic/ therapeutic procedures (e.g., lumbar punctures, thoracentesis, paracentesis, arthrocentesis, arterial blood gas drawing, placement of intravenous lines) and perform these procedures under appropriate supervision. (6) See each of their patients on a daily basis **before** morning work rounds, review what has happened since last seen, formulate a preliminary plan of care and treatment for each patient and then present these formulations to their ward teams during morning work rounds. (7) Prepare for their bedside case presentations by reading, at a minimum, relevant sections in a standard textbook of medicine. (8) Present their patients to an attending physician within 24 hours of admission, knowing all pertinent medical information as well as the rationale for their ongoing plan(s) for care and evaluation; (9) Not miss any attending rounds without prior permission from

their attending physician. (10) Attend all the Chair's Conferences, sign-out rounds with the Chief Medical Resident, Physical Diagnosis Teaching Rounds, Medical Grand Rounds, and the Student-Lecture Series unless urgent ward duties preclude doing so. Weight: 8. *Waugh and staff*

## Electives

**MED-207C. Neurology.** This course, which is restricted to second year students, provides a firm understanding of the neurological examination, formulation of clinical neurological problems, and practice with written and oral communications in a hospital setting. The student has the opportunity to apply the neuroanatomy, neurophysiology, neurochemistry, and neuropathology learned in the first year to the evaluation and care of his or her patients. Each student is assigned patients from the neurology services at Duke Hospital or the Durham VA Medical Center. The student elicits a history and performs a physical examination. The student records the findings in the hospital charts and presents the findings at regular staff rounds. The student then participates with a clinical team of faculty and house officers in the hospital evaluation of the patients. The student is encouraged to participate in all diagnostic procedures such as lumbar puncture. The student has the opportunity to follow patients through neuro-radiological and neuro-surgical procedures forming part of evaluation and treatment.

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

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

This course is usually taken in conjunction with CFM-207. Weight: 4. *Chilukuri*

**MED-210C. Advanced General Medicine (Duke/Durham-VA).** (1) Course Goals: To expand the experience and knowledge gained during the second year medicine clerkship. Primary - Providing additional experience in the management of hospitalized patients with a wide variety of general internal medical problems. Secondary - Developing 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 MED 205C. (2) How Goals Are Achieved: Students are assigned to one of the general medical wards at either Duke or the VA Hospital. They are assigned patients in rotation with the second year students on the service and are expected to perform and complete an initial evaluation, develop a care plan, write the orders (to be countersigned by the intern), present the patient at teaching rounds, and follow the patient throughout the hospital course. Students are assigned three to five patients per week and are expected to do outside reading on each. The student may be advanced to the subinternship level during the eight week period at the recommendation of the 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. Requests for Duke or Durham VA rotation are accepted on first-come, first-served basis. Call 681-6745. Credit: 10. Enrollment: max 6. *Waugh and staff*

**MED-211C. Internal Medicine Subinternship (Duke/Durham-VA-Durham Regional Hospital).** (1) Course Goals: To provide an internal medicine inpatient care experience.

rience at the intern level. (2) How Goals Are Achieved: Students are assigned to one of the two inpatient services (Duke or VA) and are supervised by a second or third year internal medicine resident. 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. No other medical intern is assigned to the subintern's patient. The number of patients assigned is determined by the supervising resident with anticipated increases over the four weeks. (3) Methods of Evaluation: Students are evaluated by their resident 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 two weeks and an informal evaluation at four weeks. No final exam is given. Prerequisites: available only to Duke medical students who receive grades of Honors or P+ in MED 205C. Students must obtain the written permission of Dr. Robert Waugh to register for or drop this course. Call 681-6745. Students may indicate a preference for Duke or the VA Hospital on a first-come, first-served basis but ultimate assignments to one institution or another will be made on the basis of factors such as team availability and patient census. Credit: 5 or 10. Enrollment: max 13. *Haynes and staff*

**MED-213C. Tutorial in Medical PDC.** (1) Course Goals: Primary—To broaden student exposure to ambulatory care in internal medicine and allow students to work intensively with a single, seasoned medical practitioner. Students learn the informational content relevant to the discipline, but also have the opportunity to observe how one doctor goes about daily practice. (2) How Goals Are Achieved: Students work in a one-to-one relationship with a faculty member in the Department of Medicine who see patients regularly in the Medical PDC. Students evaluate patients and develop plans for treatment and follow-up under the guidance of the preceptor. Students may follow patients admitted to the hospital. Students may select preceptors from General Internal Medicine or any of the medical sub-specialities. (3) Methods of Evaluation: The preceptor observes the student's interaction with patients and the quality of the student's evaluation, including assessments, plans, and follow-up on a daily basis. Prerequisites: Students must prearrange their elective with an individual preceptor and communicate the preceptor's approval to Dr. Waugh (681-6745). Credit: 2 (10 hrs/wk for 8 weeks), 4 (full time for 4 weeks or 20 hrs/wk for 8 weeks or 10 hrs/wk for 16 weeks), or 8 (full time for 8 weeks). *Waugh and staff*

**MED-214C. Introduction to Outpatient Primary Care Internal Medicine.** Course Goals: (1) To broaden exposure to outpatient diagnosis and management of internal medicine problems including a wide variety of diseases that are generally seen only in clinic; (2) to develop the student's skills in (a) taking a problem-focused history, (b) performing a directed physical exam, and (c) doing office-based procedures; (3) to provide the student as much as possible with a continuity of care experience. How Goals Are Achieved: This course is similar to MED 217C, but is designed to be more flexible and less intensive. The student chooses a faculty mentor within the Division of General Internal Medicine and spends one or more days per week with this mentor seeing patients in the Medical Private Diagnostic Clinic (MPDC). 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/she wishes to accomplish during this rotation. This should be delivered to Dr. Lia Logio at least three weeks before the rotation begins. Methods of Evaluation: Student evaluations are done by the faculty mentor who works directly with the student. Grades are based on the student's interactions with patients and his or her thought process regarding diagnosis and management of their problems. Improvement during the course of the rotation and enthusiasm 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), 2 (20 hrs/wk for 4 weeks), or 4 (20 hrs/wk for 8 weeks). *Logio and general internal medicine staff*

**MED-220C. Emergency Medicine.** (1) Course Goals: Primary - To provide a broad exposure to emergent clinical problems, emphasizing acute internal medicine in such a

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

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

**MED-224C. Intensive Care Medicine Subinternship (Durham-VA Hospital).** (1) Course Goals: Primary - To provide training in clinical physiologic and pharmacologic principles of the care of the critically ill. Secondary - To develop students' skills in performance and interpretation of diagnostic procedures. (2) How Goals Are Achieved: Under the supervision of junior assistant residents and a pulmonary fellow, students function as subinterns and are responsible for patient workups 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 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 with a syllabus of selected readings that supplements regular didactic sessions on diagnosis, pathophysiology, and management of critical illness. Student on call schedule is every third night for the duration of this four-week course. The student registered for MED-224C may drop the course up to one month before the start date. After that time, the student must arrange for a replacement if he/she subsequently drops the course. (3) Methods of Evaluation: Student evaluations are done by the fellows and faculty attending on the MICU and are based on observed performance. Information may be obtained by telephoning Gil Schreiber, 684-8404. Credit: 5. Enrollment: max 3. *Schreiber and pulmonary staff*

**MED-230C. Pulmonary Medicine.** (1) Course Goals: Primary - To provide training in clinical aspects of pulmonary medicine. The primary diseases emphasized include asthma, chronic obstructive lung disease, pulmonary vascular diseases including pul-

monary embolus, acute respiratory failure, hypersensitivity, interstitial and immunologic lung diseases and pulmonary manifestations of systemic illnesses, i.e., sarcoid, scleroderma, cystic fibrosis, etc. Secondary - To provide experience with pulmonary laboratory techniques including pulmonary function testing, cardio-pulmonary exercise testing, chest radiology, and bronchoscopy. (2) How Goals Are Achieved: Students assigned to the Pulmonary Consult Services at either the VA or at Duke Hospital. They have primary responsibility for workup and presentation of selected patients on these services. All patients are presented and followed at daily rounds with fellows and faculty. Students also participate in a half-day outpatient clinic each week. Joint seminars and conferences involving both the Duke and VA Consult Services are held each week to provide instruction in pulmonary function evaluation, pulmonary physiology, chest radiology, pulmonary pathology and clinical pulmonary medicine. (3) Methods of Evaluation: Student evaluations are done by fellows and faculty assigned to the Consult Services during the period of the course and are based on observed performance. Questions should be directed to Carolyn Ray, 681-5963. Credit: 4. Enrollment: min 1, max 4. *MacIntyre and pulmonary staff*

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

**MED-243C. Cardiology Subinternship (Asheville VA).** (1) Course Goals: Primary - To provide experience in the assessment and management of patients with acquired heart disease. Secondary - To familiarize the student with both invasive and non-invasive procedures available at this medical center. (2) How Goals Are Achieved: The student is assigned to an attending cardiologist and is expected to work up patients presenting to both the coronary care unit and the cardiology nonacute ward. Daily work rounds commence at 7:30 a.m. with additional student teaching rounds occurring three times a week. In addition, daily interpretation of electrocardiograms, stress tests, Holter monitors, and echocardiograms focus on student teaching. Cardiac catheterization results also are reviewed on a daily basis. Night call is optional, but students may elect to take call with appropriate attendings. (3) Methods of Evaluation: The preceptor evaluates the student's ability to assess patient problems based on the history and physical and to formulate a plan to evaluate the problems. Furthermore, the preceptor assesses each student's ability to evaluate and act upon data derived from both invasive and non-invasive diagnostic methods. Credit: 4. Enrollment: max 2. *Madiraha and Leon*

**MED-244C. In-Patient Cardiology Subinternship.** (1) Course Goals: Primary - To provide an in-depth experience in the evaluation and care of in-patients with various cardiovascular problems. Secondary - To refine student understanding of the cardiovascular history, physical examination and non-invasive and invasive laboratory testing in evaluating and managing patients with known or suspected cardiovascular disease. (2) How Goals Are Achieved: Students are assigned to the Duke CCU, the VA CCU, or a cardiology in-patient service at Duke, and, in concert with the housestaff, cardiology fellows, and senior staff attendings, work up and manage patients admitted to these various services. They also participate in a core curriculum experience, including individually assigned times to work with HARVEY, the cardiology patient simulator and various computer assisted instruction programs. (3) Methods of Evaluation: Students are evaluated by all resident, fellow, and senior staff with whom they work. The evaluation form is available at the beginning of the elective. Depending on circumstances, students may also be evaluated by written and practical examinations at the beginning and/or end of the elective. Credit: 5. Enrollment: max 6. *Waugh and cardiology staff*

**MED-245C. Consultative Cardiology.** (1) Course Goals: To refine student understanding of normal and pathologic cardiovascular physiology while functioning in the role of a consultant for inpatients and outpatients with various cardiovascular problems; to develop the skills necessary to quickly and accurately interpret ECGs. (2) How Goals Are Achieved: Students are assigned to the consult service at either the VA Hospital or Duke, where, in concert with the resident, fellow and senior staff attending, they evaluate the operative risk for non-cardiac surgery as well as make decisions concerning evaluation and treatment of patients with ischemic and other types of heart disease. Students participate extensively in reading ECGs and a core curriculum experience including individually assigned times to work with HARVEY, the cardiology patient simulator and various computer-assisted-instruction programs. (3) Methods of Evaluation: Students are evaluated by the resident, fellow, and senior staff with whom they work. The evaluation questionnaire is made available at the beginning of the elective. Depending on circumstances, students may also be evaluated by written and practical examinations at the beginning and/or end of the elective. Credit: 4. Enrollment: max 7. *Waugh and cardiology staff*

**MED-250C. Clinical Dermatology.** The elective in clinical dermatology is designed to prepare students to perform an accurate skin examination, formulate appropriate differential diagnoses, and choose relevant diagnostic or therapeutic interventions. This course is valuable to any student interested in improving their ability and confidence in the cutaneous exam. Students in the rotation spend two weeks working in the outpatient dermatology clinics, one week on the inpatient consult service at Duke, and one week at the VA Medical Center. The outpatient clinical experience includes general dermatology clinics as well as a variety of specialty clinics such as pediatric dermatology, HIV dermatology, cutaneous oncology, and dermatologic surgery; clinic attendance can be tailored to the student's future career goals. Patient care is supplemented with lectures designed to provide the student with a foundation in dermatologic principles, and students are encouraged to attend weekly departmental teaching conferences. Student evaluations are based on the development of clinical skills as assessed by faculty and residents, and by a brief clinically oriented examination. Any questions may be discussed with the course director, who may be reached at 681-1629. Students are to report to the Dermatology Clinic, Duke South, Orange Zone, Room 0027 at 8:30 a.m. on the first day of the rotation for orientation. Credit: 4. Enrollment: max 4. *Prose*

**MED-255C. Pharmacotherapy of Common Problems in Internal Medicine.** The purpose of this course is to integrate basic pharmacology with rigorous clinical science in order to understand how drugs should be used to treat common medical problems. Topics covered include heart failure, stroke, arthritis, hypertension, asthma, diabetes, infectious disease, and cancer. Two lectures per week during the spring term. This course is offered to fourth year students for clinical credit. Third year students may take

the course for basic science credit by registering for PHR-255B. CL: PHR-255B. Credit: 2. Enrollment: min 2. *Pritchett and Nadler*

**MED-256C. Ethical Issues in Medicine.** This seminar examines ethical questions raised by modern medical science and technology with special attention to their implications for primary care practitioners and their patients. It includes both historical and systematic philosophical analysis of these questions. Among topics addressed in this course are methods (e.g., clinical ethics, philosophical ethics, and public policy) as well as selected practice-related issues (e.g., truth-telling, confidentiality, informed consent). CL: CFM-265C. Credit: 1. Enrollment: min 6, max 12. *Keating*

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

**MED-270C. Outpatient Hematology-Oncology (Duke or Durham VA).** (1) Course Goals: To give the student experience in the diagnosis, long-term treatment, and supportive care of patients with hematologic and oncologic disorders in the outpatient setting. The use and interpretation of peripheral blood films and other specialized laboratory tests (e.g., bone marrow aspirate/biopsy, serum electrophoresis, coagulation studies, tumor markers, leukemia cell markers), as well as an approach to the evaluation and treatment of common hematologic problems (anemias, bleeding and clotting disorders, hematologic and solid tissue malignancies) are included. Issues such as quality of life and care of the geriatric oncology patient are addressed. (2) How Goals Are Achieved: The student is assigned a staff member as preceptor with whom to work in the Hematology/Oncology clinic one-three half days per week in clinic, depending on the student's schedule and the availability of physicians in clinic. If desired, a preceptor who concentrates mainly on hematology or oncology may be arranged. This course is offered for eight or, preferably, sixteen weeks. (3) Methods of Evaluation: Students are evaluated by their preceptors on the basis of their ability to obtain a history, perform a physical examination, evaluate hematologic and other laboratory data, and propose assessments and plans of action. Credit: 1-2. Enrollment: max 4. *Telen and hematology/oncology staff*

**MED-272C. Clinical Hematology And Oncology (Duke or Durham VA).** (1) Course Goals: Students learn how to interpret peripheral blood films, how to use and interpret other specialized laboratory tests (e.g., bone marrow aspirate/biopsy, serum electrophoresis, coagulation studies, tumor markers, leukemia cell markers), and how

to approach the evaluation and treatment of common hematologic problems (anemias, bleeding and clotting disorders, hematologic and solid tissue malignancies). (2) How Goals Are Achieved: Students receive a series of core lectures, gain familiarity with chemotherapy regimens and administration, and attend the ongoing clinical, research, and didactic divisional conferences. Clinical duties include the performance of inpatient consults under the supervision of a fellow and staff member. This course may be taken for four or eight weeks. (3) Methods of Evaluation: The students are expected to perform and present initial evaluations of consult cases including peripheral blood film on daily rounds, and to perform limited literature searches and evaluations of chosen clinical topics. Credit: 4 or 8. Enrollment: max 4. *Telen and hematology/oncology staff*

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

**MED-275C. Clinical Coagulation.** (1) Course Goals: Primary - To teach the clinical and laboratory approach to patients with a hemorrhagic or thrombotic disorder. The student learns to evaluate clinical coagulation disorders and become familiar with coagulation laboratory testing and interpretation. Secondary - To expose the student to recent advances in the area of coagulation research. (2) How Goals Are Achieved: The student spends four weeks on the Clinical Coagulation Consult Service under the direction of Dr. Thomas Ortel, Dr. Scott Berkowitz, Dr. William Kane, or Dr. Charles Greenberg. The student is expected to work-up inpatients 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 evaluated by the Coagulation 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. *Ortel, Greenberg, Kane, and Berkowitz*

**MED-280C. Clinical Infectious Diseases.** (1) Course Goals: To provide experience



in the clinical and laboratory diagnosis of infectious diseases and in their therapy. The primary emphasis is placed on learning from interaction with patients, resident staff, and faculty on the consultation service. Students are expected to work up assigned patients by interview, physical examination, and collation of laboratory results, leading to a summary and synthesis of the problem. Particular emphasis is placed on close follow-up of the patients during hospitalization, including attendance at procedures or operations whenever possible. Students should know their own patients well enough to be able to give a reasonable presentation on ward rounds or at conferences without notice. Students are expected to read standard texts in-depth about their patients' problems, as well as a few recent relevant primary references. Students are expected to attend the various conferences listed on the weekly schedule of division activities punctually including Microbiology Plate Rounds, Journal Club, and tutorials. They are asked to present cases and provide some discussion at the Thursday V.A. Conference. Each student should be prepared to present and briefly discuss articles that he or she considers to be interesting and timely at Journal Club. (2) Methods of Evaluation: Each student's performance is evaluated and graded by the resident, fellow, and attendings, using the usual "honors", "pass plus", "pass", "deferred", or "unsatisfactory" system that is utilized internally in the Department of Medicine. In arriving at a consensus, appropriate emphasis is placed on knowledge, enthusiasm, and evidence of improvement during the rotation. There is no written examination. Adds are accepted at any time providing the course has not been filled. However, because this course is usually oversubscribed, drops are not accepted within thirty days of the first day of classes unless the student finds his own replacement. MED-280C is a full-time experience. Also, it is offered as a sole-enrollment course and, as such, cannot be taken in conjunction with any other course without the permission of the advisory dean and the course director. Credit: 4. Enrollment: max 5. *Hamilton and infectious diseases staff*

**MED-290C. Metabolism and Endocrinology.** (1) Course Goals: Primary—The student has an in-depth experience in the evaluation and management of patients with endocrine disorders. Secondary— The student learns basic principles of hormone physiology and apply these concepts in clinical settings. (2) How Goals Are Achieved: Each student is introduced to patient problems by working with the Endocrine Faculty (Drs. Brown, Burch, Drezner, Ellis, Feinglos, Feldman, Guyton, Domalik, Green, Luttrell, Neelon, Weber, McNeill.) Prior arrangements may be made with a particular faculty member under the appropriate course number. The student is exposed to clinical endocrine disorders by seeing patients in two endocrine outpatient clinics (Diabetes/General Endocrine, and VA General Endocrine Clinic), as well as experiencing the inpatient Endocrinology Diabetes Management/General Endocrine Consult Service. The student has the opportunity to review general literature on common endocrinologic conditions and endocrinologic emergencies as well as learning basic assessment skills of the patient with diabetes, thyroid disease, and other common endocrinologic presentations. Division conferences include Grand Rounds, Research Seminar, Inpatient Attending Rounds, and Consult Rounds with opportunities to integrate basic concepts with clinical applications. (3) Methods of Evaluation: A written critique is provided by the student's preceptors with comments from other members of the division as appropriate. Credit: 4. Enrollment: max 3. *McNeill and endocrinology staff*

**MED-300C. Nephrology.** (1) Course Goals: Primary - To provide clinical experience in the diagnosis, assessment and treatment of renal diseases and hypertension. Secondary -To integrate renal physiology, immunology, pathology, and biochemistry into the clinical assessment of renal diseases. (2) How Goals Are Achieved: Students participate fully in both inpatient and outpatient assessment of patients presenting with fluid and electrolyte disorders, problem hypertension, acute renal failure, end-stage renal disease, and related complications. The student rounds daily with a renal fellow or senior resident, attends regular faculty teaching rounds and scheduled conferences devoted to correlations with basic science review of renal biopsy material, transplantation,

etc. Special emphasis is placed on renal physiology and pathophysiology, renal histopathology, and hypertension. Students may elect to participate at the VA Hospital or on the private or nonprivate services at Duke. (3) Methods of Evaluation: Written comments from the faculty. Credit: 4. Enrollment: max 4. *Coffman and nephrology staff*

**MED-307C. Neurology Clerkship.** This course is restricted to those students who did not take the Neurology rotation in their second year. It provides the student with a firm understanding of the neurological examination, formulation of clinical neurological problems, and practice with written and oral communications in a hospital setting. The student has the opportunity to apply the neuroanatomy, neurophysiology, neurochemistry, and neuropathology learned in the first year to the evaluation and care of his or her patients. The patients are drawn from the neurology services at Duke Hospital or the Durham VA Medical Center. The students elicit a history and perform a physical examination. The student records the findings in the hospital charts and presents the findings at regular staff rounds. The student then participates with a clinical team of faculty and house officers in the hospital evaluation of the patients. The student is encouraged to participate in all diagnostic procedures such as lumbar puncture. The student has the opportunity to follow patients through neuro-radiological and neuro-surgical procedures forming part of evaluation and treatment. The specific expectations for the student are: (a) to perform and record a competent neurological and history examination on each admitted patient; (b) to be competent in the hospital management of neurological patients including diagnostic evaluations such as hematological and urine evaluations, lumbar puncture and appropriate electrical studies; (c) to assume responsibility as the primary care person for his or her patients; (d) to participate in daily work rounds with an assigned team of house officers and faculty; (e) to be sufficiently knowledgeable to participate in patient care decisions; (f) to attend faculty attending rounds and to present patients to faculty within twenty-four hours after admission; and (g) to participate in neurology service rounds and conferences during the course. The course includes faculty lectures. A written evaluation is provided to the students by faculty and house staff. There is an examination. Credit: 4. Enrollment: max 1. *Chilukuri and neurology staff*

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

**MED-309C. Consultative Neurology.** (1) Course Goals: To introduce senior medical students to the diagnostic and treatment issues encountered on the consultative neurology service. (2) How Goals Are Achieved: The student becomes part of the inpatient neurology consultation team either at Duke Hospital or the Durham VA Hospital. This team consists of senior neurology attendings on a rotating basis as well as a neurology and/or medicine house officer. Consultations are performed by the student under the guidance of the house staff and then are presented to the attending on rounds. The student is responsible for performing a neurologic history and physical as well as assisting in the interpretation of all important laboratory data. The student continues to follow the patient's course as required. The student also attends rounds when other patients are presented by the house officers. Appropriate reading material is utilized to complement the clinical experience. Attendance at Neurology Grand Rounds and various Neu-

rologic Subspecialty Conferences are required. Experience on an inpatient neurology service such as MED-207C or MED-307C are prerequisites for this course. (3) Method of Evaluation: Standard written evaluation by faculty supervisor with house staff input. Credit: 4. Enrollment: max 2. *Chilukuri and neurology staff*

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

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

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

**MED-322C. Outpatient Community Rheumatology.** The clerkship in clinical rheumatology in the community setting is based in the Danville, Virginia Rheumatology Outreach Clinic. Students travel with the attending physician to the outpatient site

five days per month for two consecutive months participating in the evaluation of patients with rheumatic disease. New and return patients are seen averaging 15-20 patients per visit. The student is under the direct supervision of the attending physician as no fellows or residents are involved in this particular clinic. The student is expected to learn extensively about the approach to patients with rheumatic complaints and also gain an understanding of therapeutic options in the management of such patients. Credit: 2. Enrollment: max 1. *Caldwell*

**MED-400C. Geriatric Medicine.** (1) Course Goals: Primary - To enable the student to become familiar with the principles of caring for the geriatric patient. Secondary - To familiarize the student with the physiology and diseases of aging. (2) How Goals Are Achieved: This elective is offered by the interdepartmental faculty of the Division of Geriatric Medicine. The student works with faculty, fellows, and housestaff in a number of settings involved in the care of the geriatric patient. These include the Geriatric Evaluation and Treatment Clinic (Duke), Geriatric Evaluation Unit and Clinic (VA), Geriatric Consultation Services (VA, Duke), extended care and rehabilitation center (VA) and other nursing home facilities, interactions with community services, home assessment and other. Principles to be stressed are biology and pathophysiology of aging, multiple clinical problems in the elderly, interdisciplinary team approach to evaluation, planning and treatment, goals of maximal functional achievement and independence for the elderly. The student participates actively in the workup and management of patients in inpatient extended care and outpatient settings to become more familiar with the problems of the elderly in the community. Familiarity with the growing literature in geriatric medicine is encouraged. The student participates in seminars, lectures and team meetings at the appropriate sites including the Duke Center for the Study of Aging. (3) Methods of Evaluation: Evaluation is by consensus of instructors and fellows at the various training sites. It is based on discussions and presentations throughout the course period. Prerequisites: approval of course director. Credit: 4. Enrollment: max 2. *Cohen and staff*

## MICROBIOLOGY

Professor Jack D. Keene, Ph.D. (Washington, 1974), Chairman.  
Professors: Deepak Bastia, Ph.D. (Chicago, 1971); Dani P. Bolognesi, Ph.D. (Duke, 1967); Bryan R. Cullen, Ph.D. (New Jersey, 1984); Sharyn A. Endow, Ph.D. (Yale, 1975); Elwood Linney, Ph.D. (California at San Diego, 1973); Joseph R. Nevins, Ph.D. (Duke, 1976).

Adjunct Professors: H. Mario Geysen, Ph.D. (Melbourne, 1976); William Phelps, Ph.D. (Minnesota, 1985); Norman F. Weatherly, Ph.D. (Kansas, 1962).

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

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

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

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

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

Associate: Donald Komma, Ph.D. (Michigan, 1964).

Research Associates: Dragana Antic, Ph.D.; Ulus Atasoy, M.D.; Michael Burdick, Ph.D.; Kathleen Dudas, Ph.D.; Anja Forche, Ph.D.; Ashish Gautam, Ph.D.; Alan Goldstein, Ph.D.; George Hong, Ph.D.; James Johnson, Ph.D.; Barbara Lipes, Ph.D.; Bidyut K. Mohanty, Ph.D.; Sashidhar Mulugu, Ph.D.; Margaret S. Neece, Ph.D.; Bradley Nicholson, Ph.D.; Erin O'Reilly, Ph.D.; Aardra Potnis, Ph.D.; S. Shamsuzzaman, Ph.D.; Poonam Sharma, Ph.D.; Rahul Sharma, Ph.D.; Scott Tenenbaum, Ph.D.; Jianping Xu, Ph.D.; Zhonghui Yang, Ph.D.; Xiaohua Zhang, Ph.D.

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

## Required Course

**MIC-200B. Microbiology.** The course in microbiology for medical students is given during the second semester of the first year. An intensive study is made of the common bacteria, viruses, fungi, and parasites that cause disease in humans. The didactic portion of the course focuses on the fundamental biology of micro-organisms causing disease and the molecular mechanisms of the microbial pathogenesis. Attention is given to the host-microbial relationship and the impact of the immune system and antimicrobial therapy on this interaction.

The laboratory portion of the course is designed to acquaint students with the basic techniques employed in the clinical microbiology laboratory, and to reinforce microbiological concepts. Medical case histories are presented by the clinical staff to correlate this course with patient care. Credit: 5. *Mitchell and staff*

## Electives

**MIC-252B. General Virology and Viral Oncology.** The course is devoted to the molecular biology of mammalian viruses, with emphasis upon mechanisms of virus replication, virus-host interactions, viral pathogenicity, and the relationship of virus infection to neoplasia. C-L: IMM-252B; Graduate School. Credit: 4. Enrollment: min 5. *Keene, Alexander, Bastia, Cullen, Nevins, and Pickup*

**MIC-291B. Comprehensive Immunology.** An intensive course in the biology of the immune system and the structure and function of its component parts. Major topics discussed are: properties of antigens; specificity of antibody molecules and their biologic functions; cells and organs of the lymphoid system; structure and function of complement; inflammation and non-specific effector mechanisms; cellular interactions and soluble mediators in lymphocyte activation, replication, and differentiation; regulation of immune responses, neoplasia and the immune system; molecular structure and genetic organization of immunoglobulins, histocompatibility antigens, and T cell receptor. C-L: IMM-291B; Graduate School. Prerequisites: Permission of instructor. Credit: 4. Enrollment: max 10. *Krangel and staff*

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

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

## NEUROBIOLOGY

George Barth Geller Professor for Research in Neurobiology Dale Purves, M.D. (Harvard, 1964), Chairman.

Professors: Mohammed Abou-Donia, Ph.D. (California-Berkeley, 1967); George J. Augustine, Ph.D. (Maryland, 1980); Dona M. Chikaraishi, Ph.D. (California-San Diego, 1973); Owen Flanagan, Ph.D. (Boston, 1977); David Fitzpatrick, Ph.D. (Duke, 1982); Warren G. Hall, Ph.D. (Johns Hopkins, 1975); William C. Hall, Ph.D. (Duke, 1967); Lawrence C. Katz, Ph.D. (California Instit. of Tech., 1984); Gregory McCarthy, Ph.D. (Illinois, 1980); David R. McClay, Ph.D. (North Carolina, 1971); James O. McNamara, M.D. (Michigan, 1968); J. Victor Nadler, Ph.D. (Yale, 1972); Sidney A. Simon, Ph.D. (Northwestern, 1973); Theodore Slotkin, Ph.D. (Rochester, 1970); John E.R. Staddon, Ph.D. (Harvard, 1964); Warren J. Strittmatter, M.D. (Duke, 1973); Dennis Turner, M.D. (Indiana, 1975); E. Lee Tyrey, Ph.D. (Illinois, 1969); David S. Warner, M.D. (Wisconsin, 1980).

Associate Professors: Helene Benveniste, M.D. (Copenhagen, 1986), Ph.D. (Copenhagen, 1991); Rose-Mary Boustany, M.D. (Amer. Univ. Beirut, 1979); Nell B. Cant, Ph.D. (Michigan, 1973); Joseph M. Corless, M.D. (Duke, 1972), Ph.D. (Duke, 1971); Michael M. Haglund, Ph.D. (Washington, 1988); Darrell V. Lewis, M.D. (Minnesota, 1969); Donald C. Lo, Ph.D. (Yale, 1989); Roger D. Madison, Ph.D. (Duke, 1981); Miguel A.L. Nicoletis, M.D. (Sao Paulo, 1984), Ph.D. (Sao Paulo, 1988); Stephen Nowicki, Ph.D. (Cornell, 1985); Peter H. Reinhart, Ph.D. (Australian National Univ., 1985); Donald E. Schmechel,

M.D. (Harvard, 1974); Rochelle D. Schwartz-Bloom, Ph.D. (Georgetown, 1983); J. H. Pate Skene, Ph.D. (Washington Univ., 1980); Antonius Vandongen, Ph.D. (Univ. of Leiden, 1988); Fulton Wong, Ph.D. (Rockefeller, 1977).

Assistant Professors: Michael D. Ehlers, M.D., Ph.D. (Johns Hopkins, 1998); Robert T. Fremeau, Jr., Ph.D. (George Washington, 1985); Timothy M. George, M.D. (New York, 1986); Erich Jarvis, Ph.D. (Rockefeller, 1995); Julie A. Kauer, Ph.D. (Yale, 1986); Richard D. Mooney, Ph.D. (California Inst. Tech., 1991); Michael Platt, Ph.D. (Pennsylvania, 1994).

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

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

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

## Required Course

**NBI-202B. Basic Neurobiology.** An intensive introduction to the structure and function of the mammalian nervous system designed specifically for first-year medical students. Lectures, laboratory exercises, clinical presentations and problem-solving conferences. Credit: 4. *Cant and staff*

## Electives

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

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

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

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

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

## OBSTETRICS AND GYNECOLOGY

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

Professors: Walter L. Thomas Professor W. Allen Addison, M.D. (Duke, 1960); Andrew Berchuck, M.D. (Case Western Reserve, 1980); Richard C. Bump, M.D. (Ohio State, 1973); James M. Ingram Professor Daniel L. Clarke-Pearson, M.D. (Case Western Reserve, 1975); Ronald N. Goldberg, M.D. (California-Los Angeles, 1972); Roy T. Parker Professor Arthur F. Haney, M.D. (Arizona, 1972); F. Bayard Carter Professor William N.P. Herbert, M.D. (Bowman Gray, 1972); Gale B. Hill, Ph.D. (Duke, 1966); David F. Katz, Ph.D. (California, 1972); Stanley J. Robboy, M.D. (Michigan, 1965); David W. Schomberg, Ph.D. (Purdue, 1965); John T. Soper, M.D. (Iowa, 1978); E. Lee Tyrey, Ph.D. (Illinois, 1969). Research Professor: Claude L. Hughes, M.D., Ph.D. (Duke, 1980).

Associate Professors: Barbara Hertzberg, M.D. (Duke, 1980); Charles H. Livengood, III, M.D. (Duke, 1976); Patricia M. Saling, Ph.D. (Pennsylvania, 1979); J. Brice Weinberg, M.D. (Arkansas, 1969).

Associate Clinical Professors: Stanley J. Filip, M.D. (Mt. Sinai, 1979); Stephen C. Gooding, M.D. (Bowman Gray, 1965); Joanne T. Piscitelli, M.D. (Duke, 1980); Anna L. Stout, Ph.D. (South Carolina, 1980); David K. Walmer, M.D., Ph.D. (North Carolina, 1983).

Assistant Professors: Nels C. Anderson, Ph.D. (Purdue, 1964); Lori A. Bastian, M.D. (Emory, 1987); James D. Bowie, M.D. (Oklahoma, 1967); Ann J. Brown, M.D. (Stanford, 1988); Grace M. Couch-

man, M.D. (Colorado, 1985); Pamela L. Johnson, M.D. (Illinois, 1989); Elizabeth G. Livingston, M.D. (Duke, 1984); Diana B. McNeill, M.D. (Duke, 1982); Amy P. Murtha, M.D. (Med. Col. of Pennsylvania, 1992); Evan R. Myers, M.D. (Pennsylvania, 1988); Donald H. Penning, M.D. (Queens, 1983); Gustavo C. Rodriguez, M.D. (Illinois, 1985); Alison C. Weidner, M.D. (Duke, 1992).

Assistant Clinical Professors: Cindy L. Amundsen, M.D. (Tennessee, 1991); Jeffrey C. Andrews, M.D. (Toronto, 1983); Paul S. Andrews, M.D. (North Carolina, 1981); Avis A. Artis, M.D. (Duke, 1984); Rudy W. Barker, M.D. (North Carolina, 1967); Diana Dell, M.D. (Louisiana State, 1982); Richard J. Dwane, M.D. (Georgetown, 1962); Anne C. Ford, M.D. (North Carolina, 1991); Joe W. Hardison, M.D. (North Carolina, 1965); Charles O. Harris, M.D. (North Carolina, 1979); William R. Lambeth, M.D. (Bowman Gray, 1974); Mary Lee Lobach, M.D. (Vanderbilt, 1984); William S. Meyer, M.S.W. (Illinois-Chicago, 1977); Gerard G. Nahum, M.D. (Stanford, 1984); Douglas J. Raburn, Ph.D. (Nebraska, 1990); David L. Richardson, Jr., M.D. (South Carolina, 1973); Ira Q. Smith, M.D. (Bowman Gray, 1979); Robert K. Yowell, M.D. (Duke, 1961).

Assistant Consulting Professors: James L. Allen, M.D. (Emory, 1965); Arnold B. Barefoot, Jr., M.D. (North Carolina, 1982); Walker H. Campbell, M.D. (Virginia, 1963); Karen H. Clark, M.D. (Alabama, 1982); Richard V. Clark, M.D., Ph.D., (Washington, 1977); Vivian E. Clark, M.D. (Boston, 1981); Yancey G. Culton, Jr., M.D. (Duke, 1956); Jerry L. Danford, M.D. (Duke, 1967); James R. Dingfelder, M.D. (Jefferson, 1965); Michael D. Fried, M.D. (New York, 1971); Carl A. Furr, Jr., M.D. (North Carolina, 1958); Francis S. Gardner, Jr., M.D. (Maryland, 1951); Michael D. Gooden, M.D. (North Carolina, 1973); Howard M. Goodman, M.D. (Med. Coll. Virginia, 1979); Ronald E. Granger, M.D. (California-Irvine, 1977); William B. Gunter, Jr., M.D. (Emory, 1982); William D. Haithcock, M.D. (Med. Univ. South Carolina, 1973); Perry M. Harmon, M.D. (North Carolina, 1974); Bennet A. Hayes, Jr., M.D. (North Carolina, 1957); Melvin L. Henderson, M.D. (Duke, 1978); Robert W. Holloway, M.D. (Vanderbilt, 1993); Wanda L. Jenkins, M.D. (Cincinnati, 1979); Johnnie E. Jones, M.D. (Meharry, 1976); Samuel J. Kapnick, M.D. (Harvard, 1991); Glenward T. Keeney, M.D. (Med. Coll. Virginia, 1967); John W. Lane, M.D. (Duke, 1972); Richard E. Lassiter, M.D. (North Carolina, 1965); Stephen C. Lies, M.D. (Duke, 1976); Frank E. Long, M.D. (Maryland, 1975); Jack P. McDaniel, M.D. (North Carolina, 1956); James P. Moon, M.D. (South Dakota, 1979); William A. Nebel, M.D. (North Carolina, 1962); Phillip H. Pearce, M.D. (Duke, 1960); H. Newton Pleasant, Jr., M.D. (East Carolina, 1992); Marla M. Presta, M.D. (Chicago, 1982); Elizabeth G. Raymond, M.D. (Columbia, 1984); Steven M. Scott, M.D. (Indiana, 1974); E. Frank Shavender, M.D. (North Carolina, 1968); W. Siegfried Smith, Jr., M.D. (Duke, 1961); Paul A. Vieta, M.D. (New Jersey, 1966); Bertram E. Walls, M.D. (Duke, 1972).

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

Associates: Angeles A. Alvarez, M.D. (Washington, 1994); Matthew D. Barber, M.D. (Jefferson, 1994); Elizabeth A. Bell, M.D. (North Carolina, 1990); Richard Blumrick, M.D. (SUNY, Stony Brook, 1992); Michael F. Carney, M.D. (Loyola, 1990); Martha L. Decker, M.D. (East Carolina, 1985); Andra H. James, M.D. (Virginia, 1993); Peter D. Dwane, M.D. (McGill, 1967); Laura J. Havrilesky, M.D. (Duke, 1995); G. Larry Maxwell, M.D. (North Carolina, 1991); Holly A. Muir, M.D. (Dalhousie, 1983); Barbara H. Osborn, M.D. (Duke, 1993); Sharon L. Rupp, B.S., A.A.S.; Stuart D. Shelton, M.D. (Eastern Virginia, 1989); Anthony G. Visco, M.D. (SUNY-Syracuse, 1993); Ernest J. Zeringue, M.D. (Med. Univ. South Carolina, 1994).

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

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

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

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

## Required Course

**OBG-205C. Obstetrics and Gynecology.** Required of all second-year students—consists of eight weeks in general obstetrics and gynecology. Students attend lectures, work daily in the general and special outpatient clinics, and are assigned patients on the

obstetric and gynecologic wards. Students share in patient care, teaching exercises, and in daily tutorial sessions with the faculty. Clinical conferences, a gynecologic-pathology conference, endocrine conferences, and correlative seminars and lectures are included. Credit: 8. *Nahum*

### **Electives**

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

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

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

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

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

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



**OBG-249C. Clinical Gynecology and Urogynecology.** For students preparing for obstetrics and gynecology, general practice, surgery, and urology. Emphasis is placed on the outpatient assessment of patients with acute and chronic gynecologic disorders including pelvic floor dysfunction, pelvic organ prolapse, urinary and fecal incontinence, and others. Students have the opportunity to work closely with faculty members in the Division of Gynecology. Inpatient care is not required, but participation in the operative care of gynecologic patients can be arranged if desired. Ample time for independent study is planned. The student is expected to utilize this time reviewing a specific clinical problem with frequent guidance and input from a member of the Gynecology Division with similar interests. Credit: 4 or 8. Enrollment: max 1. *Bump, Addison, Weidner, Amundsen, and urogynecology fellows*

**OBG-253C. Preparation for Practice, Cabarrus Memorial Hospital, Concord, North Carolina.** This is an opportunity to receive both didactic exposure and clinical exposure in obstetrics and gynecology in the community hospital. The student is expected to function as an intern. The student participates actively in the care of the patients in the labor and delivery area, assists at surgery, and renders postpartum and postoperative care. This is a community hospital experience rather heavily credited in clinical obstetrics. The student is exposed to a large volume of clinical material. The practitioners in the community are all board certified obstetricians and gynecologists and are interested in student teaching. A Duke faculty person provides additional guidance by visiting once per week. This elective can be taken for four weeks for four units or eight weeks for eight units. The students are housed in quarters available for them. Prerequisites: permission of Dr. Livengood prior to signing for the course. Credit: 4, 6, or 8. Enrollment: max 1. *Livengood and staff of the Cabarrus Memorial Hospital*

## OPHTHALMOLOGY

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

Professors: W. Banks Anderson, Jr., M.D. (Harvard, 1956); Edward G. Buckley, M.D. (Duke 1977); Diane Van Horn Hatchell, Ph.D. (Marquette, 1968); Glenn J. Jaffe, M.D. (San Francisco, 1983); Joseph A. C. Wadsworth Research Professor of Ophthalmology Gordon K. Klintworth, M.D., Ph.D. (Witwatersrand, 1957, 1966); Paul Lee, M.D. (Michigan, 1986), J.D. (Columbia, 1996); Brooks W. McCuen II, M.D. (Columbia, 1974).

Associate Professors: R. Rand Allingham, M.D. (Cincinnati, 1979); Teret  Borras, Ph.D. (Madrid, 1977); Alan Carlson, M.D. (Duke, 1981); Stephen C. Pollock, M.D. (Illinois, 1981); Alan D. Proia, M.D. (Cornell, 1980), Ph.D. (Rockefeller, 1979); Fulton Wong, Ph.D. (Rockefeller, 1977).

Associate Clinical Professor: Judy H. Seaber, Ph.D. (Duke, 1985).

Assistant Professors: Joseph Corless, M.D., Ph.D. (Duke, 1972); Terry A. Cox, M.D. (Kansas, 1975); Sharon Fekrat, M.D. (Chicago, 1991); Craig Fowler, M.D. (Med. Coll. Virginia, 1985); Sharon F. Freedman, M.D. (Harvard, 1985); Leon W. Herndon, M.D. (North Carolina, 1991); Peter C. Huttemeier, M.D. (Copenhagen, 1977); Terry Kim, M.D. (Duke, 1992); Eric A. Postel, M.D. (Jefferson, 1991); Cynthia Toth, M.D. (Med. Coll. Pennsylvania, 1983); Robin Vann, M.D. (Wake Forest, 1994).

Assistant Clinical Professor: Calvin H. Mitchell, M.D. (Duke, 1958).

Assistant Research Professors: Brian McKay, Ph.D. (Med. Col. Wisconsin, 1995); Margaret Pericak-Vance, Ph.D. (Indiana, 1978).

Associate Consulting Professors: Edward K. Isbey, Jr., M.D. (Michigan, 1955); Lawrence W. Moore, Jr., M.D. (Duke, 1963).

Assistant Consulting Professors: David P. Berry, M.D. (South Carolina, 1975); John E. Bourgeois, M.D. (Virginia, 1979); David J. Browning, M.D. (Duke, 1981), Ph.D. (Duke, 1980); Anne Marie Hanneken, M.D. (Med. Coll. Wisconsin, 1984); Edward K. Isbey III, M.D. (North Carolina, 1981); Phillip McKinley, M.D. (Tulane, 1972); Walter C. McLean, Jr., M.D. (Virginia 1975); Charles F. Sydnor, M.D. (Virginia, 1969); Carol Ziel, M.D. (Kentucky, 1987).

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

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

## Electives

**OPH-210C. Medical Ophthalmology.** The ophthalmic signs and symptoms of systemic disease are presented in a lecture series. Oriented for those students interested pri-

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

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

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

**OPH-214C. Investigative Ophthalmology.** The student is assigned a project relating to basic ophthalmologic problems. Technical assistance, sufficient equipment, and laboratory animals are supplied for the completion of the project. The student is expected to attend all scheduled research seminars. Prerequisites: OPH-212C and OPH-210C suggested, but not required. Students must devote at least three months to the elective. Credit: 4 or 8. Enrollment: max 2. *Klintworth, Hatchell, Wong, Proia, Jaffe, Epstein, Fowler, and Borras*

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

**OPH-216C. Clinical Neuro-Ophthalmology.** An advanced clinical preceptorship that provides students with exposure to a variety of neuro-ophthalmologic problems, including diseases affecting the optic nerve and central visual pathways and disorders of eye movement. Emphasis is placed on history taking, acquisition of specialized examination techniques (visual fields, pupils, ocular motility, and fundus), and the logical analysis of clinical information. The course meets one day per week, either on Tuesday or Thursday and begins at 8:30 a.m. Prerequisites: OPH-212C. Credit: 1. Enrollment: max 1. *Pollock*

## **PATHOLOGY**

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

Professors: Darell D. Bigner, M.D., Ph.D. (Duke, 1965, 1971); Sandra H. Bigner, M.D. (Tennessee, 1971); Edward H. Bossen, M.D. (Duke, 1965); William D. Bradford, M.D. (Case Western Reserve, 1958); Patrick J. Buckley, M.D. (Washington, 1976), Ph.D. (Pennsylvania, 1972); Gordon K. Klintworth, M.D., Ph.D. (Witwatersrand, 1957, 1966); Keith A. Reimer, M.D. (Northwestern, 1972); Nancy Reinsmoen, Ph.D. (Minnesota, 1987); L. Barth Reller, M.D. (Virginia, 1966); Stanley J. Robboy, M.D. (California at Los Angeles, 1965); Victor L. Roggli, M.D. (Baylor, 1976); John D. Shelburne, M.D., Ph.D. (Duke, 1972, 1971).

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

Associate Professors: Soman Abraham, Ph.D. (Newcastle Upon Tyne, U.K., 1981); Marcia Gutfried, M.D. (Northwestern, 1978); Maureane Hoffman, M.D., Ph.D. (Iowa, 1982); David N. Howell, M.D., Ph.D. (Duke, 1984, 1982); Christine M. Hulette, M.D., (Louisville, 1983); James G. Lewis, Ph.D. (Duke, 1982); Alan D. Proia, M.D. (Cornell, 1980), Ph.D. (Rockefeller, 1979); Christopher Shea, M.D. (Georgetown, 1983); Charles Steenbergen, M.D., Ph.D. (Pennsylvania, 1978, 1979); John Toffaletti, Ph.D. (North Carolina, 1977); Peter Zwadyk, Jr., Ph.D. (Iowa, 1971).

Associate Research Professors: George Cianciolo, Ph.D. (Miami, 1977); Carol W. Lewis, Ph.D. (North Carolina, 1972).

Assistant Professors: Michael S. Ballo, M.D. (Case Western Reserve, 1991); Rex Bentley, M.D.

(Harvard, 1986); Scott Berkowitz, M.D. (Jefferson, 1979); Steven J. Bredehoeft, M.D. (Kansas, 1974); Mark W. Dewhirst, D.V.M., Ph.D. (Colorado State, 1975, 1979); Leslie Dodd, M.D. (Nevada, 1987); Henry S. Friedman, M.D. (SUNY at Syracuse, 1977); Herbert Fuchs, M.D., Ph.D. (Duke, 1984); Charles S. Greenberg, M.D. (Hahnemann, 1976); John Guyton, M.D. (Harvard, 1973); Laura P. Hale, M.D., Ph.D. (Duke, 1990, 1991); Lizzie Harrell, M.D. (North Carolina State, 1987); John M. Harrelson, M.D. (Duke, 1965); Randy H. Jirtle, Ph.D. (Wisconsin, 1976); William Kane, M.D., Ph.D. (Washington, 1982); Daniel Kenan, M.D., Ph.D. (Duke, 1995); Virginia Kraus, M.D., Ph.D. (Duke, 1982, 1993); Joanne Kurtzberg, M.D. (New York Med. Coll. 1976); James E. Lowe, M.D. (California at Los Angeles, 1973); Kim Lyerly, M.D. (California at Los Angeles, 1983); John F. Madden, M.D., Ph.D. (Duke, 1989); Karen Mann, M.D., Ph.D. (Tufts, 1988); Roger C. McLendon, M.D. (Med. Coll. Georgia, 1982); Sara Miller, Ph.D. (Georgia, 1972); Thomas Ortel, M.D., Ph.D. (Indiana, 1985, 1983); L. Darryl Quarles, M.D. (Alabama, 1979); Greg Riggins, M.D., Ph.D. (Emory, 1994); Jonathan I. Scheinman, M.D. (Illinois, 1966); Thomas Sporn, M.D. (Georgetown, 1986); Timothy T. Stenzel, M.D., Ph.D. (Duke, 1992); Marilyn Telen, M.D. (New York Univ., 1977); Philip J. Walther, M.D., Ph.D. (Duke, 1975, 1974); Michael R. Zalutsky, Ph.D. (Washington Univ., 1974).

Assistant Clinical Professors: John A. Bittikofer, Ph.D. (Purdue, 1971); Jane Gaede, M.D. (Duke, 1966); Claudia K. Jones, M.D. (Duke, 1985); Robert B. Kinney, M.D. (Duke, 1981); Babatunde Olatidoye, M.D. (North Carolina, 1990); Richard J. Rahija, D.V.M. (Kansas, 1974), Ph.D. (North Carolina, 1989); Margaret C. Schmidt, M.A. (Louisville, 1969), Ed.D. (Duke, 1988); Frank A. Sedor, Ph.D. (Florida, 1971); Robin T. Vollmer, M.D. (Duke, 1967).

Assistant Research Professors: Gerald E. Archer, Jr., Ph.D. (Cincinnati, 1987); Mario Gonzalez-Gronow, D.Sc. (Chile, 1970); Uma K. Misra, Ph.D. (Kansas State, 1958); B. K. Ahmed Rasheed, Ph.D. (Indian Instit. Sci., 1981).

Adjunct Assistant Professors: James Bonner, Ph.D. (Mississippi State, 1987); John Butts, M.D. (Duke, 1972); Thomas B. Clark, III, M.D. (Med. Univ. South Carolina, 1983); James D. Crapo, M.D. (Rochester, 1971); Lynn Crook, M.D. (Med. Univ. South Carolina, 1974), Ph.D. (Emory, 1966); Arthur Davis, M.D. (Minnesota, 1953); Peter Ingram, Ph.D. (Southampton, 1967); Myla Lai-Goldman, M.D. (Columbia, 1983); James Alan Popp, D.V.M. (Ohio State, 1968), Ph.D. (California at Los Angeles, 1972); Jerry E. Squires, M.D. (West Virginia, 1974), Ph.D. (Yale, 1971); Peter Wentz, Ph.D. (Florida, 1972).

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

Emeriti: Bernard F. Fetter, M.D.; Robert B. Jennings, M.D.; John A. Koepke, M.D.; Phillip C. Pratt, M.D.; Kenneth A. Schneider, M.D.; Joachim R. Sommer, M.D.; F. Stephen Vogel, M.D.; Benjamin Wittels, M.D.

## Required Course

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

## Electives

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

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

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

**PTH-241B. Pathologic Basis of Clinical Medicine.** This is a lecture course stressing clinicopathologic correlation, morphologic diagnosis, pathophysiology, and laboratory medicine. It is required for students enrolled in the Pathology Study Program, but is available as a separate elective for all students. Lectures are on Thursdays from 8:00 a.m. to 9:30 a.m. and on Fridays from 12:00 p.m. to 1:00 p.m. Gross Demonstration is Tuesdays 8:00 - 9:00 a.m. Course must be taken for the entire year. No audits are allowed. Credit: 1. *Bradford, Reimer, and Hoffman*

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

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

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

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

**PTH-353B. Neuropathology.** A view of neuropathology that emphasizes clinicopathologic correlation. Credit: 3. *McLendon and staff*

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

**PTH-364B. Skeletal 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*

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

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

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

## PEDIATRICS

Samuel L. Katz Professor Michael M. Frank, M.D. (Harvard, 1960), Chairman.  
Professors: Page A. W. Anderson, M.D. (Duke, 1963); George Bisset, III, M.D. (South Florida, 1975); James B. Sidbury Professor Rebecca H. Buckley, M.D. (North Carolina, 1958); Y.T. Chen, M.D. (Taiwan Univ., 1973), Ph.D. (Columbia, 1978); G. Robert DeLong, M.D. (Harvard, 1961); John M. Fall-etta, M.D. (Kansas, 1966); John W. Foreman, M.D. (Maryland, 1973); Henry S. Friedman, M.D. (SUNY-Syracuse, 1977); Ronald N. Goldberg, M.D. (California-Los Angeles, 1972); Edward C. Halperin, M.D. (Yale, 1979); William N.P. Herbert, M.D. (Bowman Gray, 1972); Wilburt C. Davison Professor Thomas R. Kinney, M.D. (Duke, 1970); Joanne Kurtzberg, M.D. (New York Med Coll., 1976); Darrell V. Lewis, Jr., M.D. (Minnesota, 1969); Jon N. Meliones, M.D. (Tufts, 1984); Stephen P. Sanders, M.D. (Louisville, 1975); William R. Treem, M.D. (Stanford, 1977); Martin H. Ulshen, M.D. (Rochester, 1969); Russell E. Ware, M.D., Ph.D. (Duke, 1983, 1991).

Clinical Professors: Deborah W. Kredich, M.D. (Michigan, 1962); James A. Stockman III, M.D. (Jefferson, 1969); Norman S. Talner, M.D. (Michigan, 1949); W. Samuel Yancy, M.D. (Duke, 1965).

Associate Professors: Brenda E. Armstrong, M.D. (St. Louis, 1974); Roger C. Barr, Ph.D. (Duke, 1968); A. Resai Bengur, M.D. (Med. Univ. of South Carolina, 1982); Rose-Mary Boustany, M.D. (Amer. Univ. Beirut, 1979); Edward G. Buckley, M.D. (Duke, 1977); Dennis A. Clements, M.D. (Rochester, 1973), M.P.H., Ph.D. (North Carolina, 1988, 1990); Peter C. English, M.D., Ph.D. (Duke, 1975); Michael S. Freeman, M.D. (Duke, 1976); Sharon Freedman, M.D. (Harvard, 1985); Frank H. Kern, M.D. (Pennsylvania, 1982); John G. Looney, M.D. (Texas-Southwestern, 1969); M. Louise Markert, M.D., Ph.D. (Duke, 1982, 1991); Ross E. McKinney, Jr., M.D. (Rochester, 1979); Thomas M. Murphy, M.D. (Rochester, 1973); Martin P. O'Laughlin, M.D. (Columbia, 1980); Neil Prose, M.D. (New York, 1975); Philip M. Rosoff, M.D. (Western Reserve, 1978); Scott Schulman, M.D. (George Washington, 1982); Ross M. Ungerleider, M.D. (Rush, 1977); Emmanuel B. Walter, M.D. (Maryland, 1983); Larry Williams, M.D. (Duke, 1977); Jo Rae Wright, Ph.D. (West Virginia, 1981).

Associate Clinical Professors: Laura T. Gutman, M.D. (Stanford, 1962); Ronald J. Kanter, M.D. (Vanderbilt, 1979); David T.H. Tanaka, M.D. (Johns Hopkins, 1979); Gordon Worley, (Harvard, 1973).

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

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

Assistant Professors: Kenneth A. Alexander, M.D. (Washington, 1989); Andrea Amalfitano, D.O., Ph.D. (Michigan State, 1990, 1989); Richard Auten, M.D. (North Carolina, 1981); William D. Bradford, M.D. (Western Reserve, 1958); Terrill D. Bravender, M.D. (Michigan, 1992), M.P.H. (School of Public Health Harvard, 1999); Ira M. Cheifetz, M.D. (Yale, 1989); Paulo Ferrez Collett-Solberg, M.D. (Universidade Federal Do Rio De Janeiro, 1989); Randall G. Fisher, M.D. (Tulane, 1988); Herbert E. Fuchs, M.D., Ph.D. (Duke, 1984); Timothy M. George, M.D. (New York, 1986); Eva Nozik Grayck, M.D. (Colorado-Boulder, 1988); Sridharan Gururangan, MBBS (Madras Univ., India, 1981), MRCP (Royal College of Physicians, England, 1988); J. Rene Herlong, M.D. (Duke, 1989); Howard A. I. Kader, M.D. (Nebraska, 1992); Priya Kishnani, M.D., B.S. (Bombay, 1985); Dwight D. Koeberl, M.D. (Mayo Medical School, Rochester, 1989), Ph.D. (Mayo Graduate School, Rochester, MN, 1990); Richard M. Kravitz, M.D. (Temple, 1984); Jennifer Li, M.D. (Duke, 1987); Samuel M. Mahaffey, M.D. (West Virginia, 1979); Paul L. Martin, M.D., Ph.D. (Washington, 1987); Marie T. McDonald, M.D. (Trinity College, Dublin, 1994); Erik N. Meyers, M.D. (Univ. of California, San Diego, 1990); Cindy Miller, M.D. (George Washington, 1985); Richard P. Morse, M.D. (Dartmouth, 1987); Joseph L. Roberts, M.D., (Emory, 1981), Ph.D. (Duke, 1992); Lisa A. Robinson, M.D. (Trinity College, Univ. of Toronto, 1991); M. Henderson Rourke, Jr., M.D. (Pennsylvania, 1963); Laura E. Schanberg, M.D. (Duke, 1984); Paul Szabolcs, M.D. (Simmelweis, Budapest, Hungary, 1985); Robert J. Thompson, Jr., Ph.D. (North Dakota, 1971); Judith A. Voynow, M.D. (Pennsylvania, 1982); John S. Wiener, M.D. (Tulane, 1988); Sherri A. Zimmerman, M.D. (North Carolina, 1991).

Assistant Clinical Professors: Denise M. Adams, M.D. (Georgetown, 1988); Jeffrey Baker, M.D. (Duke, 1984); Robert P. Drucker, M.D. (Duke, 1979); Nancy E. Friedman, M.D. (Med. Coll. Virginia, 1975); Karen H. Frush, M.D. (Duke, 1986); Ricki F. Goldstein, M.D. (Cornell, 1981); Martha Ann Keels, D.D.S., Ph.D. (North Carolina, 1984, 1990); Ave Maria Lachiewicz, M.D. (Minnesota, 1980); Elizabeth A. Landolfo, M.D. (Manitoba, 1988); J. Marc Majure, M.D. (Mississippi, 1981); Beatriz Morris, M.D. (Puerto Rico, 1988); John W. Moses, M.D. (Med. Univ. South Carolina, 1983); Christine Rudd, Pharm.D. (North Carolina, 1973); Gail Spiridigliozzi, Ph.D. (Kansas, 1988); Deborah Squire, M.D. (Northwestern, 1978); Karen S. St. Claire, M.D. (Texas-Galveston, 1982); Delbert Wigfall, M.D. (Emory, 1979).

Assistant Research Professors: Pasquale Chitano, Ph.D. (Milan, 1992); Michael D. Feezor, Ph.D. (North Carolina, 1969); Donald E. Fleenor, Ph.D. (Emory University, 1987); J. Francis Heidlage, Ph.D. (Missouri, 1978); Haixiang Jiang, M.D., Ph.D. (Shanghai Medical University, China, 1975, 1991); Stewart P. Johnson, Ph.D. (Case Western Reserve, 1983); Rashid N. Nassar, Ph.D. (Duke, 1974); Karen J. O'Donnell, Ph.D. (North Carolina, 1983).

Associates: Michelle L. Bailey, M.D. (SUNY, 1995); Gregory N. Barnes, M.D., Ph.D. (Kentucky, 1992, 1990); Laura M. Brooks, M.D. (Virginia, 1994); Michael P. Carboni, M.D. (Northeastern Ohio Univ. College of Medicine, 1990); Timothy A. Driscoll, M.D. (The Ohio State University, 1990); Richard P. Howrey, M.D. (Michigan, 1991); Jennifer Lawson, M.D. (Vermont, 1990); L. Scott Levin, M.D. (Temple, 1982); Laurie A. Myers, M.D. (Ohio State, 1992); Maria A. Pane, M.D. (UNMDN, 1989); Roberts H.A. Smith, M.D. (Texas-Houston, 1990).

Clinical Associates: Joanne Barton, Dr.P.H. (North Carolina, 1990); Margarita Bidegain, M.D. (Facultad de Medicina, Universidad de la Republica, Montevideo, Uruguay, 1984); C. Michael Cotten, M.D. (Miami, 1986); Maria Luisa Escobar, M.D. (Colombian School of Medicine in Bogota, Colombia, South America, 1986); Muki W. Fairchild, M.S.W. (North Carolina, 1976); Robert D. Fitch, M.D. (Duke, 1976); MaryLu Goldberg, Ph.D. (Miami, 1988); Kathryn E. Gustafson, Ph.D. (Ohio, 1988); Joy E. Kingston Hong, M.D. (Med. Coll. of Virginia, 1996); Ailyn McConkie-Rosell, M.S.W. (Arkansas, 1980); Marcia Morgenlander, M.D. (Pittsburgh, 1988); Susan E. Owens, M.D. (SUNY-Buffalo, 1995); William H. Schultz, P.A. (Duke, 1981); Yui-Lin Tang, M.D. (Taiwan, 1983); A. William Taub, M.S.W. (North Carolina, 1981); Suzanne Trzcinski Woods, M.D. (Med. Coll. of Ohio, Toledo, 1994).

Research Associates: Yan An, Ph.D. (Ottawa, Canada, 1995); Ulus Atasoy, M.D. (Minnesota, 1984); Deeksha Sarihyani Bali, Ph.D. (Amritsar, India, 1987); Robert M. Beaty, Ph.D. (Tulane University, 1998); Shih-Fong Chao, Ph.D. (North Carolina, 1992); Enyu Ding, Ph.D. (Graduate Sch. of Chinese Acad. of Agri. Sciences, Beijing, China); ; Bernard M. Fischer, DVM, Ph.D. (North Carolina State, 1988, 1997); Bradley L. Hodges, Ph.D. (Illinois, Urbana-Champaign, 1997); Kitaro Kosaka, M.D. (Kyoto Prefectural Univ. of Medicine, Kyoto, Japan); Qiang Li, M.D., (China Medical, Shenyang, People's Republic of China, 1983), Ph.D., (Saskatchewan, Saskatoon, Canada, 1996); Hui-Ming Liu, M.D. (Norman Bethune, 1978); Kathleen McKenna, M.D. (Saint Joseph's, Philadelphia, 1995); Alison J. McVie, Ph.D. (Univ. of Glasgow, Scotland, 1997); Svetlana N. Rylova, Ph.D. (Shemyakin and Ovchinnikov Institute, Moscow, Russia, 1998); Wen-Ling Shaiu, Ph.D. (Iowa State, 1993); Robert D. Stevens, Ph.D. (London, 1969); Sarah P. Young, Ph.D. (Institute of Child Health, London, England, 1997).

Associates in Research: Edward R. Darken, A.M. (Duke, 1985); James H. Heller, M.A. (Minnesota, 1980), M.S. (Memorial University of Nfld., St. John's, Nfld., Canada, 1983).

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

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

Associate Consulting Professors: Reese H. Clark, M.D. (North Carolina, 1982); Rosalind Coleman, M.D. (Case Western Reserve, 1969); William L. London, M.D. (North Carolina, 1955); Howard H. Loughlin, M.D. (Pennsylvania, 1970); Lois A. Pounds, M.D. (Pittsburgh, 1965); Evelyn Schmidt, M.D. (Duke, 1951), M.P.H. (Columbia, 1962).

Assistant Consulting Professors: Clarence A. Bailey, M.D. (North Carolina, 1958); William L. Coleman, M.D. (New Mexico, 1979); James S. Hall, Jr. M.D. (Duke, 1957); Alvin H. Hartness, M.D. (Bowman Gray, 1965); Thomas M. McCutchen, Jr., M.D. (Vanderbilt, 1963); Kathy A. Merritt, M.D. (Duke, 1985); Charles B. Neal III, M.D. (Duke, 1955); John C. Pollard, M.D. (Virginia, 1968); William C. Powell, M.D. (Bowman Gray, 1952); Rupa Redding-Lallinger, M.D. (Cornell, 1980); James B. Rouse, M.D. (Duke, 1965); Frank S. Shaw, M.D. (Pennsylvania, 1959); Charles I. Sheaffer, M.D. (Western Reserve, 1958); Leonard D. Stein, M.D. (Med. Coll. Georgia, 1975); J. Gordon Still, M.D. (Bowman Gray, 1978), Ph.D. (Wake Forest, 1978); Fred R. Stowe, Jr., M.D. (North Carolina, 1958); Marjorie E. Tripp, M.D. (Yale, 1973).

Consulting Associates: Krystal S. Bottom, M.D. (Florida, 1989); Carol A. Burk, M.D. (Pittsburgh, 1983); R. Meade Christian, Jr., M.D. (Western Reserve, 1967); Douglas W. Clark, M.D. (North Carolina, 1983); William G. Conley III, M.D. (Virginia, 1960); Lisa Piglia Ferrari, M.D. (Duke, 1994); Jean M. Findlay, M.B., Ch.B. (Aberdeen, Scotland, 1970); Gregory A. Fisher, M.D. (South Florida, 1976); Martha E. Gagliano, M.D. (Duke, 1982); Keith Gallaher, M.D. (Pennsylvania State, 1982); William M. Gay, M.D. (Eastern Virginia, 1980); James W. Grant, M.D. (Duke, 1979); Katherine M. Harper, M.D., (North Carolina, 1995); Larry C. Harris, M.D. (Duke, 1977); Rufus McP. Herring, Jr., M.D. (Bowman Gray, 1969); Sandra Hosford, M.D. (Duke, 1986); Cheryl Jackson, M.D. (Pennsylvania, 1987); Jennifer L. Lail, M.D. (Kentucky, 1978); Charles W. Lallier, M.D. (Virginia, 1981); Pierre C. LeMaster, M.D. (Florida, 1971); Donald N. Ludlow, Jr., M.D. (Hahnemann, 1983); Ashok B. Mehta, M.D. (Baroda Med. Coll., India, 1974); Katharine S. Mosca, M.D. (Virginia, 1991); Maxine L. Murray, M.D. (Pittsburgh, 1984); Richard I. Perzley, M.D. (Jefferson, Philadelphia, PA, 1973); Janice D. Stratton, M.D. (Tulane, 1961); Charles A.

Trant, Jr., M.D. (East Carolina, 1989); Lynn M. Wegner, M.D. (Oklahoma, 1984); Joseph W. Whatley, M.D. (Duke, 1958).

Emeriti: Edmond C. Bloch, M.B.; William Cleland, M.D.; Susan C. Dees, M.D.; Thomas E. Frothingham, M.D.; Jerome S. Harris, M.D.; Samuel L. Katz, M.D.; Shirley K. Osterhout, M.D.; Madison S. Spach, M.D.; Alexander Spock, M.D.; Bailey D. Webb, M.D.; Catherine M. Wilfert, M.D.

## Required Course

**PED-205C. Pediatrics.** The basic course in pediatrics for all students is an eight-week clerkship in the second year. Its principal aim is to provide an exposure to the field of child health. The student has a varying series of experiences which should give a grasp of the concepts that underlie the discipline. Goals include acquiring familiarity and competence with the basic tools of information-gathering (history, physical examination, and laboratory data) and developing an approach to the integration of this material for the solution of problems of health and illness in infancy, childhood, and adolescence. This should be accomplished with continuing reference to the basic principles of pathophysiology encountered in the first year courses.

Those patients to whom the student is assigned provide the focus for case studies. In addition to the careful history and physical examination which must be recorded, the student is expected to organize an appropriate differential diagnosis and to seek and read pertinent reference material relevant to each patient. The student should learn to present each case verbally in an organized and succinct fashion, to follow the patient's progress, and to interpret all studies which are performed. The student is expected to learn from a number of sources: standard textbooks and journals, current publications and conferences, and also from people—house staff, faculty, nurses, parents, and all others with whom contact is made in the clinical setting.

Objectives include an understanding of the roles played in pediatrics by other members of the health care team, both in the ambulatory and hospital settings. Patient care may involve nurse, social worker, recreation therapist, psychologist, physiotherapist, dietitian, and others. The eight weeks is divided to include time into several of the following settings: (a) Duke outpatient clinics and emergency room, (b) Duke inpatient, (c) Durham Regional Hospital, (d) Duke nursery, (e) Lincoln Community Health Center, and (f) community practices in and away from Durham. Credit: 8. *Drucker*

## Electives

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

Division	Faculty	Telephone
Allergy/Immunology	Rebecca H. Buckley, M.D.	684-2922
Cardiology	Stephen P. Sanders, M.D.	681-2916
Critical Care Medicine	Ira Cheifetz, M.D.	681-5872
Emergency Department	Karen Frush, M.D.	684-2246
Endocrinology	Michael S. Freemark, M.D.	684-3772
Gastroenterology	William R. Treem, M.D.	681-4841

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1. 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.

Hematology/Oncology	Philip Rosoff, M.D.	684-3401
Infectious Diseases	Ross McKinney, M.D.	684-6335
Medical Genetics	Y. T. Chen, M.D., Ph.D.	684-2036
Nephrology	John W. Foreman, M.D.	684-4246
Neurology	Darrell Lewis, M.D.	684-3219
Perinatal Medicine	Ronald N Goldberg, M.D.	681-6024
Pulmonary	J. Marc Majure, M.D.	684-2289
Rheumatology	Deborah Kredich, M.D.	684-6575
Rural Health Clinics	Joanne Barton, Dr.P.H.	<sup>1</sup> 684-3172
Sports Medicine	Deborah Squire, M.D.	477-4297

**PED-211C. Pediatric Infectious Diseases.** This course provides experience in the clinical and laboratory diagnosis of infectious diseases and in their therapy. The student works closely with the infectious disease fellow and participates actively in evaluation of patients. Daily rounds in microbiology laboratory. Credit: 4 or 8. Enrollment: max 2. *McKinney, Gutman, Katz, Drucker, Walter, Clements, Alexander, and Fisher*

**PED-215C. Endocrine Disorders in Children.** Students attend in the Pediatric Endocrine, Diabetes, Neuroendocrine (Brain Tumor), and Insulin Resistance/Obesity Clinics and assume active roles in the evaluation and management of inpatients admitted to the Endocrine Service. Emphasis is placed upon the evaluation of growth and sexual development as indices of endocrine status during childhood. Students also participate in a monthly endocrine journal club and in weekly intra- and interdepartmental endocrine clinical and research conferences. Prerequisite: contact instructors. Credit: 4 or 8. Enrollment: max 2. *Freemark and staff*

**PED-217C. Pediatric Hematology and Oncology.** Includes all aspects of clinical and laboratory hematology as well as the diagnostic evaluation, care, and treatment of patients with malignant diseases. Emphasis is placed on fundamental concepts. Students will act as sub-interns on the inpatients hematology-oncology service. They will not be required to take night or weekend call. Students may be asked to research a specific topic and present a short presentation at the end of their rotation. Prerequisites: contact instructor. Credit: 4 or 8. Enrollment: max 2. *Rosoff, Falletta, Ware, Adams, Zimmerman, Martin, Howrey, and Driscoll*

**PED-225C. Neonatology.** Students have patient care responsibilities and experiences in the Duke North Intensive Care Nursery. The course involves direct participation in patient care under the supervision of the faculty and housestaff. Emphasis is placed on the initiation of parent-child relationships and a pathophysiologic approach to assessment and management of the critically ill neonate. This is a sole-enrollment course and, as such, cannot be taken in conjunction with any other course. Credit: 5. Enrollment: max 1. *Goldberg, Goldstein, Auten, Pane, Tanaka, Meyers, Cotten, Bidegain, and Tang.*

**PED-231C. Clinical Pediatric Cardiology.** This course provides an intensive learning experience in the clinical diagnosis and management of childhood heart disease. Emphasis is placed upon the pre and postoperative management of children with surgical heart disease as well as upon the outpatient management of children with less serious heart disease. The student also is exposed to pediatric acute care medicine and the modalities available to maintain cardiovascular function in the extremely ill child. Scope: history, physical examination, and special diagnostic techniques (echocardiography, electrocardiography, cardiac catheterization and cineangiography). Students

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1. The Rural Health Clinics rotation provides a broad exposure to general pediatric problems in a medically indigent community. Four days a week (Monday through Thursday) the student travels with a senior pediatric resident to each of four rural county health departments to provide pediatric care in collaboration with public health nurses and child health clinicians. There is approximately two hours a day driving time, which allows for a one-on-one tutorial with the senior resident. The Special Topics course may vary from two to four weeks in length. Student may not drop within sixty days of the starting date without finding a replacement. Student must contact Dr. Barton three weeks before the course starting date.



participate on daily ward rounds, outpatient clinics four days per week, and all clinical and didactic teaching conferences of the Division. Prerequisites: PED 205C. Credit: 4 (or 8 with special permission of the instructor). Enrollment: max 2. *Bengur, Sanders, Talner, and Armstrong*

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

**PED-234C. Clinical Genetics and Metabolism.** The student becomes familiar with evaluation and management of various genetic disorders including malformation syndromes and biochemical disorders. History taking, pedigree construction and analysis, specialized aspects of the dysmorphological physical examination, diagnostic techniques, routine and specialized laboratory methods (cytogenetic, biochemical, molecular), and reference materials (texts and computer programs) are covered. Students participate in weekly teaching and clinical conferences and may take part in prenatal evaluations. May take with BCH-234B. Credit: 4. Enrollment: max 2. *McDonald*

**PED-241C. Pediatric Nephrology.** The course is designed to provide experience in diagnosis, interpretations of laboratory tests, natural history, and treatment of acute and chronic disorders of the kidney in children. The student also is exposed to the management of fluid and electrolyte disorders in infants and children. Prerequisites: PTH-362B suggested; prior approval of Dr. Wigfall. Credit: 4. Enrollment: max 1. *Foreman and Wigfall*

**PED-243C. Adolescent Medicine.** Students participate in a weekly seminar with emphasis on the behavioral and developmental aspects of adolescence, drug abuse, sports medicine, and the pregnant teenager. Patient interactions are arranged in the Youth Clinic at the Duke General Pediatric Clinic on Monday afternoon and/or the Sports Medicine Clinic on Thursday afternoon. Tutorial and supervisory time to discuss specific patients and pertinent literature are arranged. Credit: 2 Enrollment: max 2. *Bravender*

**PED-250C. Pediatric Intensive Care Unit.** This advanced course is designed to allow students a four week experience as a subintern in the Pediatric Intensive Care Unit. Under supervision of faculty attendings and resident housestaff, the senior student assumes primary 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 resident pediatric housestaff. Prerequisite: PED-205C. Credit: 5. Enrollment: max 2. *Cheifetz, Meliones, Kern, Schulman, and Grayck*

**PED-260C. Advanced Clerkship in Pediatrics.** This course is designed to provide the student with an intensive, in-depth exposure to the diagnosis and management of pediatric patients hospitalized at Duke. Students are responsible for admission histories, physical examinations, and management throughout the hospitalization. The student serves as an acting intern throughout the rotation. Night call is expected every fourth night. This is a sole-enrollment course and cannot be taken in conjunction with any other course. Students must obtain the written permission of Dr. Robert Drucker or Dr. Deborah Kredich to register for or to drop this course on or after January 1, 2000. Credit: 5. Enrollment: max: 2. *Drucker, Kredich, and faculty*

**PED-281C. Pediatric Neurology.** Students will partake in the evaluation and management of both hospitalized and ambulatory pediatric patients with neurological disorders. Emphasis is placed on the neurodevelopmental history, neurological

examination, the use of laboratory tests and radiological tools and pharmacotherapy in the diagnosis and management of childhood neurological disorders. Prerequisites: contact Dr. Lewis. Credit: 4 or 8. Enrollment: max 2. *Lewis*

## PHARMACOLOGY AND CANCER BIOLOGY

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

Professors: Mohamed Abou-Donia, Ph.D. (California at Berkeley, 1966); Robert T. Abraham, Ph.D. (Pittsburgh, 1981); Everett H. Ellinwood, M.D. (North Carolina, 1959); Cynthia M. Kuhn, Ph.D. (Duke, 1975); James O. McNamara, Sr., M.D. (Michigan, 1968); Elliott Mills, Ph.D. (Columbia, 1964); J. Victor Nadler, Ph.D. (Yale, 1972); Saul M. Schanberg, M.D., Ph.D. (Yale, 1964, 1961); Debra Schwinn, M.D. (Stanford, 1983); Theodore Slotkin, Ph.D. (Rochester, 1970); Gary Stiles, M.D. (Vanderbilt, 1975); Pelham Wilder, Ph.D. (Harvard, 1950).

Associate Professors: Joseph Heitman, M.D. (Cornell, 1992), Ph.D. (Rockefeller, 1989); Homme W. Hellinga, Ph.D. (Cambridge, 1986); Elwood A. Linney, Ph.D. (California at San Diego, 1973); Donald McDonnell, Ph.D. (Baylor, 1987); Tobias Meyer, Ph.D. (Basel, 1986); Ann Marie Pendergast, Ph.D. (Riverside, 1985); Rochelle D. Schwartz, Ph.D. (Georgetown, 1983); Shirish Shenolikar, Ph.D. (Leeds, 1975); Antonius VanDongen, Ph.D. (Leiden, 1988); Xiao-Fan Wang, Ph.D. (Los Angeles, 1986); A. Richard Whorton, Ph.D. (Vanderbilt, 1975).

Assistant Professors: Sheila Collins, Ph.D. (Massachusetts Inst. Tech., 1985); Christopher Counter, Ph.D. (McMaster, 1996); Robert T. Fremeau, Jr., Ph.D. (George Washington, 1985); Samuel E. George, M.D. (Washington Univ. 1980); Walter Koch, Ph.D. (Cincinnati, 1990); Madan M. Kwatra, Ph.D. (Montreal, 1977); Edward D. Levin, Ph.D. (Wisconsin, 1984); Tso-Pang Yao, Ph.D. (San Diego, 1994); John D. York, Ph.D. (Washington Univ., 1993).

Research Professors: Gertrude Elion, D.Sc. (George Washington, 1969); Wilkie A. Wilson, Jr., Ph.D. (Duke, 1971).

Associate Research Professor: Jorge Bartolome, Ph.D. (Univ. Chile, 1978).

Assistant Research Professors: Ram Gupta, Ph.D. (Delhi, 1982); Maxine Okazaki, Ph.D. (Toronto, 1984); Frederic J. Seidler, Ph.D. (Duke, 1986).

Adjunct Professors: Humberto Viveros, M.D. (Univ. Chile, 1962); Joseph Yanai, Ph.D. (Colorado, 1971).

Adjunct Associate Professor: Richard J. Kavlock, Ph.D., (Miami, 1977).

Adjunct Assistant Professors: Rochelle Hanley, M.D. (Michigan, 1978); Christopher Lau, Ph.D. (Duke, 1982); David Martin, Ph.D. (London, 1987); Hernan A. Navarro, Ph.D. (Kentucky, 1987).

Emeriti: Norman Kirshner, Ph.D.; Leon Lack, Ph.D.; Athos Ottolenghi, M.D.

## Required Course

**PHR-200B. Medical Pharmacology.** This basic course in pharmacology for medical and graduate students describes the action of drugs in relation to biochemical and physiological processes and to the rationale for their clinical use. Additional topics include pharmacokinetics, drugs of abuse, and commonly encountered toxins. Nine lectures and one small-group, case-based discussion per week for eight weeks, May-June. Credit: 4. *Nadler and staff*

## Electives

**PHR-233B. Essentials of Pharmacology, Toxicology, and Drug Discovery.** Drug absorption, distribution, excretion and metabolism; structure and activity relationships; drug and hormone receptors and target cell responses. C-L: Graduate School. Credit: 4. Enrollment: min 5, max 30. *Slotkin and staff*

**PHR-234B. Interdisciplinary Approach to Pharmacology.** Several model systems (cardiovascular, reproductive, neural, and cell cycle) are to be used to explore the molecular, biochemical, and physiologic basis of drug action. CL: Graduate School. Credit: 3. Enrollment: max 20. *Shenolikar and staff*

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

**PHR-372B. Research in Pharmacology.** Laboratory investigation in various areas of pharmacology. C-L: Graduate School. Credit to be arranged. Credit: 1-16. *Staff*

## **PSYCHIATRY**

Professor K. Ranga Krishnan, M.D. (Madras Medical College, 1978), Chairman.

### **DIVISION OF BEHAVIORAL MEDICINE**

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

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

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

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

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

Research Associates: John Feaganes, Ph.D.; Michael J. Helms.

### **DIVISION OF BIOLOGICAL PSYCHIATRY**

Professors: Everett H. Ellinwood, Jr., M.D. (North Carolina, 1959); C. William Erwin, M.D. (Texas, 1960); K. Ranga Krishnan, M.D. (Madras Medical College, 1978); Saul M. Schanberg, M.D., Ph.D. (Yale, 1964); Theodore A. Slotkin, Ph.D. (Rochester, 1970); Richard Weiner, M.D., Ph.D. (Duke, 1975).

Consulting Professor: Richard J. Wyatt, M.D. (Johns Hopkins, 1964).

Adjunct Professors: Jau-Shyon Hong, Ph.D. (Kansas, 1973); Jeffrey Lieberman, M.D. (George Washington, 1975).

Associate Professors: P. Murali Doraiswamy, M.D. (Madras, India, 1987); Edward D. Levin, Ph.D. (Wisconsin, 1984); Joseph P. McEvoy, M.D. (Vanderbilt, 1973); Bruno J. Urban, M.D. (Albertus-Magnus, Germany, 1960).

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

Assistant Professors: Lawrence A. Dunn, M.D. (Michigan, 1984); Veeraindar Goli, M.D. (Osmania Medical College, 1978); Scott D. Moore, M.D. (Virginia, 1986); Rochelle Schwartz, Ph.D. (Georgetown, 1983); David Steffens, M.D. (Texas, 1988).

Adjunct Assistant Professor: Amir H. Rezvani, M.D. (Illinois, 1983).

Assistant Clinical Professor: Marian Butterfield, M.D. (North Carolina, 1990).

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

Associate Research Professors: Sheila Collins, Ph.D. (Mass. Institute Technology, 1985); Jed E. Rose, Ph.D. (California-San Diego, 1978).

Assistant Research Professor: Tong H. Lee, M.D. (Stanford), Ph.D. (Duke, 1986).

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

Clinical Associates: Frederick Cassidy, M.D. (Vanderbilt, 1988); Geoffrey M. Georgi; Kenneth R. Gersing, M.D. (Washington, 1993).

Consulting Associates: Christopher Byrum, M.D. (Virginia, 1988); Byron Cole, M.D. (Cincinnati, 1960); Ugo Goetzl, M.D. (New York Medical College, 1968).

Adjunct Associate: Richard Weisler, M.D. (North Carolina, 1976).

Research Associates: Jeong-Hoon Kim, Ph.D. (Chicago, 1997); Eiji Kirino, M.D., Ph.D. (Hokkaido Univ, Japan, 1989); Jeffrey Cohn, Ph.D. (Tulane, 1988); Colin Davidson, Ph.D., (London, 1996); Monica Nangia, M.D. (Kasturba Medical College, India, 1998).

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

### **DIVISION OF CHILD AND ADOLESCENT PSYCHIATRY**

Assistant Clinical Professor Allan Chrisman, M.D. (George Washington, 1971), Division Head.

Professor: John G. Looney, M.D. (Southwestern, 1969).

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

Associate Professors: Adrian C. Angold, BSc (London Hospital Med. School, 1976); Charles R. Keith, M.D. (Harvard, 1961); John S. March, M.D. (California-Los Angeles, 1978).

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

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

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

Assistant Research Professor: Alaattin Erkanli, Ph.D. (Carnegie Mellon, 1991).

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

Clinical Associates: Lucy T. Davis, Ed.D. (Columbia, 1955); Helen Egger, M.D. (Yale, 1991); Paul Grant, M.D. (Bowman Gray, 1973); Ranota D.T. Hall, M.D. (East Tennessee State, 1987); Myra McSwain-Kamran, M.D. (Medical College of Georgia, 1992); Paul D. Nagy, M.S. (Florida State, 1984); Carol J. Vander-Zwaag, M.D. (Mount Sinai, 1986); Kendall Warden, M.D. (Missouri, 1992).

Consulting Associates: Peter F. Adland, M.D. (Georgetown, 1975); Linwood R. Allsbrook, M.D. (Kentucky, 1981); Peter T. Daniolos, M.D. (N. Dakota, 1989); Bryon Herbel, M.D. (North Dakota, 1986); D. Randall Johnson, M.D. (Medical Univ. of South Carolina, 1983); Michael S. Lancaster, M.D. (Tulane,

1975); Nancy J. Livingston, M.D. (Duke, 1972); Vladimir Maletic, M.D. (Belgrade, 1981); William Mackey, M.D. (Tennessee, 1969); Karen M. Munstat, M.D. (Medical College of Ohio, 1990); Daphne Rosenblitt, M.D. (Duke, 1974); Donald L. Rosenblitt, M.D. (Duke, 1973); David A. Smith, M.D. (Alabama, 1980).

Research Associate: Tonya D. Armstrong, Ph.D. (North Carolina, 1998).

Instructors: Shelley Beason, M.S.W. (North Carolina, 1997); Karen L. Mulle, M.S.W. (North Carolina, 1996); Barbara J. Smith, M.Ed. (North Carolina Central, 1983).

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

#### **DIVISION OF GENERAL PSYCHIATRY**

Professor: Jesse O. Cavenar, Jr., M.D. (Arkansas, 1963).

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

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

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

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

Assistant Clinical Professors: John L. Beyer, M.D. (Texas, 1989); Conrad C. Fulkerson, M.D. (Missouri, 1969); Harold S. Kudler, M.D. (SUNY, 1979); Roy Stein, M.D. (Duke, 1980).

Assistant Consulting Professor: Ervin Thompson, M.D. (Vanderbilt, 1972).

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

Clinical Associates: Susan L. Siegfried, M.D. (California-Riverside, 1994); Robert E. Winton, M.D. (Vanderbilt, 1972).

Consulting Associates: Thomas W. Brown, M.D. (Case Western Reserve, 1978); Jeffrey R. Chambers, M.D. (Michigan, 1986); Frances C. Greason, M.D. (East Carolina, 1991); Philip Hillsman, M.D. (Tennessee-Memphis, 1987); Eric L. Kirchmann, M.D. (Washington, 1995); Rose Shalom, M.D. (Harvard, 1978); Jonathan Weiner, M.D. (North Carolina, 1987).

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

#### **DIVISION OF GERIATRIC PSYCHIATRY**

Professors: Dan G. Blazer, M.D. (Tennessee, 1969), Ph.D. (North Carolina, 1980); Daniel T. Gianturco, M.D. (Buffalo, 1960).

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

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

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

Clinical Associates: Peter Barboriak, M.D., Ph.D. (Duke, 1989); Sharon M. Wallsten, B.S.N., M.P.H. (Michigan, 1965).

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

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

Associate in Research: R. Corey Remle, B.A. (South Carolina, 1992).

Instructor: Cornelia B. Service, M.P.H. (North Carolina, 1979).

#### **DIVISION OF MEDICAL PSYCHOLOGY**

Professor Richard S. Surwit, Ph.D. (McGill, 1972), Division Head.

Professors: Irving Alexander, Ph.D. (Princeton, 1949); James A. Blumenthal, Ph.D. (Washington, 1975); Barbara J. Burns, Ph.D. (Boston College, 1972); Robert Carson, Ph.D. (Northwestern, 1957); C. Keith Conners, Ph.D. (Harvard, 1960); Herbert Crovitz, Ph.D. (Duke, 1970); Martin Lakin, Ph.D. (Chicago, 1955); Patrick Logue, Ph.D. (North Dakota, 1965); David Madden, Ph.D. (California-Davis, 1977); Susan Roth, Ph.D. (Northwestern, 1973); Susan Schiffman, Ph.D. (Duke, 1970); Ilene C. Siegler, Ph.D. (Syracuse, 1973); Richard S. Surwit, Ph.D. (McGill, 1972); Robert J. Thompson, Ph.D. (North Dakota, 1971).

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

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

Adjunct Professors: Bernard T. Engel, Ph.D. (California-Los Angeles, 1956); Florence Kaslow, Ph.D. (Bryn Mawr, 1969); Francis J. Keefe, Ph.D. (Ohio, 1975); John Lochman, Ph.D. (Connecticut, 1976); Rune Simeonsson, Ph.D. (George Peabody College, 1971).

Associate Professors: Norman B. Anderson, Ph.D. (North Carolina, 1983); Jean Beckham, Ph.D. (Florida State, 1988); Elizabeth J. Costello, Ph.D. (London, 1981); John F. Curry, Ph.D. (Catholic, 1978); John A. Fairbank, Ph.D. (Auburn, 1980); Mark Feinglos, M.D. (McGill, 1973); Richard S.E. Keefe, Ph.D. (New York, 1990); Gail Marsh, Ph.D. (Iowa, 1968); Rochelle Schwartz-Bloom, Ph.D. (Georgetown, 1983); Robert Shipley, Ph.D. (Michigan State, 1972); Andrew Sherwood, Ph.D. (Hull, England); Karen C. Wells, Ph.D. (Georgia, 1978); Kathleen A. Welsh-Bohmer, Ph.D. (Virginia, 1985).

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

Associate Clinical Professors: James R. Clack, Ph.D. (Purdue, 1970); Jack D. Edinger, Ph.D. (Virginia Commonwealth, 1971); Karen O'Donnell, Ph.D. (North Carolina, 1983); Rolffs S. Pinkerton, Ph.D. (Georgia, 1967); Clive J. Robins, Ph.D. (SUNY, 1982); Anna L. Stout, Ph.D. (South Carolina, 1980); Joseph E. Talley, Ph.D. (Virginia, 1977).

Associate Consulting Professors: Lenore Behar, Ph.D. (Duke, 1973); Paul Brinich, Ph.D. (Chicago, 1974).

Associate Research Professors: James Lane, Ph.D. (UCLA, 1979); William C. Wetsel, Ph.D. (Massachusetts Inst. Technology, 1983).

Assistant Professors: Kathryn Gustafson, Ph.D. (Ohio, 1988); Barbara R. Keith, Ph.D. (Alabama, 1992); Edward C. Suarez, Ph.D. (Miami, 1986).

Assistant Clinical Professors: Michael Babyak, Ph.D. (Kansas, 1995); Melanie J. Bonner, Ph.D. (Virginia Polytechnic Inst., 1995); John Barrow, Ph.D. (Houston, 1971); Robin A. Buhrke, Ph.D. (Southern Illinois, 1982); Tracey Potts Carson, Ph.D. (Georgia, 1982); Jeanine M. Driscoll, Ph.D. (Maryland, 1996); Jeff N. Epstein, Ph.D. (South Carolina, 1994); Steve Herman, Ph.D. (Duke, 1977); Martin Ionescu-Pioggia, Ph.D. (North Carolina, 1985); Diane E. Johnson, Ph.D. (North Carolina, 1994); Ronette L. Koloitkin, Ph.D. (Minnesota, 1978); Deborah C. Koltai, Ph.D. (California School-Professional Psychology, 1993); Albert D. Loro, Jr., Ph.D. (Washington, 1976); Thomas Lynch, Ph.D. (Kent State, 1996); Jerri M. Oehler, Ph.D. (Duke, 1984); Oliver Oyama, Ph.D. (Indiana, 1985); Rebecca Schein, Ph.D. (Fairleigh Dickinson, 1992); Gail A. Spiridigliozzi, Ph.D. (Kansas, 1988); Craig R. Stenberg, Ph.D. (Denver, 1982); Barbara K. Walters, Ph.D. (Alabama, 1992).

Assistant Research Professors: Teri Baldewicz, Ph.D. (Miami, 1997); Hayden B. Bosworth, Ph.D. (Penn State, 1996); Lisa Brauer, Ph.D. (Chicago, 1994); Beverly H. Brummett, Ph.D. (Kansas, 1996); Isaac M. Lipkus, Ph.D. (North Carolina, 1991); Brenda Plassman, Ph.D. (Arizona, 1986); Susan G. Silva, Ph.D. (North Carolina State, 1991); Larry A. Tupler, Ph.D. (Emory, 1989); H. Ryan Wagner, Ph.D. (New Mexico, 1975); Lana Watkins, Ph.D. (North Carolina, 1991).

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

Adjunct Assistant Research Professor: Maya McNeilly, Ph.D. (Georgia, 1987).

Assistant Consulting Professors: William D. Barley, M.D. (Texas Tech., 1980); William V. Burlingame, Ph.D. (Washington, 1967); Brian Esterling, Ph.D. (Miami, 1991); Susan Head, Ph.D. (Louisiana State, 1991); Edward Landis, III, Ph.D. (Louisville, 1989); Richard L. Munger, Ph.D. (Michigan, 1979).

Clinical Associates: Linda Barnett, Ph.D. (Kentucky, 1981); Loretta E. Braxton, Ph.D. (North Carolina, 1989); Anita Yvonne Bryant, Ph.D. (Maryland, 1991); Jill S. Compton, Ph.D. (Michigan State, 1989); Scott N. Compton, Ph.D. (Nevada, 1998); Renee H. Dunn, Ph.D. (Southern Mississippi, 1996); Barbara Eldredge, Ph.D. (Southern Illinois, 1996); David Fitzgerald, Ph.D. (Notre Dame, 1995); Rebecca F. Frank, Ph.D. (North Carolina, 1994); Patricia J. Gammon, Ph.D. (North Carolina, 1990); Mary Gifford-Smith, Ph.D. (Pittsburgh, 1998); Marylu Goldberg, Ph.D. (Miami, 1988); Jill L. Hazlett, Ph.D. (Indiana State, 1990); Pamela S. Hazlett, Ph.D. (North Carolina, 1991); Judith Holder, Ph.D. (Southern Illinois, 1995); Stephanie T. Jenal, Ph.D. (Southern California, 1996); Robert Mankoff, Ph.D. (Georgia State, 1992); Desiree W. Murray, Ph.D. (South Florida, 1977); Stephanie Noll, Ph.D. (Duke 1997); Jennifer Norton, Ph.D. (North Carolina, 1995); Ruth E. Quillian, Ph.D. (Miami, 1994); Lisa Reiter-Lavery, Ph.D. (Catholic, Washington, 1996); Anna L. Remen, Ph.D. (North Carolina, 1999); Victoria Reynolds, Ph.D. (Duke, 1999); Anthony J. Smith, Ph.D. (Southern Illinois, 1996); Patrick R. Steffen, Ph.D. (Miami, 1998); Joneis F. Thomas, Ph.D. (Virginia, 1997); Janet Whidby, Ph.D. (Duke 1987); William K. Wohlgemuth, Ph.D. (Miami, 1995); Mark E. Wolever, Ph.D. (Toledo, 1997).

Consulting Associates: Steven J. Ashby, Ph.D. (Connecticut, 1976); Susanne E. Dunn, Ph.D. (Duke, 1989); Laura A. Gilliom, Ph.D. (North Carolina, 1997); Russell P. Hopfenberg, Ph.D. (Boston, 1992); Spencer Lylerly, Ph.D. (North Carolina State, 1987); Robert J. McCarthy, Ph.D. (South Carolina, 1972); Michael Murray, Ph.D. (South Florida, 1993); Richard R. Rumer, Ph.D. (North Carolina, 1982).

Adjunct Associates: Juesta M. Caddell, Ph.D. (VA Polytechnic Institute and State Univ., 1991); Anita P. Holmes, M.P.H., J.D. (North Carolina, 1972); Mareah Steketee, Ph.D. (California School of Professional Psychology, 1992).

Instructors: C. Toby McCoy, Ph.D. (Vanderbilt, 1986); John T. Edwards, Ph.D. (Georgia, 1977); Elizabeth W. Jackson, Ph.D. (North Carolina, 1996); Susmita Kashikar-Zuck, Ph.D. (Wisconsin, 1995); Pamela Maxon, Ph.D. (Pennsylvania State, 1994); Kevin P. Weinfurt, Ph.D. (Georgetown, 1997).

Research Associates: Wenhong Cao, M.D. (Medicine Hunan Medical, 1983); Anastasia Georgiades, Ph.D. (Uppsala, 1998); Thomas Haney, M.S.P.H. (North Carolina, 1978); Celia F. Hybels, Ph.D. (North Carolina, 1997); Kari K. Lewis, Ph.D. (North Carolina State, 1996); Margaret Maytan, M.D. (Umea, Sweden); Alexander V. Medvedev, Ph.D. (Institute Cytology, Russia, 1991); Daniel A. Cordoba Montoya, Ph.D. (Universidad Nacional de Cordoba, Argentina, 1998); William S. Sampson, IV, Ph.D. (North Carolina, 1998); Srinivasan Sudha, Ph.D. (Indian Institute of Science, India, 1997); Miranda A.L. van Tilburg, Ph.D. (Tilburg, Netherlands, 1997); Aaron White, Ph.D. (Miami, 1999); Jennifer Zervakis, Ph.D. (Duke, 1997).

Associates in Research: Cynthia C. McCaskill, R.N., M.S.N. (Michigan, 1967); David W. Wyrick, B.S. (North Carolina State, 1998).

## **DIVISION OF OUTPATIENT SERVICES**

Professors: H. Keith H. Brodie, M.D. (Columbia, 1965); Jonathan R.T. Davidson, M.D. (Univ. College, London, 1966).

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

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

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

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

Assistant Professors: Kathryn M. Conner, M.D. (Maryland, 1993); Andrew Krystal, M.D. (Duke, 1987).

Adjunct Assistant Professors: Charles D. Casat, M.D. (Boston, 1963); Tana A. Grady, M.D. (Duke, 1986); Rajinder Judge, M.D. (Birmingham, U.K., 1984).

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

Assistant Consulting Professors: Jack W. Bonner, III, M.D. (Southwestern, 1965); Martin G. Groder, M.D. (Columbia, 1964); Robert D. Phillips, M.D. (Pennsylvania, 1952); Leo Potts, M.D. (Adelaide, 1954); Richard Selman, M.D. (Emory, 1972); Cynia B. Shimm, M.D. (Yale, 1950); Suzanne Sutherland, M.D. (Michigan State, 1988); Pierre V. Tran, M.D. (de Franche, France, 1987).

Clinical Associates: Eileen P. Ahearn, M.D. (Duke, 1990); Melinda L. Brown, M.D. (Medical Univ. South Carolina, 1988); Greg Clary, M.D. (Texas, Houston, 1986); Manish A. Fozdar, M.D. (M.B.B.S., N.H.L. Municipal Medical College, 1988); Marlene I. Robles, M.D. (Arizona, 1994); Nerine E. Tatham, M.D. (Howard, 1992); Susan Wicke, M.D. (Ohio State, 1989).

Associates: Lou Ann Crume, M.D. (Kentucky, 1986); Theresa A. Yuschok, M.D. (Northwestern, 1986).

Consulting Associates: John A. Ascher, M.D. (North Carolina, 1980); Ernest R. Braasch, M.D. (SUNY, 1970); Lawrence Champion, M.D. (Wisconsin, 1973); John T. Clapacs, M.D. (Duke, 1992); Barbara A. Crockett, M.D. (Hahnemann Medical College, 1968); Tracey C. Holsinger, M.D. (Virginia, 1992); Doris Jarovici, M.D. (Yale, 1992); Duncan McEwen, M.D. (Tulane, 1982); Rex Moody, M.D. (North Carolina, 1987); Mindy Oshrain, M.D. (Duke, 1983); Peter Z. Perault, M.D. (Vermont, 1977); Roger Perilstein, M.D. (Temple, 1982); William Price, M.D. (North Carolina, 1985); Ernest Raba, M.D. (Texas, 1972); Kathleen Seibel, M.D. (Minnesota, 1985); Philip M. Spiro, M.D. (Yale, 1983); Nathan R. Strahl, M.D. (North Carolina, 1983); David M. Susco, M.D. (Pennsylvania, 1983); Ronald L. Vereen, M.D. (Duke, 1981); James R. Weiss, M.D. (Louisiana, 1973); James S. Wells, Jr., M.D. (North Carolina, 1977); Floyd C. Weisman, M.D. (Texas-Houston, 1982).

Instructors: Elizabeth Nicholes, PA.C. (Duke, 1979); Thomas Stephenson, M.D. (Michigan, 1972).

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

#### **DIVISION OF PSYCHIATRIC SOCIAL WORK**

Associate Muki Fairchild, M.S.W. (North Carolina, 1976), Division Head.

Clinical Assistant Professors: Lisa Gwyther, M.S.W. (Case Western Reserve, 1969); William S. Meyer, M.S.W. (Illinois, 1977).

Associates: Maxine R. Flowers, M.S.W. (Columbia, 1964); Muki Fairchild, M.S.W. (North Carolina, 1976); Edward Lueth, M.S.W. (North Carolina, 1982); Patricia Meadows, M.S.W. (Cincinnati, 1979); Diane E. Meglin, M.S.W. (Yeshiva, 1982).

Clinical Associates: Edna M. Ballard, M.S.W. (North Carolina, 1980); Mary Sue Cherney, M.S.W. (North Carolina); Barbara A. Gau, M.S.W. (North Carolina, 1986); S. Kay Patterson, M.S.W. (Ohio State, 1967); Andrew Silberman, M.S.W. (North Carolina, 1982); Libby E. Webb, M.S.W. (Indiana, 1980).

Consulting Associates: Bess Autry, M.S.W. (North Carolina, 1976); Mary Ann Black, M.S.W. (North Carolina, 1970); Mary Jane Burns, M.S.W. (North Carolina, 1974); Stephen Hawthorne, M.S.W. (California, 1974); Debbie Hill, M.S.W. (North Carolina, 1987); Cedar Koons, M.S.W. (North Carolina, 1993); Lois P. Minis, M.S.W. (North Carolina, 1981); Betty B. Parham, M.S.W. (Smith, 1971); Joye Pursell, M.S.W. (North Carolina, 1978); Carolyn Thornton, M.S.W. (North Carolina, 1968); Stella Waugh, M.S.W. (North Carolina, 1986); Elinor T. Williams, M.S.W. (North Carolina, 1977); Margaret Wilner, M.S.W. (Columbia, 1977).

Instructors: Christine Bell, M.S.W. (North Carolina, 1977); Nan T. Birchall, M.S.W. (Pennsylvania, 1979); Vicki-Lynn Brown, M.S.W. (North Carolina, 1993); James Dolan, M.S.W. (Rutgers, 1981); Cooley Gaffigan, M.S.W. (North Carolina, 1996); James R. Gonzalez, M.S.W. (North Carolina, 1998); M. Jane Howard, M.S.W. (Texas, 1979); Bohdan Hrynewych, M.S.W. (Catholic, 1987); Meryl Kanfer, M.S.W. (Pennsylvania, 1994); Robert Laws, M.S.W. (North Carolina, 1978); Gael McCarthy, M.S.W. (North Carolina, 1985); John McLain, M.S.W. (North Carolina); Ylana N. Miller, Ph.D. (California-Berkeley, 1975); Patrick J. Murphy, M.S.W. (Our Lady of the Lake, 1974); Maureen Murray, M.S.W. (Smith College, 1986); Twyla J. Peterson, M.S.W. (North Carolina, 1985); Marilyn D. Reedy, M.S.W. (Tulane, 1964); Mickey Tullar, M.S.W. (North Carolina, 1982); Janis A. Williams, M.S.W. (Georgia, 1983); Bobby Williamson, M.S.W. (Michigan State, 1979); Ann S. Willoughby, M.S.W. (North Carolina, 1988); Maryanne Zabrycki, M.S.W. (Illinois, 1980).

#### **DIVISION OF SOCIAL AND COMMUNITY PSYCHIATRY**

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

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

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

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

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

Associate Consulting Professor: Nicholas Stratas, M.D. (Toronto, 1957).  
 Assistant Professors: Elizabeth M.Z. Farmer, Ph.D. (Duke, 1991); Jeffrey W. Swanson, Ph.D. (Yale, 1985).  
 Adjunct Associate Professor: B. Kathleen Jordan, Ph.D. (Duke, 1986).  
 Assistant Consulting Professors: Sally Johnson, M.D. (Jefferson, 1976); John G. Wagnitz, M.D. (Ohio State, 1971).  
 Assistant Research Professor: L. Richard Landerman, Ph.D. (Duke, 1978).  
 Clinical Associates: Lucile D. Clotfelter, M.D. (North Carolina, 1986); James N. Finch, M.D. (South Florida, 1981); Holly B. Rogers, M.D. (Texas, 1990); Carol Saur, M.S.N. (America School of Nursing, 1965); Susan A. Van Meter, M.D. (Oklahoma, 1991).  
 Consulting Associates: Bruce A. Berger, M.D. (Minnesota, 1977); Jeffrey Brantley, M.D. (North Carolina, 1977); Wiley Dickerson, M.D. (Medical Univ. South Carolina, 1989); Amilda Horne, M.D. (Texas Biomedical Graduate School, 1979); Barbara Johnson, M.D. (Minnesota, 1991); Gordon Lavin, M.D. (Case Western Reserve, 1978); Robert A. Millet, M.D. (Louisiana State, 1991); Elizabeth Murry, M.D. (Arkansas, 1992); Thomas D. Owens, M.D. (Louisiana State, 1985); Mark S. Reynolds, M.D. (Tulane, 1983); James A. Smith, III, M.D. (Howard, 1976).  
 Instructor: Joanne B. Dellaero, M.Ed. (Houston, TX 1991).  
 Associate in Research: Sandra C. Leak, M.A. (Duke, 1979).  
 Lecturers: Robert Rollins, M.D. (Duke, 1956); N.P. Zarzar, M.D. (American University, Beirut, 1956).

## Required Course

**PSC-205C. Psychiatry.** This course is a required six-week clerkship in clinical psychiatry for second year medical students. Students assume limited responsibility with supervision for the diagnosis and treatment of patients with common and severe psychiatric illnesses. Educational settings include inpatient psychiatry services at four different hospitals, psychiatry outpatient clinics, and the psychiatry emergency rooms of two hospitals. Students participate in a series of core didactic lectures and didactic modules which expose them to basic psychopathologic entities, differential diagnosis of psychiatric symptoms, practical application of treatment modalities, and issues of cost effectiveness in diagnosis and treatment. Students also participate in lectures, rounds, and clinical case conferences particular to their rotation site. Students are encouraged to observe psychotherapy and to participate in supervised psychological treatments wherever appropriate opportunities can be provided. Credit: 6. *Stein*

## Basic Science Electives

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

**PSC-223B. Neurobiological Basis of Behavior.** The course surveys neuroanatomical, neurophysiological, neurochemical and neuropharmacological evidence of central nervous system function as it relates to normal and abnormal behavior. Clinical description, measurements of function and laboratory models of function as well as the biological substrates of affective disorders and psychoses are emphasized. Scientific bases of current therapeutic procedures, especially psychopharmacological, are examined. Course format consists of assigned readings, study questions, and lectures by faculty and other active researchers. Mid-term and final examinations are given. Each student is expected to critique a circumscribed area of research literature focusing on the appropriateness of conceptualizations and experimental methods. Additionally, students have an opportunity to become acquainted with, and to participate in, ongoing research. Credit: 4. Enrollment: min 1. *Krystal*

**PSC-297B. Ethnic and Minority Health Patterns and Problems.** Descriptive and analytical focus on the literature about ethnic and minority health patterns in the United States, the issues inherent therein, and the implications thereof for the delivery of medical services. Credit: 4. Enrollment: min 1. *Carter and Anderson-Brown*

**PSC-299B. Preceptorship in Behavioral Neurosciences.** This course provides an opportunity for the student to work closely with a member of the faculty in an area of mutual interest with emphasis upon research (see the booklet, Basic Science Elective Program for Students in the Third Year, Behavioral Neurosciences Study Program section, for partial list of interest areas; more complete descriptions available). Credit: 1-16. *Krystal*

### **Clinical Science Electives**

**PSC-227C. Behavioral Aspects of Pediatrics.** This course offers medical students the opportunity to study, as a part of an interdisciplinary team, the diagnosis and treatment of children and adolescents (ages two to twenty-one) with a variety of psychiatric problems. This may include anorexia nervosa, bulimia, enuresis, encopresis, school phobia, psychosomatic disorders, Tourette syndrome, suicidal and acting-out adolescents, chronically or terminally ill children, and child abuse and neglect cases. Students study principles of psychological development, psychoanalytic, and family systems theory. The student participates in child, parent, and family interviews as an integral part of the treatment team. There is opportunity to be involved in the inpatient and outpatient treatment process on pediatric and adolescent psychiatric wards. C-L: PED-227C. Credit: 2-6. *McSwain-Kamran*

**PSC-240C. Subinternship in Psychiatry.** This course is an intensive clinical experience in the diagnosis and treatment of severe and incapacitating psychiatric disorders. The student is given more clinical responsibility than the comparable second year inpatient rotation. Patient care responsibilities include management of ward milieu. Treatment approaches emphasizing psychotropic medication and individual, family, and group psychotherapy are part of the clinical experience. Participation at selected patient care conferences and didactic lectures is expected. The rotation is available at Duke with specialty program experience that can be structured to include a survey of the variety of residential treatments available in this area. If desired, a student can arrange for a special reading tutorial in related topics (e.g., schizophrenia). Credit: 4 or 8. Enrollment: max 1. *VanMeter*

**PSC-245C. Consultation-Liaison Psychiatry.** The consultation-liaison services at both Duke Medical Center and VA Hospital offer clinical clerkships in the management of psychological problems of medical patients and somatic symptoms in psychiatric patients. The student does psychiatric consultations in various specialized medical and surgical services under supervision of residents and senior staff. Emphasis is placed on training the student in advanced interviewing techniques and in assessment and intervention for psychological reactions or depression due to medical illness. The site selected and the specific specialty area chosen depends on the availability and location of psychiatric consultants with those interests. The rotation is flexible. We try to match student interests with the interests of available consultants. Students need to check with Dr. Volow (VA) or Dr. Varia (Duke) four weeks in advance on the current availability on this rotation. Credit: 4 or 8. Enrollment: max 1. *Varia*

**PSC-251C. Community Psychiatry.** The student develops a course based on selections from a variety of community and special population settings. These include the Durham Mental Health Center and its component units (children's services, alcohol and drug abuse and dependency treatment programs, programs for the care and training of the mentally retarded, and adult psychiatry services), the Federal Corrections Center at Butner, and the psychiatric services and clinics at Duke and the Durham VA Hospital. Students interested in this elective must contact Dr. Marvin Swartz at least eight weeks



prior to the term selected for this course in order to develop a program tailored to the student's interests. Credit: 4 or 8. Enrollment: max 2. *Swartz*

**PSC-260C. Neuropsychiatry.** Neuropsychiatry is the study of how alterations in brain structure and function produce disturbances in human behavior. In this course, the student becomes familiar with the major neuropsychiatric syndromes: dementia, delirium, and selective organic mental syndromes such as organic personality syndrome (e.g., frontal lobe syndrome) and organic affective syndrome (e.g., post-stroke depression). The student develops an understanding of diagnosis and treatment based upon a multidisciplinary clinical approach including specialized clinical neuropsychiatric exams. The patient population is drawn from the Duke Medical Center and Durham VA Hospital psychiatry, neurology, and neurosurgery services. Depending on the site, the student may also have an opportunity to become familiar with specialized neuropsychiatric approaches including psychometric testing and neural imaging techniques such as EEG and computerized EEG, CT scan, MRI, cerebral blood flow, and PET scan. The student must contact Dr. Volow four weeks prior to the term selected to confirm availability. Credit: 4. Enrollment: max 1. *Volow*

**PSC-280C. Modern Psychotherapy: Intensive Clinical Introduction.** In this full-time (or near full-time) introduction, the student participates actively in assessment of outpatients for psychotherapy, short-term psychotherapy of inpatients, ongoing psychotherapy groups, and family therapy sessions. In addition he/she attends seminars on the various psychotherapeutic approaches: psychoanalytically oriented, cognitive, behavioral, interpersonal, systemic, etc. Readings are assigned and discussed. The student may pursue an area of special interest in greater depth with a selected preceptor. Permission of instructor is required to elect the course at any time other than section 41 of the fall term. Credit: 4. Enrollment: min 1. *H. Kudler*

**PSC-343C. Clinical Aspects of Alcohol and Drug Abuse.** This course offers a part-time or full-time experience at the Duke Alcoholism and Addiction Program or the VA Hospital in the diagnosis and treatment for patients who abuse alcohol and/or drugs. The interrelations of substance abuse with personality disorder and major psychiatric disorder is emphasized. Students may also choose to rotate on an inpatient/outpatient substance abuse program at the Duke Alcoholism and Addictions Program, the VA Hospital, or the Alcohol and Drug Addictions Treatment Center at John Umstead Hospital. Students must contact Dr. Stein four weeks in advance to confirm availability. Credit: 4-8. Enrollment: min 1, max 2. *Stein*

## **RADIATION ONCOLOGY**

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

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

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

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

Associates: Gunilla C. Bentel (Orebro Lans Sjuksterskeskola, 1961); M. Gray Bowen, M.D. (Eastern Virginia, 1990); Rachel Chou, M.D. (Tufts, 1992); Kellie S. Condra, M.D. (Tennessee, 1992); Carol A. Hahn, M.D. (Georgetown, 1990); Sally S. Ingram, M.D. (North Carolina, 1988); Catherine G. Lee, M.D. (South Florida, 1988); Sushma Patel, M.D. (Pennsylvania, 1993).

## **Basic Science Electives**

**RON-227B. General Radiobiology.** This course provides a comprehensive overview of radiation's interactions with cells and/or tissues and is oriented toward gaining an understanding of such interactions as they relate to the therapeutic use of radiation alone or in combination with chemotherapeutic drugs. Topics that are covered include carcinogenesis; radiation protection mutagenesis; DNA damage and repair; oncogene, suppressor gene and growth factor expression; methods for quantitating radiation dam-

age *in vitro* and *in vivo*; tumor and normal tissue models for radiation studies; solid tumor metabolism, microenvironment, and physiology; radiation sensitizers and protectors; effects at the tissue and whole organ and whole organism level; time, dose, and fractionation; low dose rate radiotherapy, including use of radio labelled monoclonal antibodies; hyperthermia; radiation/drug and heat/drug interactions. Credit: 2. Enrollment: max 10. *DeWhirst*

**RON-228B. The Basic Science of Oncology.** In this course we discuss the molecular and cellular biology of cancer including oncogenes, tumor suppressor genes, growth factors, chromosomal abnormalities, cellular invasion and metastases, and the control of cell cycling. Tumor biology is considered including concepts of tumor doubling time, cell loss, tumor hypoxia, and fiber and foreign body, viral, and tobacco induced carcinogenesis/mutagenesis. The course concludes with a consideration of the basic science underlying cancer prevention, diagnosis, and therapy including the pharmacology of cancer chemotherapy, biologic and immunotherapy principles, radiobiology and hyperthermic oncology, and the scientific basis of surgical oncology practice. Credit: 3. Enrollment: min 3, max 25. *Halperin, J. Marks, and guest lecturers*

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

### Clinical Science Elective

**RON-215C. Clinical Radiation Oncology.** Radiation oncology plays a crucial role in the management of patients with cancer. The student begins this course with lectures, individual tutorials, and audio-visual education programs to review the crucial elements of radiation biology, medical radiation physics, and dosimetry. This is followed by clinical instruction based in the ambulatory clinics of the Radiation Oncology Department as well as participation in brachytherapy procedures, care of inpatients, and new patient consultations. This course provides an introduction to the role of radiation therapy in the treatment of malignant disease. Credit: 4 or 8. Enrollment: max 2. *L. Marks and staff*

## RADIOLOGY

Professor Carl E. Ravin, M.D. (Cornell, 1968), Chairman.

Professors: George S. Bisset, III, M.D. (South Florida, 1975); James D. Bowie, M.D. (Oklahoma, 1967); Barbara Carroll, M.D. (Stanford, 1972); James T.T. Chen, M.D. (Natl. Defense Med. Ctr., Taiwan, 1950); R. Edward Coleman, M.D. (Washington, 1968); Carey Floyd, Jr., Ph.D. (Duke, 1981); Philip C. Goodman, M.D. (California-Los Angeles, 1970); E. Ralph Heinz, M.D. (Pennsylvania, 1955); Clyde A. Helms, M.D. (Texas-San Antonio, 1972); Barbara Hertzberg, M.D. (Duke, 1980); Ronald Jaszczak, Ph.D. (Florida, 1968); G. Allan Johnson, Ph.D. (Duke, 1974); Salutarior Martinez, M.D. (Havana, 1961); Gregory McCarthy, Ph.D. (Illinois, 1980); James R. McFall, Ph.D. (Maryland, 1976); Rendon C. Nelson, M.D. (Loma Linda, 1980); Edward F. Patz Jr., M.D. (Maryland, 1985); Tony P. Smith, M.D. (East Carolina, 1981); Leonard D. Spicer, Ph.D. (Yale, 1968); Charles Spritzer, M.D. (Pittsburgh, 1981); Michael R. Zalutsky, Ph.D. (Washington, 1974).

Associate Professors: Salvador Borges-Neto, M.D. (Federal Fluminense, 1981); Hal Cecil Charles, Ph.D. (New Orleans, 1981); William Currie, Ph.D. (North Carolina, 1964); James Dobbins, III, Ph.D. (Wisconsin, 1985); William Foster, Jr., M.D. (Duke, 1973); Donald P. Frush, M.D. (Duke, 1985); Mark A. Klierer, M.D. (Duke, 1985); Linda Gray Leithe, M.D. (Ohio State, 1982); H. Page McAdams, M.D. (Duke, 1986); Glenn E. Newman, M.D. (Duke, 1973); Erik K. Paulson, M.D. (Duke, 1985); James M. Provenzale, M.D. (Albany, 1983); Paul Suhocki, M.D. (Georgetown, 1985).

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

Associate Research Professors: David Gilland, Ph.D. (North Carolina, 1989); Laurence Hedlund,

Ph.D. (Pittsburgh, 1968); Ganesan Vaidyanathan, Ph.D. (Kentucky, 1987); Bruce Wieland, Ph.D. (Ohio State, 1973).

Assistant Professors: Daniel P. Barboriak, M.D. (Harvard, 1986); James D. Eastwood, M.D. (SUNY-Buffalo, 1992); David Enterline, (North Carolina, 1982); Jeremy Erasmus, M.B., Ch.B. (Witwatersrand, 1982); Kelly Freed, M.D. (Jefferson, 1991); Rosalie J. Hagge, M.D. (Washington, 1988); Michael W. Hanson, M.D. (West Virginia, 1974); Joan P. Heneghan, M.B., B.Ch., B.A.O. (Dublin, 1988); Vincent Low, M.B.B.S., F.R.A.C.R. (Western Australia, 1983); Nancy Major, M.D. (Tufts, 1988); Cindy R. Miller, M.D. (George Washington, 1985); Sara M. O'Hara, M.D. (Georgetown, 1988); Jeffrey R. Petrella, M.D. (University of Medicine and Dentistry of New Jersey, 1987); Neil A. Petry, R.Ph., M.S., B.C.N.P., F.A.Ph.A. (Purdue, 1977); Eric L. Rosen, M.D. (California-San Francisco, 1991); J. Mark Ryan, M.B., B.Ch., B.A.O., B.A. (Trinity College, Dublin, 1988); Douglas Sheafor, M.D. (Washington, 1992); Allen W. Song, Ph.D. (Medical College of Wisconsin, 1996); Mary Scott Soo, M.D. (Wake Forest, 1987); Terence Z. Wong, M.D., Ph.D. (Dartmouth, 1990).

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

Assistant Research Professors: Gamal Akabani-Hneide, Ph.D. (Texas A&M, 1990); Alan H. Baydush, Ph.D. (Duke, 1994); James Bowsher, Ph.D. (North Carolina, 1989); Michael J. Campa, Ph.D. (Florida, 1989); Timothy DeGrado, Ph.D. (Wisconsin at Madison, 1988); Edward Hsu, Ph.D. (Johns Hopkins, 1996); Joseph Lo, Ph.D. (Duke, 1993); Atsushi Takahashi, Ph.D. (McGill, 1995); Martin P. Tornai, Ph.D. (California-Los Angeles, 1997); Georgia Tourassi, Ph.D. (Duke, 1993); Timothy Turkington, Ph.D. (Duke, 1989); James Voyvodic, Ph.D. (Washington, 1988).

Associate: Sheri Albers, D.O. (North Texas State, 1986).

Clinical Associates: Jeffrey Betts, M.D. (Marshall, 1991); Edith Marom, M.D. (Sackler, 1990).

Fellows: Paul Balen, M.D. (California-San Diego, 1994); Dean Bushy, M.D. (Washington, 1995); Kevin Carroll, M.D. (Georgetown, 1990); Barry Charnick, M.D. (Boston, 1994); Eric Crotty, M.D., B.Ch., B.A.O. (University College-Cork, Ireland, 1990); Eric Farnsworth, M.D. (Tennessee, 1995); Alexander Guo, M.D. (Johns Hopkins, 1994); Alvand Hassankhani, M.D. (University of Medicine and Dentistry of New Jersey, 1994); Daniel Hatch, M.D. (Utah, 1994); Jeffrey Hinman, M.D. (Wayne State, 1995); James Killius, M.D. (SUNY-Buffalo, 1995); John Lee, M.D. (Texas-Houston, 1995); Michael Miller, M.D. (Hahnemann, 1994); Jorge Ramirez, M.D. (Puerto Rico, 1994); Audrey Spielmann, M.D. (British Columbia, 1992); Marvin Tam, M.D. (Columbia, 1993); Thuan Tran, M.D. (Baylor, 1995); Thuy Vo, D.O. (University of Medicine and Dentistry of New Jersey, 1994); Joseph Wagner, M.D. (North Carolina, 1995); Kenneth Wong, M.D. (British Columbia, 1994); Michael Workman, M.D. (Iowa, 1994).

## Basic Science Elective

**RAD-250B. Research in Radiology.** An individually arranged experience in which the student identifies with and participates in an established research program of a faculty member. Program should be arranged with DPA and proposed faculty member well in advance of starting date. Credit: 1-16. Enrollment: max 10. *G.A. Johnson*

## Clinical Science Electives

**RAD-210C. Pediatric Radiology.** A specialized program of instruction and participation in the wide variety of radiographic examinations in the pediatric age group. Special correlation of these examinations to the problems of specific diagnosis and patient care is made. Prerequisite: must contact Dr. Miller prior to registration. Credit: 4 or 8. Enrollment: max 2. *Miller and staff*

**RAD-211C. Clerkship in Neuroradiology.** A specialized program of detailed instruction in neuroradiology. The program includes participation in many interdepartmental conferences and the performance and interpretation of a variety of examinations including cerebral angiography, computerized axial tomography, magnetic resonance images, and myelography. Prerequisites: must contact Dr. Provenzale prior to registration. Credit: 4 or 8. Enrollment: max 2. *Provenzale and staff*

**RAD-229C. Basic Radiology Clerkship.** This course is designed to provide an overview of the various imaging modalities of diagnostic radiology and their clinical utility. The elective consists of: (a) lectures and film interpretation sessions supplemented by student presentations; (b) assignment to a variety of diagnostic radiology services during which students observe the performance of diagnostic and interventional studies; and (c) use of a teaching file of radiographs and diagnostic images. One week is spent on the thoracic radiology service. Additional rotations may include the musculoskeletal, neuroradiology, mammography, vascular/interventional, pediatric, CT/abdominal

imaging, ultrasound, nuclear medicine, gastrointestinal, and VA Hospital services. Credit: 4. Enrollment: min 4, max 9. *Major and staff*

**RAD-230C. Thoracic Imaging.** This course will provide the ability to interpret chest radiographs and increase the students confidence in diagnosing cardiac and pulmonary diseases from chest films. Through formal teaching sessions and case presentations as well as daily interactions with surgical and medical clinical teams, the student will be exposed to the broad range of modalities and interventional procedures conducted by the thoracic imaging division. Opportunities exist to become involved in research projects. During the course of one month, the student will have interpreted or observed the reading of more than 1,000 chest radiographs. Prerequisite: General Radiology elective preferred but not mandatory. Credit:4. Enrollment: max 1. *Goodman and staff*

## **SURGERY**

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

### **DIVISION OF GENERAL SURGERY**

Professor Ralph R. Bollinger, M.D. (Tulane, 1970), Ph.D. (Duke, 1977), Chief.

Professors: Onyekwere Akwari, M.D. (Southern California, 1970); William G. Anlyan, M.D. (Yale, 1949); James B. Duke Professor Dani P. Bolognesi, Ph.D. (Duke, 1964), Experimental Surgery; Pierre A. Clavien, M.D. (Geneva, 1985), Ph.D. (Toronto, 1992); J. W. and D. W. Beard Professor Eli Gilboa, Ph.D. (Weizmann Inst. Sci., 1977), Experimental Surgery; Gregory S. Georgiade, M.D. (Duke, 1973); John P. Grant, M.D. (Chicago, 1969); George S. Leight, Jr., M.D. (Duke, 1972); H. Kim Lyerly, M.D. (California at Los Angeles, 1983); Richard L. McCann, M.D. (Cornell, 1974); Joseph A. Moylan, M.D. (Boston, 1964); Theodore N. Pappas, M.D. (Ohio State, 1981); Hilliard F. Seigler, M.D. (North Carolina, 1960); David S. Warner, M.D. (Wisconsin, 1980); John L. Weinerth, M.D. (Harvard, 1967).

Research Professors: Per-Otto F. Hagen, F.H.W.C. (Watt Univ., Edinburgh, 1961), Experimental Surgery; Alphonse J. Langlois, Ph.D. (Duke, 1966), Experimental Surgery.

Associate Professors: Darell D. Bigner, M.D., Ph.D. (Duke, 1965, 1971), Experimental Surgery; Kathleen J. Clem, M.D. (Loma Linda, 1989), Emergency Medicine; Thomas J. Matthews, Ph.D. (Missouri, 1971), Experimental Surgery; Emil R. Petrusa, Jr., Ph.D. (Utah, 1979); Debra A. Schwinn, M.D. (Stanford, 1983); Robert N. Sladen, M.B., Ch.B. (Cape Town, 1970); Kent J. Weinhold, Ph.D. (Pennsylvania, 1979), Experimental Surgery.

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

Associate Clinical Professor: Norbertus P. DeBruijn, M.D., M.Sc. (Gronigen, 1976).

Assistant Professors: Gregory H. Botz, M.D. (George Washington, 1990); Steven J. Bredhoeft, M.D. (Kansas, 1974); Bradley Collins, M.D. (Duke, 1989); W. Steve Eubanks, Jr., M.D. (Alabama, 1987); John L. Gray, M.D. (Duke, 1985); Andrew K. Hilton, M.B., B.S. (New South Wales, 1983); Lewis R. Hodgine, M.D. (SUNY, 1985); Walter J. Koch, Ph.D. (Cincinnati, 1990); Jeffrey Lawson, M.D., Ph.D. (Vermont, 1991); Christopher Mantyh, M.D. (Wisconsin, 1991); Glenn E. Newman, M.D. (Duke, 1973); Scott K. Pruitt, M.D. (Columbia, 1987), Ph.D. (Duke, 1994); Mark W. Sebastian, M.D. (Rush, 1987); Harry W. Severance, Jr., M.D. (Duke, 1981); Bruce A. Sullenger, B.S. (Indiana), Experimental Surgery; Douglas S. Tyler, M.D. (Dartmouth, 1985); Steven N. Vaslef, M.D. (Virginia, 1984); Frances E. Ward, Ph.D. (Brown, 1965), Experimental Surgery; David K. Wellman, M.D. (Duke, 1971), Emergency Medicine; Christopher C. Young, M.D. (Duke, 1981).

Assistant Research Professors: Zeinab A. Abdel-Wahab, Ph.D. (Eastern Virginia, 1985), Experimental Surgery; Timothy L. Darrow, Ph.D. (SUNY, 1980); Yuping Deng, Ph.D. (Virginia Polytechnic Inst., 1991); Andrew P. Futreal, Ph.D. (North Carolina, 1993); Sanford C. Garner, Ph.D. (North Carolina, 1989); Michael L. Greenberg, Ph.D. (SUNY, 1984), Experimental Surgery; Yiwen Li, M.D. (Zhejiang Medical, 1986); Smita K. Nair, Ph.D. (Tennessee, 1993); Emmanuel C. Opara, Ph.D. (London, 1984); William R. Parker, Ph.D. (Nebraska, 1992); Janet E. Tuttle-Newhall, M.D. (Bowman Gray, 1988).

Assistant Clinical Professors: David N. DuBois, M.D. (Georgetown, 1983), Emergency Medicine; Karen S. H. Frush, M.D. (Duke, 1986), Emergency Medicine; Paul C. Hendrix, B.S. (Coll. Charleston, 1970), B.H.S. (Duke, 1975); Emergency Medicine; Kirk A. Ludwig, M.D. (Cincinnati, 1988); C. Michael Schuch, B.A. (North Carolina, 1977); Richard K. Serra, M.D. (Michigan, 1977), Emergency Medicine; Catherine A. Share, M.D. (Emory, 1986).

Assistant Consulting Professors: Louis H. Barr, M.D. (Georgetown, 1973); Rollins S. Burhans, Jr., M.D. (Louisville, 1963); Walter W. Burns, M.D. (North Carolina, 1969); John T. Daniel, M.D. (Howard, 1964); Joel Horowitz, M.D. (Pittsburgh, 1988); Henry N. Ho, M.D. (Michigan, 1978); Robert W. Kieffer, M.D. (Johns Hopkins, 1978); Jane A. Kurucz, M.D. (West Virginia, 1983); Walter J. Loehr, M.D. (Cornell, 1963); Stephen K. Rerych, M.D. (Columbia, 1974); Phillip P. Shaddock, M.D. (California, 1986); Harvey A. Shub, M.D. (Rome, Italy, 1971); Peter S. Turk, M.D. (Indiana, 1985); David J. Vaughn, M.D. (Cincinnati, 1980); James P. Weaver, M.D. (Pennsylvania, 1969); James S. Wilson, Jr., M.D. (North Carolina, 1975).

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

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

Associates: John M. Brown, M.D. (Florida, 1984), Emergency Medicine; John J. Dallara, M.D. (Med. Col. of Virginia, 1987), Emergency Medicine; David A. Knapp, M.D. (California-San Diego, 1984), Emergency Medicine; John L. Morris, M.D. (Ohio State, 1986), Emergency Medicine; Bernadette R. Page, M.D. (Loyola, 1970), Emergency Medicine.

Research Associates: Alexander Miron, Ph.D. (Duke, 1993); Erik M. Clary, B.S. (Kansas State, 1991); James F. Demarest Ph.D. (George Washington, 1985); Laurie A. Dempsey, Ph.D. (New York, 1988); Andrea D. Eckhart, Ph.D. (North Carolina, 1997); Guido Ferrari, M.D. (Genoa, 1985); Wenshi Gao, M.D. (Capital Inst., Beijing, China, 1982); Gudrun Huper, M.A. (Stuttgart, 1966); Yuzo Kodaria, M.D. (Nippon, Japan, 1989); Brian St. John Manning, Ph.D. (Crumlin Hosp., Dublin, 1992); Takeshi Nagayasu, M.D., Ph.D. (Nagasaki Univ., Japan, 1987, 1996); Coreen Q. H. Oei, Ph.D. (Natl. Inst. Singapore, 1992); Laurence T. Rimsky-Clarke, Ph.D. (Paris, 1984); Christopher P. Rusconi, Ph.D. (Colorado, 1996); Robert W. Storms, Ph.D. (Texas, 1991); Eric Wagner, Ph.D. (Laval Univ., 1994); Takashi Watanabe, M.D. (Chiba Univ., 1986), Ph.D. (Nagoya Univ., 1995); Si-Xun Yang, M.D. (Suzhou Med. Col., China, 1986); Rahima Zennadi, Ph.D. (Nantes, France, 1992); Jintao Zhou, Ph.D. (Shanghai, 1985); Jiying Zhou, Ph.D., (Chinese Pharm. Univ., Shenyang, 1984).

#### **DIVISION OF THORACIC SURGERY**

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

Professors: Mary and Deryl Hart Professor of Surgery Robert H. Jones, M.D. (Johns Hopkins, 1965); James E. Lowe, M.D. (California at Los Angeles, 1973); James B. Duke Professor David C. Sabiston, M.D. (Johns Hopkins, 1947); Ross M. Ungerleider, M.D. (Rush, 1976); Walter G. Wolfe, M.D. (Temple, 1963).

Associate Professors: Donald D. Glower, Jr., M.D. (Johns Hopkins, 1980); David H. Harpole, M.D. (Virginia, 1984).

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

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

Assistant Professors: Thomas A. D'Amico, M.D. (College of Physicians and Surgeons, 1987); Robert D. Davis, M.D. (California, 1984); James Jagers, M.D. (Nebraska, 1988); Kevin P. Landolfo, M.D. (Manitoba, 1985); Carmelo Milano, M.D. (Chicago, 1990).

Assistant Research Professors: James W. Davis, Ph.D. (Duke, 1993); Lawrence H. Muhlbaier, Ph.D. (North Carolina, 1981), Experimental Surgery; Doris A. Taylor, Ph.D. (Texas, 1987).

Assistant Consulting Professors: Calvin P. Claxton, M.D. (Virginia, 1961); Robert Fietsam, M.D. (Wayne State, 1986); Charles A. Keller, Jr. (Louisiana State, 1959); John C. Lucke, M.D. (St. Louis, 1985); F. Maxton Mauney, Jr., M.D. (Duke, 1959); Amir A. Neshat, M.D. (Isfahan, Iran, 1960); Wayne H. Welsher, M.D. (SUNY at Upstate, 1975).

Research Associates: Stephen M. Langley, M.B.B.S. (London, 1989); Leslee J. Shaw, Ph.D. (St. Louis, 1994); Somaya H. Soloma, M.D. (Egypt, 1989).

#### **DIVISION OF NEUROSURGERY**

Professor Allan H. Friedman, M.D. (Illinois, 1974), Chief.

Professor: Robert H. Wilkins, M.D. (Pittsburgh, 1959).

Associate Professors: Cecil O. Borel, M.D. (Hahnemann, 1977); Herbert E. Fuchs, M.D., Ph.D. (Duke, 1984); Michael M. Haglund, M.D., Ph.D. (Washington, 1987, 1988); Dennis A. Turner, M.D. (Indiana, 1975).

Associate Research Professor: Roger Madison, Ph.D. (Duke, 1981), Experimental Surgery.

Assistant Professors: Timothy M. George, M.D. (New York, 1986); John P. Gorecki, M.D. (Queens, Canada, 1983); William J. Richardson, M.D. (Eastern Virginia, 1977); John Sampson, M.D., (Manitoba, 1998), Ph.D. (Duke, 1996); Bruno J. Urban, M.D. (Germany, 1960).

Assistant Research Professors: Rok Cerne, M.D. (Slovenia, 1987), Ph.D. (Iowa, 1993), Ashok K. Shetty, Ph.D. (India Inst. Med. Sciences, 1990).

Assistant Clinical Professor: Ziaur Rahman, M.B. (Prince of Wales Med. Coll., India, 1968).

Assistant Consulting Professors: Peter R. Bronec, M.D. (Duke, 1981); Charles S. Haworth, M.D. (Duke, 1982); Bruce L. Kihlstrom, M.D. (North Carolina, 1972); Robert Lacin, M.D. (Lausanne, Switzerland, 1986); Robert E. Price, Jr., M.D. (North Carolina, 1964).

Research Associates: Weiying Gao, M.D. (Harbin Med., China, 1986); Martha A. Keels, D.D.S., M.S., Ph.D. (North Carolina, 1984, 1990), Dentistry; Janice O. Levitt, Ph.D. (Temple, 1963); Robert D. Pearlstein, M.S. (North Carolina, 1978); Gowri K. Pyapali, Ph.D. (Nehru Univ., India, 1989); Darion Rapozo, Ph.D. (Chicago, 1990); Maria Rapazo, Ph.D. (Duke, 1994).

#### **DIVISION OF ORAL SURGERY**

Assistant Professor: Thomas A. McGraw, D.D.S. (Pennsylvania, 1985).

Assistant Clinical Professor: Edward A. Dolan, D.D.S. (Maryland, 1971).

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

## **DIVISION OF ORTHOPAEDIC SURGERY**

Virginia Flowers Baker Professor James R. Urbaniak, M.D. (Duke, 1962), Chief.  
Professors: John M. Harrelson, M.D. (Duke, 1964); James H. McElhaney, Ph.D. (West Virginia, 1964), Experimental Surgery; James A. Nunley, M.D. (Tulane, 1973).  
Associate Professors: Robert D. Fitch, M.D. (Duke, 1976); Richard D. Goldner, M.D. (Duke, 1974); William T. Hardaker, Jr., M.D. (Duke, 1973); L. Scott Levin, M.D. (Temple, 1982); William J. Richardson, M.D. (Eastern Virginia, 1977); Sean P. Scully, M.D., Ph.D. (Rochester, 1986); Kevin P. Speer, M.D. (Johns Hopkins, 1985); Thomas Parker Vail, M.D. (Loyola, 1985).  
Associate Research Professor: Long-en Chen, M.D. (Peking Med. Col., 1967), Ph.D. (Shanghai, 1983).  
Assistant Professors: David E. Attarian, M.D., (Duke, 1980); Carl J. Basamania, M.D. (George Washington, 1984); Mark Easley, M.D. (Virginia, 1992); Lloyd A. Hey, M.D. (Harvard, 1988); Laurence D. Higgins, M.D. (SUNY, 1992); Salutarior Martinez, M.D. (Havana, 1961); Barry S. Myers, M.D., Ph.D. (Duke, 1991); S. David Stanley, M.D. (Duke, 1993).  
Assistant Research Professor: Farshid Guilak, Ph.D. (Columbia, 1991).  
Assistant Clinical Professors: George S. E. Aitken, M.D. (Case Western Reserve, 1982); Donald T. Kirkendall, Ph.D. (Ohio, 1979); Stephen N. Lang, M.D. (Illinois, 1965); Richard S. Moore, M.D. (North Carolina, 1991); Christopher Talley, M.D. (Virginia, 1991).  
Assistant Consulting Professors: Quinn H. Becker, M.D. (Louisiana State, 1956); Edward W. Bray, III, M.D. (Med. Univ. South Carolina, 1971); William J. Callison, M.D. (Vanderbilt, 1953); Edwin B. Cooper, Jr., M.D. (Duke, 1966); Jon R. Davids, M.D. (Harvard, 1985); Rafael F Escamilla, Ph.D. (Auburn, 1995); Robert W. Esposito, M.D. (Columbia, 1981); J. Lawrence Frank, M.D. (Duke, 1965); H. John Gerhard, M.D. (Harvard, 1981); Stephen A. Grubb, M.D. (Northwestern, 1974); James J. Hoskie, M.D. (Michigan); Ralph A. Liebelt, M.D. (Michigan, 1985); C. Robert Lincoln, M.D. (Med. Coll. Virginia, 1960); William J. Mallon, M.D. (Duke, 1984); Keith M. Maxwell, M.D. (Oral Roberts, 1982); Mark L. Moody, M.D. (Georgetown, 1987); Ronald J. Neimkin, M.D. (Cornell, 1975); William S. Ogden, M.D. (Med. Coll. Georgia, 1965); Thomas B. Pace, M.D. (Mississippi, 1982); Theodore M. Pitts, M.D. (Yale, 1977); Edwin T. Preston, Jr., M.D. (Duke, 1960); Glydon B. Shaver, Jr., M.D. (Tennessee, 1961).  
Consulting Associates: Richard F. Bruch, M.D. (Illinois, 1972); Albert T. Jennette, M.D. (North Carolina, 1959); Ronald A. Pruitt, M.D. (Med. Coll. Virginia, 1959); William A. Somers, M.D. (Duke, 1972).  
Research Associates: Wen-ning Qi, M.D. (Peking Union Med. Coll., 1967); Anthony V. Seaber.

## **DIVISION OF OTOLARYNGOLOGY**

Professor Joseph C. Farmer, Jr., M.D. (Duke, 1962), Acting Chief.  
Professor: William J. Richtsmeier, M.D. (Case Western Reserve, 1975), Ph.D. (Med. Coll. of Wisconsin, 1975).  
Associate Professor: Samuel R. Fisher, M.D. (Duke, 1975).  
Associate Research Professor: David W. Smith, Ph.D. (Michigan, 1986).  
Assistant Professors: Gregory F. Hulka, M.D. (Duke, 1988); Richard L. Scher, M.D. (Cincinnati, 1985); Debra L. Tucci, M.D. (Virginia, 1985); David L. Witsell, M.D. (Colorado, 1990).  
Assistant Research Professor: Roger L. Miller, Ph.D. (California, 1993).  
Assistant Consulting Professors: Charles E. Clark, III, M.D. (Michigan, 1968); Cameron A. Gillespie, M.D. (Virginia, 1974); Lynn A. Hughes, M.D. (Oklahoma, 1968); Johns F. P. Langford, M.D. (Mississippi, 1989); Robert E. Taylor, M.D. (Alabama, 1976); C. Emery Williams, M.D. (Louisiana, 1963).  
Adjunct Assistant Professors: Charles C. Finley, M.D. (North Carolina, 1983); Dewey T. Lawson, Ph.D. (Duke, 1972); Christopher Van Den Honert, Ph.D. (Case Western Reserve, 1979).  
Associate: Rowena J. Dolor, M.D. (Duke, 1991).  
Consulting Associates: Peter G. Chikes, M.D. (North Carolina, 1972); Edward V. Hudson, M.D. (Bowman Gray, 1962).

## **DIVISION OF PEDIATRIC SURGERY**

Associate Professors: Samuel M. Mahaffey, M.D. (West Virginia, 1979); Michael A. Skinner, M.D. (Rush, 1984).  
Assistant Professor: Henry E. Rice, M.D. (Yale, 1988).

## **DIVISION OF PLASTIC AND MAXILLOFACIAL SURGERY**

Associate Professor L. Scott Levin, M.D. (Temple, 1982), Chief.  
Professor: Donald Serafin, M.D. (Duke, 1964).  
Associate Professor: Gregory S. Georgiade, M.D. (Duke, 1973).  
Associate Clinical Professor: Ronald Riefkohl, M.D. (Tulane, 1972).  
Associate Consulting Professor: Verne C. Lanier, Jr., M.D. (Vanderbilt, 1966).  
Assistant Clinical Professors: James A. Hoke, D.D.S. (Ohio State, 1972), M.S. (Michigan, 1976); Salvatore C. Lettieri, M.D. (Bowman Gray, 1988); Gregory L. Ruff, M.D. (Michigan, 1978).  
Assistant Research Professor: Bruce M. Klitzman, B.S.E. (Duke, 1974), Ph.D. (Virginia, 1979).  
Consulting Associate: James T. White, D.D.S. (Loyola, 1966), M.S. (North Carolina, 1976).

## DIVISION OF UROLOGIC SURGERY

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

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

Associate Professor: Cary N. Robertson, M.D. (Tulane, 1977).

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

Associate Consulting Professor: John H. Grimes, M.D. (Northwestern, 1965).

Assistant Professors: Yehia Daaka, Ph.D. (Southern Florida, 1995); Craig F. Donnatucci, M.D. (Temple, 1979); David T. Price, M.D. (Louisiana State, 1989); John S. Wiener, M.D. (Tulane, 1988); Johannes Vieweg, M.D. (Munich Med. School, 1988).

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

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

Assistant Consulting Professors: Robert W. Andrews, M.D. (Bowman Gray, 1980); Niall J. Buckley, M.B., B.Ch. (Univ. Coll. Dublin, 1979); Hector H. Henry II, M.D. (Tulane, 1965); G. Byron Hodge, M.D. (Duke, 1977); Raymond E. Joyner, M.D. (Bowman Gray, 1968); Ignacio-Sarmine, M.D. (Med. Col. of Ohio, 1982); Wade S. Weems, M.D. (Duke, 1962); Arthur W. Whitehurst, M.D. (Virginia, 1968).

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

Research Associate: Karl B. Thor, Ph.D. (Pittsburgh, 1985).

## DIVISION OF SPEECH PATHOLOGY AND AUDIOLOGY

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

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

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

## Required Course

**SUR-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 a weekly session 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. *Tuttle-Newhall*

## Electives

**SUR 227C. Advanced Urologic Clerkship.** The diagnosis, management, and surgical treatment of patients with urologic disorders are stressed. Students are afforded intimate association with the entire staff in the clinics, wards, and operating rooms, and participate in surgery. Cystoscopic and urographic diagnostic methods along with other techniques are taught. Credit: 4 or 8. Enrollment: max. 6. *Paulson, Anderson, Wiener, Weinerth, Webster, Dontucci, Walther, and Robertson*

**SUR-228C. Clerkship in Pediatric Urology.** The course is designed to give an overview of urologic problems in the pediatric population. It includes patient contact and seminar material as well as ward and operating room experience in the diagnosis, treatment, and long-term follow-up of children with urologic disease. Credit: 4. Enrollment: min 1, max 2. *Wiener*

**SUR-235C. Clinical Neurosurgery.** The course is designed for those students with a career interest in one of the neurological sciences. Duties include the work up and care of inpatients, work up of clinic patients, assistance in the operating room, daily rounds, and night call. Weekly conferences are held in neurosurgery, neurology, neuropathology, and neuroradiology. There are also special lectures. Prerequisites: student must have the approval of Dr. Wilkins to register for this course. Credit: 4 or 8. Enrollment: max 4. *Wilkins, Cook, Friedman, Fuchs, Nashold, and Turner*

**SUR-236C. Intermediate Clinical Neurosurgery.** This elective, intended as an intermediate experience between SUR-233C and SUR-235C, focuses on the clinical presentation of common neurosurgical disorders, radiographic evaluation, and therapeutic options including the indications and contraindications for surgical intervention. The student works up one to three patients and assists at their operations the following day either once or twice per week and attends the Saturday, neurosurgical conference. Prerequisites: permission of instructor. Credit: 1 or 2. Enrollment: max 1. *Wilkins*

**SUR-237C. Investigative Neurosurgery.** The student is assigned a project relating to neurologic sciences and, within reason, is provided with technical help, recording equipment, and experimental animals necessary for its completion. Each student plans and executes his own individual project with the help of the neurosurgery staff. Attendance at weekly conferences is also required. Prerequisites: SUR-235C suggested. The student must have the approval of Dr. Wilkins and Dr. Turner to register for this course. Credit: 8. Enrollment: max 2. *Turner, Fuchs, Madison, and Nashold*

**SUR-239C. Clinical Otolaryngology.** This course provides the student with a comprehensive survey of clinical otolaryngology. Duties include participation in both outpatient clinic activities and inpatient care in addition to assisting in the operating room. The student participates in ward rounds and in various conferences held by the division. Credit: 4 or 8. Enrollment: max: 2. *Scher, Richtsmeier, Kenan, Farmer, and Fisher*

**SUR-241C. Surgical Intensive Care.** This course is designed to broaden the student's knowledge and experience in dealing with critically ill patients. Under supervision, students function as sub-interns in the Surgical Intensive Care Unit (SICU). Students are assigned their own patients and actively participate in daily rounds as part of the SICU team. There is a morning lecture on aspects of critical care each day. Students take call one night in four and work on a one-on-one basis with SICU house staff in the supervised management of critically ill patients. Two weeks are spent in the SICU at Duke University Medical Center (trauma, vascular surgery, liver-kidney-pancreas transplantation, general surgery) and two weeks in 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 nutritional support. Students are formally evaluated by the SICU house staff and the attending physician. C-L: ANE-241C. Credit: 5. Enrollment: max 8. *Sebastian, Vaslef, Tuttle-Newhall, and staff*

**SUR-244C. Introduction to Plastic, Reconstructive and Maxillofacial Surgery.** This course is designed for students who may have a future interest in plastic surgery. Duties include the preoperative evaluation of patients, assisting in the operating room, making daily ward rounds, and participation in conferences. Credit: 4. *Georgiade, Ruff, Levin, and Zenn*

**SUR-246C. Clerkship in Plastic and Reconstructive Surgery.** The student participates in evaluation and management of plastic surgery patients including preoperative assessment, surgical assistance, and postoperative follow-up in a private office and at Durham Regional Hospital. Daily seminars cover core topics such as skin and surgical techniques, wound healing, and scars. Prerequisite: permission of instructor. Credit: 4. Enrollment: max 1. *Levin, Ruff, Georgiade, and Zenn*



**SUR-247C. Plastic Surgery Research.** Students are engaged in scholarly activities which are active, in-depth learning experiences related to microvascular, plastic, and/or reconstructive surgery. The students are expected to design, execute, and analyze data and to formulate hypotheses and draw conclusions from their projects. Credit: 1-8 Enrollment: max 4. *Klitzman, Levin, and Brown*

**SUR-255C. Directed Study in Speech/Language Pathology and Audiology.** Individual directed study in selected topics concerning normal and abnormal hearing, language and speech. In consultation with a faculty member, each student selects one or more areas of study. Emphasis is on fundamentals of normal and abnormal function, principles of evaluation, and management of disorders. Prerequisite: permission of instructor. Credit: 1. *DeRuyter*

**SUR-259C. General Principles of Orthopaedics.** a full experience on the Orthopaedic Service with duties and responsibilities similar to a first year resident. Inpatient care, outpatient examination, and operating room experience are included. Conference attendance is required. Individual or group discussions are conducted each day with attending staff/residents. The purpose of the course is to present broad concepts of orthopaedics to students planning general practice, pediatrics, allied surgical specialties, or orthopaedics. Credit: 4 or 8. Enrollment: max 5 for 4 weeks. *Urbaniak, Bassett, Harrelson, Hardaker, Nunley, R. Goldner, Fitch, Lang, Richardson, Speer, Vail, Levin, Scully, Hey, Moore, Higgins, and Basamania*

**SUR-267C. Introductory Clinic Course in Children's Orthopaedics and Cerebral Palsy.** This introductory clinic course is arranged for those interested in pediatric orthopaedic problems, neurological disease, and related fields. The course gives the student a working experience in the examination and evaluation of clinical out-patients, in-patients, and surgical patients. It demonstrates both the individual and multidisciplinary group approach to the whole patient with complex orthopaedic and neurologic conditions as they affect growth, development, and rehabilitation. Credit: 2 or 4. Enrollment: max 2. *Fitch and Lenox Baker Children's Hospital staff*

**SUR-275C. Pediatric Cardiac Surgery.** The student becomes an active member of the surgical team caring for infants and children with congenital heart defects. Responsibilities include ward work and participation during surgery. This student is involved in perioperative decision making. Weekly formal didactic sessions are conducted. Credit: 4. Enrollment: max 2. *Ungerleider*

**SUR-276C. Advanced Clerkship in Pediatric Surgery.** This course is designed to familiarize the student with the whole range of surgical problems in children, but with emphasis on the pathophysiology of surgical and related problems in the newborn infant and the total care of the child with a malignancy. The student is encouraged to participate fully in the patient care aspects of the service and is considered an integral part of the patient care team. Although the course may be taken for the full eight weeks, it is felt that a four week experience is probably optimal for most students. It may be combined with other advanced surgical clerkships such as SUR-299C or with four weeks of neonatology (PED-225C) or other courses depending on the interests of the student. Credit: 4 or 8. Enrollment: max 2. *Mahaffey*

**SUR-277C. Orthopaedic Research.** Individual projects are assigned for completion during a limited period of time. a student works with an investigator in the orthopaedic laboratory either at Duke Medical Center or the Durham Veterans Affairs Hospital. Clinical investigation studies are also available at both institutions. Prerequisite: SUR-259C. Credit: 8. Enrollment: max 4. *Urbaniak, orthopaedic senior staff, and house staff*

**SUR-280C. General Surgical Oncology.** The course is designed for the student interested in surgical oncology. The students are involved in patient care with a specific surgeon but, in addition, are expected to attend multidisciplinary conferences related to gastrointestinal and breast carcinoma. These multidisciplinary conferences involve medical and radiation oncology as well as surgical oncology. The student is also expect-

ed to evaluate surgical patients in an outpatient setting as well as participating in inpatient and operative patient care. This course is designed for students who have an interest in the basic sciences in relation to surgical oncology. Attendance at research conferences involved in the molecular and cellular biology of human cancers is also expected. Permission of instructor is required. Credit: 4. Enrollment: min 1, max 2. *Lyerly, Iglehart, Leight, Seigler, and Tyler*

**SUR-281C. Introduction to Fractures and Musculoskeletal Trauma.** Students participate in the emergency management of patients through the Duke or Durham Regional Hospital Emergency Rooms. Principles of fractures and trauma are given during emergency room assignment. Attendance at Fracture Conference is required on Wednesdays and Saturdays at 7:30 a.m. in addition to two nights on call in the emergency room. Seeing patients in the Out-Patient Clinic one day per week is required. Credit: 3. Enrollment: max 2. *Urbaniak, Duke orthopaedics staff, and Durham Regional Hospital orthopaedics staff*

**SUR-283C. Advanced Surgery-Emphasis Cardiovascular/Thoracic.** Advanced concepts in surgery are presented in seminars and in ward, clinic, and operating room experiences. Fifty to seventy-five percent of the time is devoted to cardiovascular/thoracic surgery and related basic topics and the remainder to surgery generally. Credit: 8. Enrollment: min 2, max 5. *Wolfe, Anderson, Jones, Lowe, Smith, Ungerleider, Young, Glower, Landolfo, Davis, Juggers, D'Amico, and Harpole*

**SUR-299C. Advanced Surgical Clerkship.** This course is structured to provide the student with a comprehensive approach to surgical disorders. Each student works in the clinics, on the wards, and in the operating rooms side by side with one senior surgeon to be selected from the approved list below. Credit: 5 or 10. *Pappas, Bollinger, Davis, D'Amico, G. Georgiade, Glower, Grant, Harpole, Iglehart, Jones, Juggers, Landolfo, Leight, Lowe, Lyerly, McCann, Sebastian, Seigler, Smith, Ungerleider, Vaslef, and Wolfe*

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

**SUR-302C. Family Practice/Traumatology.** The student spends a portion of each day in the ski clinic triaging acute ski injuries and seeing family practice type problems coincident with a small community clinic. In addition, there is office practice in the physician's offices contiguous with St. John's Hospital, Jackson Hole, Wyoming under the directorship of Dr. Richard Sugden and Dr. Kenneth Lambert. Both are board certified in their specialties and hold university appointments. The unique opportunities of this travel away experience are to see the excellence that can be accomplished in a setting of this nature, to benefit from the mentorship of these outstanding individuals, and to add to experience in both family practice and orthopaedic traumatology. Credit: 4. Enrollment: min 1, max 1. *Sugden and Lambert*

**SUR-303C. Trauma Service.** This course is designed to provide students interested in trauma care with further experience both in the Emergency Department and on the Inpatient Trauma Service. The course emphasizes both triage and resuscitation for major and minor emergency problems in the Emergency Department and also pre- and postoperative care on the Inpatient Trauma Service. The student has a full-time experience by assuming duties and responsibilities similar to a junior intern. Emphasis is placed on developing skills in the care of patients with multisystem injuries in the Emergency Department, Inpatient Service, and Operating Room. Students work in conjunction with the attending staff and the residents on the Trauma Service. Credit: 4. Enrollment: max 2. *Vaslef, G. Georgiade, and Sebastian*

**SUR-304C. Nutrition in the Hospitalized Patient.** This course is designed to acquaint students with the techniques of nutritional assessment including somatic pro-

tein, visceral protein mass, body fat mass, immune competence, and metabolic balance studies. Students learn to determine basal energy expenditure and nitrogen requirements. The metabolic effects of acute and chronic starvation as well as stress and infection and the role played by these events in the hospital course of patients are studied. Emphasis is placed on techniques of nutritional support including routine and specialized hospital diets, routine and modular tube feeding diets, peripheral intravenous protein sparing and total parenteral nutrition. At the completion of the course, students have a thorough grasp of clinical nutrition and are able to apply specialized oral diets, tube feeding diets, and intravenous nutrition. If permitted by the instructor, this clinical science course can be audited. Credit: 1. Enrollment: min 3, max 8. *Grant*

## **Special Interdisciplinary Study Programs**

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

PROGRAM DIRECTORS: Kathryn P. King, M.D. (Coordinating Director), Richard Moon, M.D., Bryant W. Stolp, M.D., Ph.D., and David S. Warner, M.D.

While the university offers a range of opportunities from biochemistry to organ physiology, anesthesiology 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 and critical care medicine provides strong basic science grounding and application of research principles.

An area of independent study is defined and a hypothesis proposed as part of an ongoing interaction between the student and the laboratory mentor. Necessary methodological skills are learned by the student early in the course of study to allow data acquisition for subsequent analysis and interpretation. As the year progresses, students participate in "work in progress" seminars, that focus on the development of scientific information using the students' projects as examples. Emphasis is placed on experimental design and statistical analysis. At the end of the year, each student is expected to have completed a project of sufficient merit to warrant presentation and publication. Further, the Department offers a unique opportunity for the students to present their projects in a formal setting moderated by an external reviewer of national stature.

We encourage students to take Statistics as recommended by the MS3 Directors Committee. Additional courses in Advanced Diving Physiology and Medicine are available for interested students.

Students meet with the coordinating director to monitor progress in the laboratory. The course directors meet on a quarterly basis regarding course direction and the individual progress of students in the laboratories.

FACULTY: Richard L. Auten, Jr., Ph.D.; Peter B. Bennett, Ph.D., D.Sc.; Helene D. Benveniste, M.D., Ph.D.; Steve Eubanks, M.D.; Wayne A. Gerth, Ph.D.; Kathryn P. King, M.D.; Madan M. Kwatra, Ph.D.; Jeffery H. Lawson, M.D., Ph.D.; Richard Moon, M.D.; David Needham, Ph.D.; Laura E. Niklason, M.D., Ph.D.; Donald H. Penning, M.Sc., M.D.; Claude A. Piantadosi, M.D.; James D. Reynolds, Ph.D.; Debra A. Schwinn, M.D.; Sidney A. Simon, M.D.; Thomas F. Slaughter, M.D.; Bryant W. Stolp, M.D., Ph.D.; Richard D. Vann, Ph.D.; Steven N. Vaslef, M.D., Ph.D.; David S. Warner, M.D.

### **BEHAVIORAL NEUROSCIENCES STUDY PROGRAM (BSP)**

PROGRAM DIRECTOR: Andrew D. Krystal, M.D., M.S.

This study program is designed to help third year medical students obtain an integrative understanding of the basic processes underlying normal and pathological human and laboratory animal behavior. The course and preceptorship offerings familiarize students with significant developments in the behavioral neurosciences, investigative methodology used to examine human behavior and its neurobiological underpinnings, and the application of these findings to medicine. As an example, they are provided with the neuroanatomical, histochemical, neuroimmunological, neurophar-

macological, and neurobehavioral basis of prescribing anxiolytics, antidepressants, and other neurotropic drugs.

Students are encouraged to select an area of research concentration and then arrange to match their interests with a faculty member as a research preceptor by discussing the array of options with the study program director. They are given the opportunity to focus on some determinant of human behavior which may include neurobiological, developmental, or psychosocial factors. Students may choose to spend a significant portion of their time in a closely supervised laboratory with associated library research in an area of the student's interest resulting in a published report of the work. Specific science interests can be augmented through seminars, guided readings, and appropriate courses providing a greater familiarity with current issues in the biobehavioral sciences. The following course work is required of all students: PSC 223B, Neurobehavioral Basis of Behavior.

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

PSC-360B Neuropharmacology

PHR-372B Cellular Endocrinology

NBI-270B Neurobiology

PSC-213B Human Development I. Birth through Adolescence

PSC-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.; Everett H. Ellinwood, Jr., M.D.; Jau-Shyong Hong, Ph.D.; K. Ranga Krishnan, M.B., Ch.B.; Andrew D. Krystal, M.D., M.S.; Cynthia M. Kuhn, Ph.D.; Edward D. Levin, Ph.D.; David J. Madden, Ph.D.; Roy J. Mathew, M.B.; Jed E. Rose, Ph.D.; Saul M. Schanberg, M.D., Ph.D.; Susan S. Schiffman, Ph.D.; Rochelle D. Schwartz-Bloom, Ph.D.; Andrew Sherwood, Ph.D.; Kamaraju S. Sundar, Ph.D.; Richard S. Surwit, Ph.D.; Marvin S. Swartz, M.D.; Richard D. Weiner, M.D., Ph.D.; Redford B. Williams, M.D.

## **BIOMEDICAL ENGINEERING STUDY PROGRAM (BES)**

PROGRAM DIRECTORS: Donald D. Glower, M.D. and James H. McElhane, Ph.D.

This interdepartmental study program is designed to provide third year students with an opportunity to perform basic science research in the broad area of biomedical engineering. The program is designed to provide research opportunities to students interested in the quantitative understanding of the physiology of organs and organ systems. The majority of the faculty have research laboratories which investigate these areas at the macroscopic level. The course of study usually emphasizes either the employment of whole animal models or *in vitro* simulation of disease states. The development and employment of new instrumentation may be a component of the research effort, but not its exclusive objective. Emphasis in the student experience is placed upon the teaching of the quantitative method of understanding biological systems. The student is expected to learn to formulate hypotheses regarding biologic systems, develop appropriate methods to test such hypotheses, and use statistical methods to resolve the information obtained. Each student selects a faculty preceptor in consultation with the program director(s) and an individual research plan is developed. Students who wish to enter this program are not required to have an engineering background.

FACULTY: Roger C. Barr, Ph.D.; Raphael Escamilla, Ph.D.; John A. Feagin, Jr., M.D.; Robert D. Fitch, M.D.; Farshid Guilak, Ph.D.; Donald D. Glower, M.D.; Craig S. Henriquez, Ph.D.; Bruce M. Klitzman, Ph.D.; Andrew D. Krystal, M.D.; Jeffery H. Lawson, M.D., Ph.D.; E. Scott Levin, M.D.; James E. Lowe, M.D.; James H. McElhane, Ph.D.; Roger L. Miller, Ph.D.; Barry S. Myers, M.D., Ph.D.; Laura E. Niklason, M.D., Ph.D.; Ares D. Pasipoularides, M.D., Ph.D.; Robert Plonsey, Ph.D.; Debra A. Schwinn, M.D.; Lori A. Setton, Ph.D.; David W. Smith, Ph.D.; Peter K. Smith, M.D.; Doris A. Taylor, Ph.D.; George A. Truskey, Ph.D.; Ross M. Ungerleider, M.D.; James R. Urbaniak, M.D.; Olaf T. von Ramm, Ph.D.; Patrick D. Wolf, Ph.D.

## **BIOPHYSICS STUDY PROGRAM (BBP)**

PROGRAM DIRECTOR: Joseph Y. Lo, Ph.D.

This interdepartmental program provides an opportunity for medical students in the elective year to participate in research areas of basic and clinical medicine where quantitative and engineering methods are employed. The range of subject material included in the program is broad, ranging from the development of instrumentation to theoretical studies on chemical and physical mechanisms in biomedical systems. Some example areas are the development and application of new imaging techniques and the application of computer simulation to the study of biochemical and physiological systems.

Each student selects a faculty preceptor in consultation with the program directors and designs an individual plan in cooperation with the preceptor and directors. The primary emphasis of each student's plan is expected to be research. Students may, however, also be advised to take an existing course or to set up a tutorial with a faculty member to fill in deficient areas or to acquire needed quantitative or engineering skills. Depending on the subject area selected, a student may initiate a new research project of limited scope or take over a well-defined part of an existing project. Students are expected to produce a written summary of their work, possibly (but not necessarily) a paper suitable for publication in a scientific journal.

Students taking this program should have some prior training or experience in one or more of the following areas: mathematics, computer science, physics, chemistry, or engineering (electrical, mechanical, biomedical, etc.).

FACULTY: H. Cecil Charles, Ph.D.; James T. Dobbins, III, Ph.D.; Carey E. Floyd, Jr., Ph.D.; Laurence W. Hedlund, Ph.D.; Ronald J. Jaszczak, Ph.D.; G. Allan Johnson, Ph.D.; Joseph Y. Lo, Ph.D.; James R. MacFall, Ph.D.; Edward F. Patz, Jr., M.D.

## **CANCER BIOLOGY STUDY PROGRAM (CBP)**

PROGRAM DIRECTOR: Edward C. Halperin, M.D.

The Cancer Biology Study Program offers third year medical students a thirty-two credit program of basic science instruction. Each student has an opportunity to focus on an area of interest and pursue a scholarly activity. Through a combination of research preceptorship and classroom work, students are introduced to cancer research. The students may choose to investigate oncogenes, tumor suppressor genes, growth factors, chromosomal abnormalities, cellular invasion and metastases, tumor doubling time, cell loss, tumor hypoxia, tumor angiogenesis, chemical/radiation/foreign body/viral/tobacco carcinogenesis, biologic and immunotherapy principles, radiobiology and hyperthermic oncology, and the pharmacology of cancer chemotherapy.

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

FACULTY: Andrew Berchuck, M.D.; Patrick J. Casey, Ph.D.; O. Michael Colvin, M.D.; Christopher Counter, Ph.D.; Mark W. Dewhirst, D.V.M., Ph.D.; Henry S. Friedman, M.D.; Eli Gilboa, Ph.D.; James M. Grichnik, M.D., Ph.D.; Edward C. Halperin, M.D.; Maureen R. Hoffman, M.D., Ph.D.; Randy L. Jirtle, Ph.D.; Michael J. Kelley, M.D.; Sally A. Kornbluth, Ph.D.; Joanne Kurtzberg, M.D.; Chuan-Yuan Li, Ph.D.; Jeffrey R. Marks, Ph.D.; Lawrence B. Marks, M.D.; Anthony R. Means, Ph.D.; Joseph R. Nevins, Ph.D.; Ann Marie Pendergast, Ph.D.; Salvatore V. Pizzo, M.D., Ph.D.; Hilliard F. Seigler, M.D.; Tso-Pang Yao, Ph.D.

## **CARDIOVASCULAR STUDY PROGRAM (CVS)**

PROGRAM DIRECTOR: Neil Freedman, M.D.

This interdepartmental study program is designed to provide third year medical students with an in-depth basic science research experience in one area of the broad discipline of cardiovascular science. The program is directed at those students potentially interested in a career in cardiovascular research. Faculty members in this study tract come from numerous departments including biochemistry, cell biology, immunology,

pathology, and pharmacology. Students who elect this study program undertake a research project in a laboratory under the guidance of a faculty preceptor. In addition, students are encouraged to take course work each term to complement their research interests. Because a wide range of research opportunities is available, course work is individually tailored by the faculty preceptor to the interests of the student.

**FACULTY:** Page A. W. Anderson, M.D.; G. Vann Bennett, M.D., Ph.D.; Marc G. Caron, Ph.D.; Neil J. Freedman, M.D.; Augustus O. Grant, M.B., Ch.B.; Joseph C. Greenfield, Jr., M.D.; Barton F. Haynes, M.D.; Bruce M. Klitzman, Ph.D.; Walter J. Koch, Ph.D.; Christopher D. Kontos, M.D.; William E. Kraus, M.D.; Madan M. Kwatra, Ph.D.; Robert J. Lefkowitz, M.D.; Ann LeFurgey, Ph.D.; Anthony R. Means, Ph.D.; Claude A. Piantadosi, M.D.; Keith A. Reimer, M.D., Ph.D.; Howard Rockman, M.D.; Debra A. Schwinn, M.D.; Jonathan S. Stamler, M.D.; Doris A. Taylor, Ph.D.; Antonius M. J. VanDongen, Ph.D.; Xiao-Fan Wang, Ph.D.; A. Richard Whorton, Ph.D.

## **CLINICAL RESEARCH STUDY PROGRAM (CRP)**

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

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

During the fall term, students are required to take two courses: Fundamental Concepts of Clinical Research (CRP-230) and Fundamental Concepts of Biostatistics (CRP-240). Other courses may be taken with the approval of the student's preceptors.

**FACULTY:** Robert M. Califf, M.D.; G. Ralph Corey, M.D.; Elizabeth R. DeLong, Ph.D.; Christopher Granger, M.D.; Robert A. Harrington, M.D.; Victor Hasselblad, Ph.D.; James Jollis, M.D.; Kerry L. Lee, Ph.D.; Daniel B. Mark, M.D.; David B. Matchar, M.D.; Lawrence H. Muhlbaier, Ph.D.; L. Kristin Newby, M.D.; Eugene Z. Oddone, M.D.; E. Magnus Ohman, M.D.; Eric D. Peterson, M.D.; Gregory P. Samsa, Ph.D.; Daniel J. Sexton, M.D.; Sandra S. Stinnett, Dr.P.H.; Barbara E. Tardiff, M.D.; Gail E. Tudor, Ph.D.; William E. Wilkinson, Ph.D.

## **EPIDEMIOLOGY AND PUBLIC HEALTH STUDY PROGRAM (EPH)**

**PROGRAM DIRECTOR:** Laurence G. Branch, Ph.D.

The Epidemiology and Public Health Study Program is designed to provide third year Duke medical students with the knowledge regarding research tools to design clinical trials and to analyze the resultant health services research data. Participants also learn the essentials of research design, statistical analyses, health policy, and comparative health systems so that they can be contributors to the improvement of the system of health care, beginning with the improved health of the patient but extending to local, state, and national issues. Each student selects a faculty preceptor in consultation with the program director.

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

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

**Required Research.** In conjunction with the practicum, each student is required to produce a research paper analyzing an area of epidemiology, health service research, finance, health systems, or health policy, related to the student's practicum experience. He or she works with an advisor to determine and investigate the topic. This research activity extends throughout the nine months, accumulating with the acceptance of the completed paper. Oral presentations at the AOA Symposium are also expected.

**Dual Degree Programs.** In some instances, third year students may opt to enter one of several approved programs for dual degrees or study away from this campus. A student must apply both to the other school and to the Medical School by completing the Duke Third Year Elective Form. The approved dual degree programs include the M.D./M.P.H. program which allows third year students to enroll in one of several approved M.P.H. programs (Biostatistics; Environmental Sciences and Engineering;

Epidemiology; Health Care and Prevention; Health Policy and Administration; and Maternal and Child Health) at the University of North Carolina at Chapel Hill and to complete all requirements for the M.P.H. degree during one academic year in fulfillment of their third year requirement. Dr. Branch is the director of this M.D./M.P.H. Program. Other dual degree programs include the Duke master's degree in Public Policy from the Sanford Public Policy Institute (M.D./M.P.P. program; Dr. Branch is the director), and the Duke Master's in Business Administration from the Fuqua School of Business (M.D./M.B.A. program; Dr. Broedeheft is the director). Some of these other programs may take more time, thereby necessitating an extension of the time required for completing the third year requirement. In addition, students may propose an individually-tailored Study Away option. Study away proposals are reviewed and approved individually by the Third Year Study Program Committee. Placements in the Cloisters Program at the National Institutes of Health and at the National Institute of Environmental Health Sciences in Research Triangle Park are options; the supervision of students in the study away programs can be carried out by faculty from a number of study programs.

FACULTY: Lori A. Bastian, M.D.; Dan G. Blazer, M.D., Ph.D.; Laurence G. Branch, Ph.D.; Steven J. Bredehoeft, M.D., M.P.H.; Barbara J. Burns, Ph.D.; Robert M. Califf, M.D.; Dennis A. Clements, M.D., Ph.D.; John M. Dement, Ph.D.; Linda K. George, Ph.D.; Deborah T. Gold, Ph.D.; Judith C. Hays, Ph.D.; Ronnie D. Horner, Ph.D.; Robert H. Jones, M.D.; George L. Maddox, Ph.D.; David B. Matchar, M.D.; Joellen M. Schildkraut, Ph.D.; David L. Simel, M.D., M.H.S.; Marvin S. Swartz, M.D.; James Tulskey, M.D.; Emmanuel Walter, M.D., M.P.H.

## **HUMAN GENETICS STUDY PROGRAM (HGP)**

PROGRAM DIRECTORS: Marcy C. Speer, Ph.D. (Coordinating Director), Margaret Pericak-Vance, Ph.D., and Jeffrey M. Vance, M.D., Ph.D.

Our genetic makeup to a large extent dictates our health. The promise of the Human Genome Initiative is a greater understanding of the genetic components to health. Once the genetic contributions to common diseases like osteoarthritis, heart disease, and cancer are understood, the physician will have a powerful means at his or her disposal for identifying individual risk factors and offering lifestyle modifications. The study program in human genetics offers third year medical students an integrated program for understanding research in human genetics, its application to human genetic disease for risk assessment, genetic counseling, and potential therapeutics, and ethical and legal implications for this research on the patient, the family, and society. We anticipate that students in this program will follow one of several broad paths, utilizing either a molecular approach or a statistical approach to understanding and treating human genetic disease.

Research opportunities are available in laboratories studying such diverse topics as positional cloning of human disease genes, apoptosis, gene therapy, biochemical genetics, animal models of genetics and development, and genetic epidemiology. Students are expected to produce a written summary of their work at the end of the program, which may be a scientific manuscript.

In addition to the laboratory work, the program requirements include a 2 credit course Genetic Analysis for Human Disease offered in the fall semester and a year-long seminar series held weekly targeting current topics in human genetic research. Other elective courses may be taken with the permission of the program director and the student's preceptor.

FACULTY: Andrea Amalfitano, D.O., Ph.D.; Rose-Mary Boustany, M.D.; Yuan-Tsong Chen, M.D., Ph.D.; John R. Gilbert, Ph.D.; John Klingensmith, Ph.D.; Virginia B. Kraus, M.D., Ph.D.; Douglas Marchuk, Ph.D.; Margaret Pericak-Vance, Ph.D.; Joellen Schildkraut, Ph.D.; Marcy C. Speer, Ph.D.; Bruce Sullenger, Ph.D.; Jeffrey M. Vance, M.D., Ph.D.; Fulton Wong, Ph.D.

## **IMMUNOLOGY STUDY PROGRAM (ISP)**

PROGRAM DIRECTOR: Frances E. Ward, Ph.D.

This program is designed for students whose career goals lie in one of the many clinical specialties that interface broadly with immunology, allergy-immunology, infectious diseases, rheumatology, hematology, transplantation, and oncology. A basic but

thorough introduction to immunology is developed in IMM 291B, which also emphasizes critical discussion of original research papers. Each student chooses a faculty preceptor with whom to work on an original research project. It is encouraged that the student not be merely injected into the continuum of the preceptor's research interests, but rather that an individual project be developed which can be completed during the study program. The primary goals of the program are to encourage and develop the student's own creativity, to expose him or her to the research interests and philosophies of the entire Department of Immunology, and to help gain a useful personal perspective on current immunologic thought with an emphasis on clinical relevance. The student's efforts and time are generally divided as follows:

*Preceptorship.* The major emphasis of the program during which the students function much as graduate students in the Department of Immunology. (30 hours or more per week).

*Comprehensive Immunology (IMM 291B).* An optional in-depth course in the basic concepts of immunology. Analysis of antigens and antibodies is followed by an emphasis on the organization and cellular and molecular aspects of the immune system, its regulation, and effector mechanisms. (3 hours per week, spring term).

*Seminars for Research Progress.* Throughout the year, fellows and students in the department present brief informal seminars on their ongoing research. The discussion that follows is of great help to the presenter and allows the student to observe and participate in critical analysis of research before it is at the publication or formal seminar stage. (1 hour per week).

*Immunology Department Seminars.* A series of formal seminars by department faculty and visiting scientists. (1-2 hours per week).

*Additional Course Work.* The student may elect to take any of several courses in immunology and related fields, but is generally discouraged from excessively diluting his laboratory experience.

FACULTY: R. Randal Bollinger, M.D., Ph.D.; Rebecca H. Buckley, M.D.; Jeffrey R. Dawson, Ph.D.; Carolyn Doyle, Ph.D.; Eli Gilboa, Ph.D.; Russell P. Hall, III, M.D.; Barton F. Haynes, M.D.; Maureen R. Hoffman, M.D., Ph.D.; Garnett Kelsoe, Ph.D.; Donna D. Kostyu, Ph.D.; Michael S. Krangel, Ph.D.; Virginia B. Kraus, M.D., Ph.D.; Roger J. Kurlander, M.D.; Joanne Kurtzberg, M.D.; M. Louise Markert, M.D., Ph.D.; Michael G. McHeyzer-Williams, Ph.D.; William Parker, Ph.D.; David S. Pisetsky, M.D., Ph.D.; Marcella Sarzotti-Kelsoe, Ph.D.; Hilliard F. Seigler, M.D.; Ralph Snyderman, M.D.; Herman F. Staats, Ph.D.; Thomas F. Tedder, Ph.D.; Marilyn J. Telen, M.D.; Frances E. Ward, Ph.D.; Weiguo Zhang, Ph.D.; Minghua Zhu, Ph.D.; Yuan Zhuang, Ph.D.

## **INFECTIOUS DISEASES STUDY PROGRAM (IDP)**

PROGRAM DIRECTOR: Kenneth Alexander, M.D., Ph.D.

Knowledge of infectious diseases is relevant to care of patients of all ages and in each clinical specialty from surgery, pediatrics, and medicine to obstetrics-gynecology and family medicine. This study program provides students with the opportunity to directly explore infectious diseases in a laboratory setting coupled with lecture/seminar courses designed to provide some breadth of knowledge of the host, microorganisms, and their interactions. The goals of the program are to instill a critical assessment of information, to provide the opportunity for creative acquisition of data, to encourage independent thinking, and to provide insight into modern technology and the interrelationship of clinical infectious diseases with basic microbiology and immunology. Most of the participating faculty members are involved in research that relates to microbial pathogenesis.

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



- *Preceptorship.* This is the major emphasis of the program with students functioning essentially as graduate students. 30 hours or more per week.
- *Courses.* During the spring term, students may take either Medical Immunology (MIC 330B), Virology and Viral Oncology (MIC 252B), or Microbial Pathogenesis (MIC 282B), depending on the student's laboratory research interests.
- *Seminars.* Students in the Infectious Diseases Study Program attend seminars in which faculty members, fellows, and students present their ongoing research. Such presentations enable the student to observe and participate in critical analysis of research before it reaches the publication stage.
- *Additional Course Work.* Although other basic science electives in microbiology and immunology may be taken upon approval by the program director, the student is discouraged from excessively diluting her or his laboratory experience.

FACULTY: Kenneth Alexander, M.D., Ph.D.; Rebecca H. Buckley, M.D.; Richard Frothingham, M.D.; Mariano A. Garcia-Blanco, M.D., Ph.D.; Carol Dukes Hamilton, M.D.; John D. Hamilton, M.D.; Joseph Heitman, M.D., Ph.D.; Jack D. Keene, Ph.D.; Kenneth N. Kreuzer, Ph.D.; Roger J. Kurlander, M.D.; John H. McCusker, Ph.D.; Thomas G. Mitchell, Ph.D.; Joseph R. Nevins, Ph.D.; John R. Perfect, M.D.; David J. Pickup, Ph.D.; Christian R.H. Raetz, M.D., Ph.D.; Daniel J. Sexton, M.D.; Herman F. Staats, Ph.D.; J. Brice Weinberg, M.D.; Kenneth H. Wilson, M.D.

## NEUROBIOLOGY STUDY PROGRAM (NBP)

PROGRAM DIRECTORS: Dennis A. Turner, M.D. and Miquel Nicoletis, M.D., Ph.D.

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

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

FACULTY: George J. Augustine, Ph.D.; Jorge V. Bartolome, Ph.D.; Rose-Mary Boustany, M.D.; Nell B. Cant, Ph.D.; Joseph M. Corless, M.D., Ph.D.; Robert P. Erickson, Ph.D.; Robert P. Erickson, Ph.D.; David Fitzpatrick, Ph.D.; William C. Hall, Ph.D.; Michael M. Haglund, M.D., Ph.D.; Lawrence C. Katz, Ph.D.; Cynthia M. Kuhn, Ph.D.; Darrell V. Lewis, Jr., M.D.; Donald C. Lo, Ph.D.; Roger D. Madison, Ph.D.; James O. McNamara, Sr., M.D.; J. Victor Nadler, Ph.D.; Dale Purves, M.D.; Peter H. Reinhart, Ph.D.; Saul M. Schanberg, M.D., Ph.D.; Donald E. Schmechel, M.D.; Rochelle D. Schwartz-Bloom, Ph.D.; Sidney A. Simon, Ph.D.; J. H. Pate Skene, Ph.D.; Theodore A. Slotkin, Ph.D.; John E.R.

Staddon, Ph.D.; Warren J. Strittmatter, M.D.; Dennis A. Turner, M.D.; E. Lee Tyrey, Ph.D.; Jeffery M. Vance, M.D., Ph.D.; Wilkie A. Wilson, Jr., Ph.D.; Fulton Wong, Ph.D.

## **OPHTHALMOLOGY AND VISUAL SCIENCE STUDY PROGRAM (OVS)**

PROGRAM DIRECTORS: David L. Epstein, M.D. and Fulton Wong, Ph.D.

- *Description.* The purpose of this study program is to provide third year medical students with research skills and experience that can be applied to future careers as clinician scientists in ophthalmology and other fields. Although there is a primary emphasis on laboratory science, clinical research programs of inquiry based on strong scholarship are also possible. There is a focus on clinical investigators forming a true partnership with basic science researchers in attempting to advance the understanding and therapy of ocular diseases. There is an emphasis on hypothesis formation and the planning and execution of experiments that can address and then redefine the hypothesis.
- *Curriculum.* Each student chooses a preceptor according to her/his interests. Together they determine a topic of investigation which requires hands-on laboratory or clinical research by the student. Joint preceptors (for example, a clinical investigator and a basic science researcher) are acceptable and, in fact, encouraged. The course of study must be approved by the study program directors. At the end of the year, each student is expected to produce an in-depth paper based on the research. Throughout the year students attend: a) regular lectures on topics about ophthalmology and visual science given by Duke faculty as well as outside lecturers; b) participate in bimonthly 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: R. Rand Allingham, M.D.; Tereté Borrás, Ph.D.; Edward G. Buckley, M.D.; Joseph M. Corless, M.D., Ph.D.; David L. Epstein, M.D.; W. Craig Fowler, M.D.; Diane L. Hatchell, Ph.D.; Glenn J. Jaffe, M.D.; Gordon Klintworth, M.D., Ph.D.; Brooks W. McCuen II, M.D.; Alan D. Proia, M.D., Ph.D.; Judy H. Seaber, Ph.D.; Cynthia A. Toth, M.D.; Fulton Wong, Ph.D.

## **PATHOLOGY STUDY PROGRAM (PSP)**

PROGRAM DIRECTORS: William D. Bradford, M.D. (Coordinating Director), Keith A. Reimer, M.D., Ph.D., and Maureane R. Hoffman, M.D., Ph.D.

Pathology is the study of disease through the utilization of structural and functional changes to gain information about the human organism's response to injury. The goal of the Pathology Study Program is to provide the medical student with a thorough learning experience in pathology and laboratory medicine under the guidance of a senior faculty preceptor. The essential elements of this program are: a) organized course work, b) independent, but guided research experience (bench or library), and c) active participation in small group seminars.

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

### ***PSP Track I***

Required Courses:	Systemic pathology; didactic lectures (PTH 241B); student seminar
Elective Courses:	None
Independent Study:	Research with thesis/project report require
Advisor:	Dr. Keith A. Reimer (684-3659)
Max number students:	4

### ***PSP Track II***

Required Courses:	Systemic pathology; didactic lectures (PTH 241B); autopsy, surgical, or
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	cytopathology rotation (PTH 223B, PTH 348B, PTH 281B); student seminars
Elective Courses:	Limited
Independent Study:	Thesis/project report required
Advisor:	Dr. Maureane R. Hoffman (684-6925)
Max number students:	4

### ***PSP Track III***

Required Courses:	Systemic pathology; didactic lectures (PTH 241B); student seminars; autopsy, surgical or cytopathology rotation (PTH 223B, PTH 348B, PTH 281B)
Elective Courses:	A carefully planned selection of preceptorships, e.g., molecular pathology, microbiology, surgical pathology, autopsy pathology, or transfusion medicine selected with the advice of Dr. Bradford
Independent Study:	Thesis/project report required
Advisor:	Dr. William Bradford (684-5112)
Max number students:	2

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

FACULTY: Soman N. Abraham, Ph.D.; Rex C. Bentley, M.D.; Darell D. Bigner, M.D., Ph.D.; Sandra H. Bigner, M.D.; Edward H. Bossen, M.D.; William D. Bradford, M.D.; Stephen J. Bredehoeft, M.D.; Dennis A. Clements, M.D., Ph.D.; Mark W. Dewhirst, D.V.M., Ph.D.; Marcia R. Gottfried, M.D.; Charles S. Greenberg, M.D.; Laura P. Hale, M.D.; David H. Harpole, M.D.; Maureane R. Hoffman, M.D., Ph.D.; David Howell, M.D., Ph.D.; Randy L. Jirtle, Ph.D.; William H. Kane, M.D., Ph.D.; Gordon Klintworth, M.D.; Virginia B. Kraus, M.D., Ph.D.; James E. Lowe, M.D.; Herbert K. Lyerly, M.D.; Neil R. MacIntyre, M.D.; John F. Madden, M.D., Ph.D.; Sara E. Miller, Ph.D.; Salvatore V. Pizzo, M.D., Ph.D.; Alan D. Proia, M.D., Ph.D.; L. Darryl Quarles, M.D.; Keith A. Reimer, M.D., Ph.D.; Nancy L. Reinsmoen, Ph.D.; L. Barth Reller, M.D.; Gregory J. Riggins, M.D.; Victor L. Roggli, M.D.; Frank Sedor, Ph.D.; Christopher Shea, M.D.; John D. Shelburne, M.D., Ph.D.; Charles Steenbergen, M.D., Ph.D.; Timothy T. Stenzel, M.D.; Ph.D.; John G. Toffaletti, Ph.D.; Robin T. Vollmer, M.D.; Philip J. Walther, M.D., Ph.D.; J. Brice Weinberg, M.D.; Peter Zwadyk, Jr., Ph.D.

## **PHARMACOLOGY AND MOLECULAR THERAPEUTICS (PMT)**

PROGRAM DIRECTORS: Robert Abraham, Ph.D., Patrick J. Casey, Ph.D., Anthony R. Means, Ph.D.

The PMT program is based on utilization of the basic concepts of biology and chemistry to determine how drugs affect humans. It encompasses the study of the biological targets of drug action, the mechanism by which drugs act, the therapeutic and toxic effects of drugs, as well as the development of new therapeutic agents. Participating faculty members have particular strengths in the areas of receptor function and cellular signaling mechanisms as targets of drug action. Special emphasis is placed on the complex regulatory mechanisms that govern mammalian cell growth and differentiation, how these mechanisms are perturbed in human diseases (such as cancer) and how our knowledge of these regulatory mechanisms might lead to improved therapies. Current research interests of the faculty include:

1. the mechanism of action of neuropeptides and neurotransmitters;
2. ontogeny of signaling pathways in nervous, cardiovascular and immune tissue;
3. cellular signaling mechanisms, including the actions of calcium and cyclic nucleotides on protein phosphorylation/dephosphorylation;
4. receptor function and cell signaling mechanisms regulating cell growth, proliferation and death;

#### 5. the molecular basis of rational drug design.

The major emphasis of the PMT program is on student-generated independent study/research projects conducted in close association with a faculty preceptor. A course in Pharmacotherapy of Common Problems in Internal Medicine (MED 255/PHR 255) has been developed to enrich the research experience and is required for all students. 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.

FACULTY: Mohamed (Bahie) Abou-Donia, Ph.D.; Robert T. Abraham, Ph.D.; G. Vann Bennett, M.D., Ph.D.; Scott Brazer, M.D.; Marc G. Caron, Ph.D.; Patrick J. Casey, Ph.D.; Sheila Collins, Ph.D.; Michael O. Colvin, M.D.; Christopher M. Counter, Ph.D.; Carlos de Castro, M.D.; Mark W. Dewhirst, Ph.D.; Carol Dukes, M.D.; Everett H. Ellinwood, M.D.; Larry Goldstein, M.D.; Christopher Granger, M.D.; John Hamilton, M.D.; Joseph Heitman, M.D., Ph.D.; Homme W. Hellinga, Ph.D.; Jack Keene, Ph.D.; Kathy Kirkland, M.D.; Walter Koch, Ph.D.; Sally Kornbluth, Ph.D.; Ranga R. Krishnan, M.B.; Cynthia M. Kuhn, Ph.D.; Peter Kussin, M.D.; Madan M. Kwatra, Ph.D.; Robert J. Lefkowitz, M.D.; Daniel Lew, Ph.D.; Donald P. McDonnell, Ph.D.; James O. McNamara, M.D.; Diana McNeill, M.D.; Anthony R. Means, Ph.D.; Elliott Mills, Ph.D.; Paul Modrich, Ph.D.; Victor Nadler, Ph.D.; Joseph R. Nevins, Ph.D.; Kristin Newby, M.D.; Christopher O'Connor, M.D.; Thomas Ortel, M.D.; Ann Marie Pendergast, Ph.D.; John Perfect, M.D.; David Pisetsky, M.D.; David Price, M.D.; Gregory J. Riggins, M.D.; Johannes Rudolph, Ph.D.; Saul M. Schanberg, M.D.; Rochelle D. Schwartz-Bloom, Ph.D.; Debra A. Schwinn, M.D.; Shirish Shenolikar, Ph.D.; Theodore A. Slotkin, Ph.D.; William St. Clair, M.D.; Laura Svetkey, M.D.; Antonius M. VanDongen, Ph.D.; Xiao-Fan Wang, Ph.D.; Thomas Weber, M.D.; Richard A. Whorton, Ph.D.; Wilkie A. Wilson, Ph.D.; Tso-Pang Yao, Ph.D.; John D. York, Ph.D.

# Roster of Students<sup>1</sup>

## Class of 2000

Adlakha, Charu L. (Massachusetts Institute of Technology), Columbia, Maryland  
Agarwal, Swati (Duke), Hollidaysburg, Pennsylvania  
Alan, Rodney K. (Morehouse), Tallahassee, Florida  
Allen, Brandy M. (Kansas), Durham, North Carolina  
Asplin, Iain R. (Virginia), Charlottesville, Virginia  
Bagley, Carlos A. (Duke), Jonesboro, Georgia  
Bauman, Monica J. (California at Los Angeles), Chapel Hill, North Carolina  
Bindal, Vishal (Duke), McLean, Virginia  
Bruch, Suzanne M. (California Institute of Technology), Durham, North Carolina  
Burnett, Daniel R. (Pennsylvania), Greenfield, Massachusetts  
Carlson, Marie A. (North Carolina State), Fayetteville, North Carolina  
Cherwek, David H. (North Carolina at Chapel Hill), Fredericksburg, Virginia  
Ching, Christine D. (Wellesley), Santa Ana, California  
Citrin, Deborah E. (North Carolina State), Thomasville, North Carolina  
Cole, Vanessa R. (Cornell), Albuquerque, New Mexico  
Corcoran, Ethan E. (Cornell), Pennington, New Jersey  
Courtney, Kevin D. (Dartmouth), Keene, New Hampshire  
Davidson, Jesse A. (Yale), Washington, District of Columbia  
Davila, Marco L. (Texas Christian), Rockwall, Texas  
Denny, John P. (North Carolina State), Asheville, North Carolina  
Denny, Susan D. (North Carolina at Chapel Hill), Hickory, North Carolina  
Dixon, Terry C. (South Carolina at Columbia), Aynor, South Carolina  
Forna, Fatu M. (Florida A & M), Tallahassee, Florida  
Franklin, Kendra M. (Ohio State), Gahanna, Ohio  
Gallop, Vernetta D. (Yale), Bronx, New York  
Green, Ari J. (Miami), Durham, North Carolina  
Grunberg, Gregory E. (Amherst), New York, New York  
Hardison, Jeremy L. (Duke), Durham, North Carolina  
Harrild, David M. (Dartmouth), Durham, North Carolina  
Hata, Ankie-Marie (Wheaton), Elyria, Ohio  
Helm, Hughes M. (North Carolina at Charlotte), Chapel Hill, North Carolina  
Ho, Janie A. (Harvard), Chapel Hill, North Carolina  
Holley, Christopher L. (Duke), Apex, North Carolina  
Holmes, Jarrod P. (Duke), Easley, South Carolina  
Holmes, Jude, Jr. (North Carolina at Chapel Hill), Maple Hill, North Carolina  
Huang, Erich S. (Harvard), Durham, North Carolina  
Huang, Xuewei (Massachusetts Institute of Technology), Brookline, Massachusetts  
Hueman, Matthew T. (United States Military Academy), Golden, Colorado  
Jacobs, Michael K. (Vanderbilt), Stone Mountain, Georgia  
James-Rodriguez, Felice A. (Duke), Marion, South Carolina  
Jenkin, Janet (Duke), Whitehouse Station, New Jersey  
Jones, Michael R. (Duke), Fayetteville, North Carolina  
Jones, Relief, III (Stanford), Buras, Louisiana  
Kahl, Christina R. (Dartmouth), Winston-Salem, North Carolina  
Kaplan, Andrew L. (Duke), Woodbury, New York  
Kasibhatla, Mohit S. (Columbia), Greensboro, North Carolina  
Kayes, Andrew V. (Duke), Cincinnati, Ohio  
Kendelhardt, Jason D. (Wake Forest), Matthews, North Carolina  
Killian, Jonathan K. (Stanford), Saratoga, California  
Kim, Eun Y. (Harvard), Bayside, New York  
Kong, Garheng A. (Stanford), Fresno, California  
Kunz, Abby B. (Dartmouth), Durham, North Carolina  
Lager, Patrick J. (Whitman), Shelby, Montana  
Lawson, William T., Jr. (Duke), Lakeland, Florida  
Le, Thuy (California at Los Angeles), Bakersfield, California  
Lindauer, Kelly R. (Colorado-Boulder), Denver, Colorado  
Mallette, Quinterol J. (Duke), Hartford, Connecticut  
Marcus, Stacy J. (Duke), Silver Spring, Maryland  
Martin, Jamila C. (Duke), Berkeley, California

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<sup>1</sup>-Hometown does not denote legal residence.

Maurer, Carter J. (Duke), Ashland, Oregon  
 McCall, Shannon J. (North Carolina State), High Point, North Carolina  
 McDaniel, Benjamin B. (Duke), Grand Junction, Colorado  
 McIntire, Katherine N. (California at Los Angeles), Solana Beach, California  
 McMahon, Connette P. (Duke), Granite Quarry, North Carolina  
 McMurry, Michelle T. (Harvard), Oakland, California  
 McNamara, Bridget T. (North Carolina State), Burlington, North Carolina  
 Mills, Tara A. (Winston-Salem State), Wilson, North Carolina  
 Mitchell, Duane A. (Rutgers), Somerset, New Jersey  
 Moore, Frederick D. (United States Naval Academy), Durham, North Carolina  
 Mostaghel, Elahe A. (Harvard), Toledo, Ohio  
 Odom, Audrey R. (Duke), High Point, North Carolina  
 Olson, Michael R. (Harvey Mudd), East Greenwich, Rhode Island  
 Ormsbee, Susan M. (Yale), New Bern, North Carolina  
 Palestrant, Daniel (Johns Hopkins), Phoenix, Arizona  
 Patel, Prerana N. (William Marsh Rice), Hickory, North Carolina  
 Patel, Vikas J. (Duke), Cary, North Carolina  
 Payne, Joseph R. (Georgia Institute of Technology), Greenville, North Carolina  
 Peake, Paula L. (Cincinnati), Fort Thomas, Kentucky  
 Peterson, Erica L. (Nebraska at Lincoln), Lincoln, Nebraska  
 Pond, Kyle K. (Duke), Cape Elizabeth, Maine  
 Posther, Katherine E. (Harvard), Fort Wayne, Indiana  
 Pradhan, Adit A. (Duke), Des Moines, Iowa  
 Pradhan, Ashutosh A. (Johns Hopkins), Dix Hills, New York  
 Quan, Hai N. (Indiana at Bloomington), Indianapolis, Indiana  
 Quayle, Frank J., IV (Princeton), Charlottesville, Virginia  
 Rad, Ariel N. (Princeton), Holmdel, New Jersey  
 Radkowski, Christopher A. (Johns Hopkins), Greensburg, Pennsylvania  
 Ravin, Adam G. (Vanderbilt), Durham, North Carolina  
 Recanati, Maurice A. (Rensselaer Poly Institute), New York, New York  
 Reed, Robyn C. (Wake Forest), Durham, North Carolina  
 Rose, Daniel T. (North Carolina at Chapel Hill), Nashville, North Carolina  
 Ruan, Daniel T. (Middleburg), Trumbull, Connecticut  
 Saldanha, Charles E. (Emory), Rochester, New York  
 Scholnick, Joshua D. (Yale), Williamsburg, Virginia  
 Shih, George L. (Duke), Lexington, Kentucky  
 Smith, Brian A. (Vanderbilt), St. Albans, West Virginia  
 Smith, Eric G. (Johns Hopkins), Durham, North Carolina  
 Snyder, Laurie D. (De Pauw), Westerville, Ohio  
 Soni, Sejal R. (Yale), Marietta, Georgia  
 Stohr, Bradley A. (Swarthmore), Sacramento, California  
 Sullivan, Michael D. (Harvard), River Ridge, Louisiana  
 Tai, Oliver S. (Harvard), Germantown, Tennessee  
 Tweedy, Damon S. (Maryland Baltimore County), Lanham, Maryland  
 Wang, Stephen L. (Kentucky), Lexington, Kentucky  
 Wellons, Melissa F. (Duke), Durham, North Carolina  
 White, Brent C. (Emory), Columbus, Georgia  
 Wilfert, Rachel A. (Amherst), Chapel Hill, North Carolina  
 Winkle, Brooke E. (Harvard), Palo Alto, California  
 Wong, Jimmie C. (Columbia University), Monterey Park, California  
 Wong, Stephen (California Institute of Technology), Los Angeles, California  
 Wu, Joy Yee-Jia (Stanford), Voorhees, New Jersey  
 Wu, Zhenqing (Franklin and Marshall), Durham, North Carolina  
 Wurth, Kathleen E. (North Carolina at Chapel Hill), Bethlehem, Pennsylvania  
 Yacoubian, Talene A. (Harvard), Chattanooga, Tennessee  
 Yoo, David S. (Duke), Spring, Texas  
 Yowell, Charles W. (Duke), Durham, North Carolina  
 Yuan, Shan (Oberlin), Milpitas, California  
 Zamah, Alberuni M. (William Marsh Rice), Kansas City, Missouri  
 Zaref, Jeffrey I. (Harvard), Haworth, New Jersey  
 Zhang, Ming M. (California-Berkeley), Durham, North Carolina  
 Zomorodi, Ali R. (Duke), Winter Haven, Florida

## Class of 2001

Altman, Jennifer J. (Tulane), Somerville, New Jersey

Anderson, Deverick J. (North Carolina at Chapel Hill), Durham, North Carolina  
 Baker-Lepain, Julie C. (Notre Dame), St. Charles, Illinois  
 Balius, Anastasia M. (California at Berkeley), Anaheim, California  
 Banerjee, Audreesh (Delaware), Newark, Delaware  
 Bertrand, Scott W. (North Carolina at Chapel Hill), Greensboro, North Carolina  
 Blackmon, Scott M. (North Carolina at Chapel Hill), Tabor City, North Carolina  
 Bolger, Frank W. (Illinois at Chicago), Chicago, Illinois  
 Brazeale, Caryn B. (Johns Hopkins), Elynia, Ohio  
 Brown, Carrie L. (Princeton), Cohasset, Massachusetts  
 Bucher, Laurette A. (Ohio), Kettering, Ohio  
 Buxbaum, Evan R. (Williams), Madison, New Jersey  
 Cavazos, Christina M. (Harvard), Laredo, Texas  
 Chappell, Jonathan D. (Davidson), Mooresville, North Carolina  
 Christian, Andrea L. (Hampton), Brookline, Massachusetts  
 Cigler, Tessa (Harvard), Charlotte, North Carolina  
 Clayton, Carolyn E. (Duke), Charlotte, North Carolina  
 Cohen, Theodore (Oberlin), San Francisco, California  
 Deming, Katie A. (California-Santa Barbara), San Rafael, California  
 Dixon, Mary B. (Duke), Society Hill, South Carolina  
 Erickson, Christian P. (Texas-Austin), Waco, Texas  
 Evans, Lilian Q. (North Carolina at Charlotte), Charlotte, North Carolina  
 Gelaw, Bethlehem (Pennsylvania), Philadelphia, Pennsylvania  
 George, Isaac (Massachusetts Institute of Technology), Wendell, North Carolina  
 Gillary, Jennifer (Pennsylvania), San Francisco, California  
 Gist, Lauren E. (Wellesley), Del Mar, California  
 Gonzalez, Maria C. (North Carolina at Chapel Hill), Wilmington, North Carolina  
 Gopal, Satish (North Carolina at Chapel Hill), Cary, North Carolina  
 Halperin, Terri J. (Harvard), Granville, New York  
 Harker, Eric J. (Willamette), Boise, Idaho  
 Hart, Justin P. (Dartmouth), Washington, District of Columbia  
 Hartwig, Matthew G. (Birmingham Southern), Hattiesburg, Mississippi  
 Hobbs, Hasan A. (Morehouse), Stone Mountain, Georgia  
 Holmes, Thomas M. (Duke), Buies Creek, North Carolina  
 Horton, April C. (Furman), Murfreesboro, Tennessee  
 Hsu, Gerald W. (Toronto), Danville, California  
 Iyengar, Rajashri S. (California-Berkeley), Newark, Delaware  
 Janssen, Erin M. (Massachusetts Institute of Technology), Farmington Hills, Michigan  
 Johnson, Kristine E. (North Carolina at Chapel Hill), Winston-Salem, North Carolina  
 Kaminski, Brian J. (Duke), Cincinnati, Ohio  
 Kong, Garyun B. (Harvard), Fresno, California  
 Kuhls, Elizabeth A. (Vanderbilt), Manassas, Virginia  
 Kukes, Thellean J. (Amherst), Woodland Hills, California  
 Lam, Gordon K. (Princeton), Honolulu, Hawaii  
 Lawrence, Laura B. (Wake Forest), Asheville, North Carolina  
 Lee, Patrick Y. (Northwestern), Piedmont, California  
 Legrand, Alexander B. (North Carolina State), Shelby, North Carolina  
 Leveque, Jean-Christopher (Amherst), Olney, Maryland  
 Liao, Peggy B. (Michigan-Ann Arbor), Novi, Michigan  
 Looney, Colin G. (Washington and Lee), Durham, North Carolina  
 Manousos, George A. (North Carolina at Chapel Hill), Matthews, North Carolina  
 Margolis, David A. (California at Los Angeles), Rolling Hills, California  
 Martinez, Roger A. (Stanford), Socorro, New Mexico  
 McAllister, Anne K. (Davidson), Wilmington, North Carolina  
 McDonald, Brian M. (Notre Dame), Webster, Texas  
 McLachlan, Douglas I. (Morehouse), Redwood City, California  
 Minter, Karin T. (Cornell), New Haven, Connecticut  
 Morcos, John P. (Massachusetts College Pharmacy/Allied Health), Suitland, Maryland  
 Murphy, Richard C. (Duke), Tarrytown, New York  
 Murray, John P. (Boston), Winchester, Massachusetts  
 Nallamshetty, Shriram (Columbia), Orlando, Florida  
 Parsons, Daniel J. (Trinity), Minneapolis, Minnesota  
 Patel, Akash A. (North Carolina State), Cary, North Carolina  
 Payne, Perry W., Jr. (Stanford), Pine Bluff, Arizona  
 Pham, DuyKhanah T. (North Carolina at Chapel Hill), Charlotte, North Carolina  
 Pulver, Aaron F. (Vanderbilt), Medford, Oregon

Quinn, Michele T. (North Carolina at Chapel Hill), Charlotte, North Carolina  
 Qureshi, Jawad A. (Duke), Denton, Texas  
 Raetz, Jaqueline G. (Yale), Rougemont, North Carolina  
 Richheimer, William E. (Cornell), Orange, Connecticut  
 Richmond, Marc E. (Pennsylvania), Franklin Square, New York  
 Rouf, Rosanne (Massachusetts Institute of Technology), Glen Carbon, Illinois  
 Sachdev, Molly (Duke), East Amherst, New York  
 Sarvis, Sarah S. (Massachusetts Institute of Technology), Rockville, Maryland  
 Scannell, Ryan B. (Duke), Worcester, Massachusetts  
 Schoenecker, Jonathan G. (Middlebury), St. Louis, Missouri  
 Schofield, Kelly A. (Utah), Logan, Utah  
 Self, Annie L. (Davidson), Greenwood, South Carolina  
 Shah, Amit N. (Maryland College Park), Potomac, Maryland  
 Shah, Bimal R. (North Carolina at Chapel Hill), Winston-Salem, North Carolina  
 Sheppard-Sawyer, Christine (Harvard), Falmouth, Maine  
 Shin, Eun J. (Harvard), Baltimore, Maryland  
 Sinnar, Shamim A. (Maryland at College Park), Columbia, Maryland  
 Stevens, Keisha C. (Duke), Goldsboro, North Carolina  
 Sudarshan, Sharon (Harvard), Wichita Falls, Texas  
 Tebbit, Christopher L. (North Carolina at Chapel Hill), Greensboro, North Carolina  
 Tillem, Elizabeth J. (Michigan-Ann Arbor), Jackson Heights, New York  
 Walton, Kelly A. (North Carolina at Chapel Hill), Charlotte, North Carolina  
 Ward, Mark A. (North Carolina State), Raleigh, North Carolina  
 Waugh, Michael S. (Bucknell), Durham, North Carolina  
 Weiss, Stefan C. (Yale), Hollywood, Florida  
 Weng, Haoling (Duke), Taipei, Taiwan ROC  
 Winkfield, Karen M. (SUNY at Binghamton), Binghamton, New York  
 Woel, Roxanne T. (Yale), Baltimore, Maryland  
 Wu, Chen-Sen (Stanford), Federal Way, Washington  
 Yi, Sang P. (Stanford), Potomac, Maryland  
 Yu, Yen-Rei A. (Duke), Katy, Texas  
 Zhang, Qingfei J. (Davidson), Asheville, North Carolina  
 Zlogar, Daniel F. (Duke), Arlington Heights, Illinois

## Class of 2002

Alam, Zarina (Cornell), Bloomfield Hills, Michigan  
 Archibald, Jason D. (Brigham Young University), Potomac, Maryland  
 Atchison, Fawn W. (Minnesota), Duluth, Minnesota  
 Athar, Nishath (North Carolina at Chapel Hill), Mount Airy, North Carolina  
 Barnett, Andy S. (Harvard), North Brunswick, New Jersey  
 Bass, Adam J. (Amherst), Bethesda, Maryland  
 Berg, Sigrid E. (Harvard), Arlington, Virginia  
 Biggers, Lindsay F. (Duke), Central, South Carolina  
 Bordeaux, Jeremy S. (North Carolina State), Castle Hayne, North Carolina  
 Bowman, Michael K. (Dartmouth), Atlanta, Georgia  
 Brown, Kimberly E. (Howard), Temple Hills, Maryland  
 Buschmann, Robert (North Carolina at Chapel Hill), Gold River, California  
 Cabrera, Yessica E. (Massachusetts Institute of Technology), North Miami, Florida  
 Cancel, Quinton V. (Washington), Florissant, Missouri  
 Casal, Suzette G. (Duke), Coral Gables, Florida  
 Changizi, Barbara K. (Virginia), Newtown, Pennsylvania  
 Chen, Carol C. (North Carolina at Chapel Hill), Raleigh, North Carolina  
 Chen, Jarvis C. (Washington), Lincoln, Nebraska  
 Chen, June (Harvard), Pine Brook, New Jersey  
 Choy, Catherine (Yale), San Francisco, California  
 Daniels, Shannon L. (Duke), Durham, North Carolina  
 Davel, Jennifer T. (Duke), Marietta, Georgia  
 Edghill, Benjeil Z. (North Carolina at Chapel Hill), Brooklyn, New York  
 Eldaif, Bassem M. (Emory), Roswell, Georgia  
 Ellis, Matthew J. (Davidson), Albuquerque, New Mexico  
 Feldman, Zachary W. (Virginia), Dunwoody, Georgia  
 Ficklin, Mary B. (Stanford), San Mateo, California  
 Fields, Ryan C. (Michigan), Bloomfield Hills, Michigan  
 Finn, Alexander J. (Brown), San Francisco, California  
 Freidinger, Brad A. (North Carolina at Chapel Hill), Winston-Salem, North Carolina



Gaillard, Stephanie (Virginia), Chicago, Illinois  
 Givens, Raymond C. (Georgia), Stone Mountain, Georgia  
 Grossi, Peter M. (Amherst), McLean, Virginia  
 Hall, Allison H. (Stanford), Denver, Colorado  
 Hawkins, Yolanda C. (Florida A&M), Des Moines, Iowa  
 Higgins, Steven P. (Duke), Centreville, Virginia  
 Hirsch, Dana L. (Duke), Mount Kisco, New York  
 Howard, Brandon A. (Swarthmore), Lovettsville, Virginia  
 Hsu, Michael C. (Harvard), Burr Ridge, Illinois  
 Hwang, Eugene I. (William Marsh Rice), College Station, Texas  
 Jenkins, Jarrod D. (Morehouse), Madison, Tennessee  
 Jones, Kermit L. (Clark Atlanta), Marietta, Georgia  
 Kelly, Bridget B. (Williams), Scranton, Pennsylvania  
 Khurana, Rahul (Stanford), Monte Sereno, California  
 Kim, Soo H. (Duke), St. Louis, Missouri  
 Knab, Brian R. (Virginia), Great Falls, Virginia  
 Kuniholm, Erin F. (Brown), Durham, North Carolina  
 Lee, Edward (North Carolina at Chapel Hill), Burlington, North Carolina  
 Lee, Shelly T. (Harvard), Yucaipa, California  
 Lighvani, Arash (Massachusetts Institute of Technology), Rockville, Maryland  
 Lima, Brian (Cornell), Kearny, New Jersey  
 Linden, Diane C. (Middlebury), Los Angeles, California  
 Lo, Wayne R. (Yale), Tucker, Georgia  
 Lynn, Stephanie D. (Princeton), Boston, Massachusetts  
 Maercks, Rian A. (Florida), Miami, Florida  
 Mavropoulos, John C. (Chicago), Atlantic City, New Jersey  
 McCoy, Allison N. (Duke), Durham, North Carolina  
 McGirt, Matthew J. (Duke), Charlotte, North Carolina  
 Miksad, Rachel E. (Duke), Charlottesville, Virginia  
 Molino, Arlene C. (Northwestern), Chicago, Illinois  
 Morgan, Katherine S. (Yale), Maysville, North Carolina  
 Morgan, Marcello A. (Harvard), Upper Nyack, New York  
 Mummary, Heather J. (Rochester), Alden, New York  
 Nimjee, Shahid M. (Yale), Brampton, Ontario, Canada  
 Norris, Regina D. (Duke), Gaffney, South Carolina  
 O'Halloran, Elizabeth K. (Chicago), Spokane, Washington  
 Odunze, Millicent J. (Harvard), Orem, Utah  
 Parker, Rodney D. (Harvard), Durham, North Carolina  
 Pasquali, Sara K. (Michigan), Ann Arbor, Michigan  
 Pickering, Trevor R. (California at Berkeley), Durham, North Carolina  
 Rohatgi, Anand D. (Duke), Durham, North Carolina  
 Rovak, Jason M. (Michigan), Ann Arbor, Michigan  
 Sabo, Gregory J. (Notre Dame), Colorado Springs, Colorado  
 Sanchez, Carlos D. (Dartmouth), Highland Park, New Jersey  
 Sandler, Aaron J. (Yale), Gaithersburg, Maryland  
 Schweigler, Lisa M. (Harvard), Bethesda, Maryland  
 Scott, Lisa M. (William & Mary), Richmond, Virginia  
 Serlin, Scott B. (Texas A&M), Bowie, Maryland  
 Sharps, Stephanie K. (Hampton), Columbia, Maryland  
 Sheetz, Jonathan P. (North Carolina at Chapel Hill), Durham, North Carolina  
 Simpson, Amanda E. (Cornell), Latham, New York  
 Singh, Rakesh K. (Cornell), Coram, New York  
 Smith, Monica L. (North Carolina at Chapel Hill), Durham, North Carolina  
 Sufka, Susan A. (St. Mary's), St. Cloud, Minnesota  
 Sweis, Ranya N. (Wheaton), Carol Stream, Illinois  
 To, Binh K. (California at San Diego), Alhambra, California  
 Trinh, Jane V. (Rice), Lake Charles, Louisiana  
 Van de Ven, Thomas J. (Canisius), Grand Island, New York  
 Walton, Geoffrey B. (North Carolina State), Raleigh, North Carolina  
 Wang, Alice M. (Duke), Chester Spring, Pennsylvania  
 Wang, Emily A. (Harvard), Houston, Texas  
 Wang, George T. (Rice), Sugar Land, Texas  
 Wang, Gin R. (Oklahoma), Apex, North Carolina  
 Wellman, Samuel S. (North Carolina at Chapel Hill), Raleigh, North Carolina  
 West, Jesse L., IV (North Carolina at Chapel Hill), Asheville, North Carolina

Wickham, Michael Q. (Duke), Raleigh, North Carolina  
Wirk, Shaheen A. (Duke), Beaver Creek, Ohio  
Woo, Joan S. (California at Berkeley), Glendale, California  
Wood, William A., Jr. (Harvard), Newport Beach, California  
Ye, Qing B. (Fudan, China), Chicago, Illinois  
Jesus, Ambeshie (Yale), Columbia, Missouri

### **Class of 2003**

Alexander, Thomas (Arizona), San Diego, California  
Alpert, Eryn (Brown), Charlotte, North Carolina  
Anthony, Kara (Duke), Dayton, New Jersey  
Asomugha, Chisaraokwu (Stanford), Lawndale, California  
Bernstein, Michael (Duke), Durham, North Carolina  
Boiman, Erica (Yale), Lake Bluff, Illinois  
Bourque, Jamieson (Virginia), Bethesda, Maryland  
Bush, Errol (Emory), Decatur, Georgia  
Carter, Khalil (Florida), San Jose, California  
Chang, Wendy (Yale), Redmond, Washington  
Chen, Weip (Massachusetts Institute of Technology), Los Angeles, California  
Chi, Sulene (Princeton), Potomac, Maryland  
Chien, James (Creighton), Omaha, Nebraska  
Chien, Lynn (Duke), Chapel Hill, North Carolina  
Cho, Patricia (Harvard), Cincinnati, Ohio  
Chung, Edward (Massachusetts Institute of Technology), Knoxville, Tennessee  
Cole, Catherine (Princeton), Severna Park, Maryland  
Cook, Julia (New Mexico), Albuquerque, New Mexico  
Corey, Kathleen (Michigan-Ann Arbor), Ann Arbor, Michigan  
Crotty, Laura (Duke), Durham, North Carolina  
Dawn, Aerlyn (Harvard), San Francisco, California  
Edwards, David (New Mexico), Albuquerque, New Mexico  
Edwards, Marianne (Stanford), Baltimore, Maryland  
Ekeruo, Wesley (California at Berkeley), Fremont, California  
Fecci, Peter (Cornell), Plainview, New York  
Feldman, Zachary W. (Virginia), Dunwoody, Georgia  
Gardner, Kim (Florida State), Gainesville, Florida  
Gilbert, Brett (Illinois at Urbana), Buffalo Grove, Illinois  
Gillespie, Heather (Brown), Rochester, New York  
Gupta, Summit (Pennsylvania), Durham, North Carolina  
Hatfield, Ann (Notre Dame), Cedar Rapids, Iowa  
Hervey, Sheleika (Stanford), Duncanville, Texas  
Hoffman, Karen (Virginia), Annandale, Virginia  
Hu, Patrick (California at Berkeley), Durham, North Carolina  
Ibom, Valerie (Ohio), Columbus, Ohio  
Jan, Farhana (Massachusetts Institute of Technology), Exton, Pennsylvania  
Jones, Kermit L. (Clark Atlanta), Marietta, Georgia  
Kao, James (Duke), Loveland, Ohio  
Kawamoto, Kensaku (Harvard), Durham, North Carolina  
Kelly, Patrick (Notre Dame), Stonington, Connecticut  
Khalatbari, Dara (Vanderbilt), Kingwood, Texas  
Khan, Farah (New Jersey), Holmdel, New Jersey  
Kim, Hyung (Harvard), Somerville, New Jersey  
Kim, Luke (Johns Hopkins), Columbia, Maryland  
Kotloski, Robert (Wisconsin-Madison), Berlin, Wisconsin  
Lai, Kenny (Harvard), Cranbury, New Jersey  
Lhamon, Margie (Richmond), Lima, Ohio  
Louie, Gregory (Stanford), W. Vancouver BC, Canada  
Lucas, Chere (Dartmouth), Spokane, Washington  
McCoy, Theresa (North Carolina Central), Durham, North Carolina  
McDade, Henry (North Carolina State), Hillsborough, North Carolina  
McFadden, Adrienne (Maryland at Baltimore County), Bowie, Maryland  
McIntosh, Belinda (Harvard), Miami, Florida  
McLean, Kia (Stanford), Silver Spring, Maryland  
Meade, William (Duke), Martinsville, Virginia  
Melgiri, Ryan (Rice), Sugar Land, Texas

Merchant, Faisal (Emory), Lawrenceville, Georgia  
 Meyer, Laura (Harvard), Washington, District of Columbia  
 Miller, Aaron (Duke), Norfolk, Virginia  
 Mobley, Victoria (Duke), Fairfax, Virginia  
 Moeller, Benjamin (Massachusetts Institute of Technology), Omaha, Nebraska  
 Moore, Karen (Middlebury), Durham, North Carolina  
 Murphy, Michael (Notre Dame), Schenectady, New York  
 Nicholas, Jennifer (Miami), Durham, North Carolina  
 Nielsen, Nathan (Stanford), Titusville, New Jersey  
 Obembe, Olufolajimi (California at Los Angeles), Los Angeles, California  
 Onyewu, Chiatogu (Maryland at Baltimore County), Olney, Maryland  
 Palker, Todd (Virginia), Kings Park, New York  
 Patel, Yogin (Duke), Salisbury, North Carolina  
 Pernell, Chris (Princeton), East Orange, New Jersey  
 Phelps, B. Ryan (Texas at Austin), Denison, Texas  
 Phillips, Katie (Michigan-Ann Arbor), Midland, Michigan  
 Powell, Tiffany (Michigan-Ann Arbor), West Bloomfield, Michigan  
 Prempeh, Maxwell (Duke), Maplewood, New Jersey  
 Purves, Harriett (Macalester), Chapel Hill, North Carolina  
 Raja, Ali (Rice), Katy, Texas  
 Rauscher, Frederic (Indiana at Bloomington), Griffith, Indiana  
 Reynolds, Christopher (Duke), Durham, North Carolina  
 Rimel, Bobbie (Rochester), Fayetteville, North Carolina  
 Rineer, Craig (Pennsylvania), Mount Joy, Pennsylvania  
 Ro, Richard (Oklahoma-Norman), Stillwater, Oklahoma  
 Robinson, Barrett (Morehouse), Dayton, Ohio  
 Ruiz-de-Luzuriaga, Brian (Ohio), West Chester, Ohio  
 Saharia, Kapil (Johns Hopkins), Rockville Centre, New York  
 Sair, Haris (Duke), Cary, North Carolina  
 Silver, Rebecca (Wellesley), Durham, North Carolina  
 Stewart, Laura (Vanderbilt), Knoxville, Tennessee  
 Sturm, Jesse (Duke), North Granby, Connecticut  
 Taylor, Steve (Duke), Durham, North Carolina  
 Thomas, Lisa-Gail (Miami), Clarendon, Jamaica  
 Tiku, Anjali (Duke), Raton, New Mexico  
 Toomayan, Glen (Duke), Palisades Park, New Jersey  
 Townsend, Brent (Harvard), Tulsa, Oklahoma  
 Tseng, Timothy (Harvard), Houston, Texas  
 Udayakumar, Krishnakumar (Virginia), Jonesville, Virginia  
 Villani, John (Pennsylvania), Durham, North Carolina  
 Walker, Tamesha (Yale), Memphis, Tennessee  
 Wang, David (Rice), Corpus Christi, Texas  
 Weinzierl, Elizabeth (Emory), Tampa, Florida  
 Wright, Tarra (Texas Tech), Lubbock, Texas  
 Wu, Caroline (Rice), Durham, North Carolina  
 Young, Laura (Duke), Durham, North Carolina



## Class of 2000 with Postgraduate Year One Appointment

*Key: Student, Name, Hometown, Internship Institution and Discipline (if applicable), City and State, Residency Institution and Discipline, City and State, Ultimate Career Choice*

Allen, Leigh M. (Lexington, Kentucky) Vanderbilt University - University of California, San Francisco, California - Internal Medicine

Bethel, Mary Angelyn (Marietta, Georgia) Duke University - Duke University Medical Center, Durham, North Carolina - Internal Medicine

Binder, Devin K. (Berkeley, California) Harvard University - University of California, San Francisco, California - Surgery, University of California, San Francisco, California - Neurosurgery

Blazer, III, Dan G. (Cary, North Carolina) Duke University - University of Michigan Hospitals, Ann Arbor, Michigan - Surgery

Bleich, Karen Beth (New York, New York) Wesleyan University - Mount Sinai School of Medicine, New York, New York - Internal Medicine, Washington University, St. Louis, Missouri - Radiology

Boozer, Margaret Maybin (Atlanta, Georgia) Duke University - Medical University of South Carolina, Charleston, South Carolina - Obstetrics and Gynecology

Brady, Todd Chadwick (Winston-Salem, North Carolina) Dartmouth College - Private Industry Consultant, Boston, Massachusetts - Residency Deferred

Breen, Catherine Malooly (Green Bay, Wisconsin) College of William and Mary - Duke University Medical Center, Durham, North Carolina - Pathology

Brodsky, Michael Cory (Huntington, New York) Massachusetts Institute of Technology - Georgetown University, Fairfax Hospital, Falls Church, Virginia - Transitional, Duke University Medical Center, Durham, North Carolina - Radiology

Bronner, Leslie Larissa (Columbia, Maryland) Duke University - Residency Deferred

Brooks, Kelli Rachel (Tazewell, Virginia) University of Virginia - Duke University Medical Center, Durham, North Carolina - Surgery

Castellino, Robert Craig (Matthews, North Carolina) Duke University - Massachusetts General Hospital, Boston, Massachusetts - Pediatrics

Charles, Kirk L. (Brooklyn, New York) Harvard University - University of Buffalo, Buffalo, New York - General Surgery

Chen, Elbert H. (Pine Brook, New Jersey) Harvard University - Yale University, New Haven, Connecticut - Internal Medicine, Yale University, New Haven, Connecticut - Dermatology

Chen, Hsiupeí (Florham Park, New Jersey) Princeton University - University of California, San Francisco, California - Internal Medicine

Chen, Joyce C. (Lubbock, Texas) Stanford University - University of California, Los Angeles, California - General Surgery

Corkey, William Barnette (Raleigh, North Carolina) North Carolina State University - Duke University Medical Center, Durham, North Carolina - Anesthesiology

Crichlow, Brian R. (Miami, Florida) Carleton College - Christiana Care Health Services, Wilmington, Delaware - Transitional, Medical College of Pennsylvania, Hahnemann University, Philadelphia, Pennsylvania - Ophthalmology

Datto, Michael B. (Cherry Hill, New Jersey) Johns Hopkins University - Residency Deferred

Dawes, Donald Murray (Alexandria, Virginia) Cornell University - Los Angeles County, Harbor Medical Center, Torrance, California - Emergency Medicine

De, Jitakshi (Ahmedabad, India) University of North Carolina at Chapel Hill - Stanford University, Palo Alto, California - Postdoctoral Research

Della Rocca, Gregory J. (Castleton, New York) Cornell University - Washington University, Barnes/Jewish Hospital, St. Louis, Missouri - Orthopaedic Surgery

Dezfulian, Cameron (Plantation, Florida) University of Florida - University of Michigan, Ann Arbor, Michigan - Internal Medicine and Pediatrics

Dike, Nwamara Chinwe (Hyattsville, Maryland) University of Maryland - Greenville Hospital Systems, Greenville, South Carolina - Transitional, Siskin Rehabilitation Center, Chattanooga, Tennessee - Internal Medicine

Dong, Xiang Da (Eric) (New York, New York) Massachusetts Institute of Technology - Yale University, New Haven, Connecticut - Surgery

Dooley, Kelly Elise (Vienna, West Virginia) Northwestern University - Johns Hopkins Hospital, Baltimore, Maryland - Internal Medicine

Engler, Susanne Marie (East Meadow, New York) Cornell University - Lancaster General Hospital, Lancaster, Pennsylvania - Family and Community Medicine

Ennis, Jr., Francis A. (Shrewsbury, Massachusetts) Yale University - Yale, New Haven Hospital, New Haven, Connecticut - General Surgery

Foster, Jr., William Joseph (Pasadena, California) California Institute of Technology - Duke University Medical Center, Durham, North Carolina - Surgery, Washington University, St. Louis, Missouri -

## Ophthalmology

- Garg, Rahul (Miami, Florida) Massachusetts Institute of Technology - Johns Hopkins University School of Medicine, Baltimore, Maryland - Internal Medicine
- Gartner, Anne Elizabeth (Edina, Minnesota) Stanford University - Stanford University, Stanford, California - Psychiatry
- Gilliam, Lisa Katherine (Dallas, Texas) Amherst College - University of Washington, Seattle, Washington - Internal Medicine
- Glasgow, Sean Christopher (Colorado Springs, Colorado) Duke University - Wilford Hall Medical Center, Lackland Air Force Base, San Antonio, Texas - General Surgery
- Greenman, Herbert E. (Charlotte, North Carolina) University of Pennsylvania - Mount Sinai School of Medicine, Cabrini, New York, New York - Preliminary Internal Medicine, Duke University Medical Center, Durham, North Carolina - Ophthalmology
- Grubbs, Elizabeth Gardner (Greensboro, North Carolina) Duke University - Duke University Medical Center, Durham, North Carolina - Surgery
- Handy, Michael Harvey (Winston-Salem, North Carolina) University of North Carolina - University of Virginia, Charlottesville, Virginia - Orthopaedic Surgery
- Harris, Geoffrey Robin (Bexley, Ohio) Ohio State University - University of Cincinnati, Cincinnati, Ohio - Plastic and Reconstructive Surgery
- Hattangadi, Shilpa M. (Richboro, Pennsylvania) Massachusetts Institute of Technology - The Johns Hopkins Hospital, Baltimore, Maryland - Pediatrics
- Healey, Michael J. (Clifton Park, New York) University of Pennsylvania - Brigham and Women's Hospital, Boston, Massachusetts - Internal Medicine
- Heinly, Craig Stephen (Lancaster, Pennsylvania) Duke University - University of North Carolina Hospital, Chapel Hill, North Carolina - Internal Medicine
- Heron, Kerrie-Anne Alexandra (Orlando, Florida) Emory University - Emory University School of Medicine, Atlanta, Georgia - Internal Medicine
- Hewitt, John D. (Greensboro, North Carolina) North Carolina State University - Duke University Medical Center, Durham, North Carolina - Preliminary Surgery
- Huang, Benjamin Yu-bin (Chapel Hill, North Carolina) University of North Carolina at Chapel Hill
- Hughes, Solon Gray (Tabor City, North Carolina) University of North Carolina at Chapel Hill - University of Tennessee, Department of Surgery, Memphis, Tennessee - Surgery
- Kane, IV, H. Scott (Chevy Chase, Maryland) Swarthmore College - National Naval Medical Center, Bethesda, Maryland - Psychiatry
- Kaz, Andrew (Long Beach, California) Duke University - University of Michigan, Ann Arbor, Michigan - Internal Medicine
- Kherani, Aftab Razak (Grafton, Ohio) Duke University - Duke University Medical Center, Durham, North Carolina - Surgery
- King, Aliceson Yvette (Baltimore, Maryland) University of Maryland, Baltimore County - Children's Hospital of Pittsburgh, Pittsburgh, Pennsylvania - Pediatrics
- Koshy, Anita Ann (Albuquerque, New Mexico) Stanford University - University of Washington Affiliated Hospitals - Internal Medicine
- Krzyszowski, David Kent (Orem, Utah) Brigham Young University - Good Samaritan Hospital, Phoenix, Arizona - Surgery
- Lallemand, Roger Louis (Harrison, New York) Harvard College - UMDNJ, Robert Wood Johnson Medical Center, New Brunswick, New Jersey - Orthopaedic Surgery
- Lang, Jason Edward (Durham, North Carolina) Johns Hopkins University - Duke University Medical Center, Durham, North Carolina - Medicine/Pediatrics
- Laubach, Jacob Peter (Whitefish Bay, Wisconsin) Swarthmore College - Duke University Medical Center, Durham, North Carolina - Internal Medicine
- Lee, Anna Pei-Ching (Cary, North Carolina) Duke University - University of California, Fresno, California - Internal Medicine, University of California, Sacramento, California - Ophthalmology
- Lee, Kenneth Jianu-Hung (Charlotte, North Carolina) Duke University - University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania - Surgery, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania - Orthopaedic Surgery
- Lee, Samson (Burlington, North Carolina) University of North Carolina - University of Washington, Seattle, Washington - Surgery, University of Washington, Seattle, Washington - Otolaryngology
- Lien, Lillian Frances (Germantown, Maryland) Harvard University - Duke University Medical Center, Durham, North Carolina - Internal Medicine
- Malinzak, Robert Andrew (Winston-Salem, North Carolina) Davidson College - Duke University Medical Center, Durham, North Carolina - Orthopaedic Surgery
- Mick, Nathan Woodburn (Midland, Michigan) University of Notre Dame - Brigham and Women's Hospital, Boston, Massachusetts - Emergency Medicine
- Miller, Chad Michael (Beresford, South Dakota) Stanford University - Stanford University, Stanford, California - Internal Medicine, Duke University Medical Center, Durham, North Carolina -

Diagnostic Radiology

Mobisson, Kathrine Chinyere (Enugu, Nigeria) Wellesley College - New York University Medical Center, New York, New York - Psychiatry

Moff, Irene Kaplan (Silver Spring, Maryland) Duke University - Johns Hopkins Hospital, Baltimore, Maryland - Pediatrics

Moff, Stephen Louis (Greensboro, North Carolina) Duke University - Johns Hopkins Hospital, Baltimore, Maryland - Internal Medicine

Moody, M. Anthony (Greensboro, North Carolina) Duke University - Emory University School of Medicine, Atlanta, Georgia - Pediatrics

Moon, Suk Jin (Jacksonville, Florida) Reading Hospital and Medical Center, Reading, Pennsylvania - Transitional, Baylor College of Medicine, Houston, Texas - Ophthalmology

Moreira, Sandra Patricia (Cincinnati, Ohio) Duke University - Duke University Medical Center, Durham, North Carolina - Pediatrics

Neujahr, David Cooper (Madison, Wisconsin) Duke University - New York Presbyterian Hospital - Cornell Medical Center, New York, New York - Internal Medicine

Obadiah, Joseph Michael (Greensboro, North Carolina) Duke University - Washington University, St. Louis, Missouri - Preliminary, Columbia - New York Hospitals, New York, New York - Dermatology

Olson, Ty James (Bremerton, Washington) Stanford University - Columbia University, New York, New York - General Surgery, Columbia University, New York, New York - Neurological Surgery

Pande, Ashvin Narayan (Braintree, Massachusetts) Harvard College - Brigham and Women's Hospital, Boston, Massachusetts - Internal Medicine

Parker, Libbie Lynn Pearl (Bradenton, Florida) Duke University - Duke University Medical Center, Durham, North Carolina - General Surgery

Powell, Jeffrey C. (Worthington, Ohio) Colgate University - University of Washington, Seattle, Washington - Pediatrics

Rahman, Nadeem Ur (Gastonia, North Carolina) Duke University - University of California, San Francisco, California - Urology

Rahn, Karyn Weston (Oak Ridge, Tennessee) Indiana University - Residency Deferred

Resta, Lee P. (Butler, Pennsylvania) University of Chicago - Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania - Internal Medicine

Rhorer, Anthony Sampson (Chandler, Arizona) The University of Arizona - Duke University Medical Center, Durham, North Carolina - Orthopaedic Surgery

Roberts, O. Adetola (LaGos, Nigeria) University of South Carolina - Case Western Reserve University, Cleveland, Ohio - Neurosurgery

Rosas, Humberto Gerardo (San Antonio, Texas) Stanford University

Rosen, Allison B. (Potomac, Maryland) Wharton School, University of Pennsylvania - University of California, San Francisco, California - Internal Medicine

Routbort, Mark Jules (Darien, Illinois) University of Chicago - Duke University Medical Center, Durham, North Carolina - Pathology

Sarraf-Yazdi, Shiva (Tehran, Iran) Duke University - Duke University Medical Center, Durham, North Carolina - Surgery

Scanga, Daniel Raymond (Chapel Hill, North Carolina) University of North Carolina at Chapel Hill - Duke University Medical Center, Durham, North Carolina - Internal Medicine, Vanderbilt University Medical Center, Nashville, Tennessee - Radiology

Siddiqui, Nouman (Orlando, Florida) Duke University - University of North Carolina Hospital, Chapel Hill, North Carolina - Preliminary, Duke University Medical Center, Durham, North Carolina - Ophthalmology

Smith, Rachelle Ann (Toronto, Ontario, Canada) University of North Carolina at Chapel Hill - Rochester General/Strong Memorial Hospital, Rochester, New York - Medicine/Pediatrics

Stubbs, IV, Allston Julius (Winston-Salem, North Carolina) University of North Carolina at Chapel Hill - Duke University Medical Center, Durham, North Carolina - Orthopaedic Surgery

Sudarshan, Sunil (Wichita Falls, Texas) Duke University - Medical University of South Carolina, Charleston, South Carolina - Surgery

Taylor, Wendy Lynn (Chesapeake, Virginia) College of William and Mary - Duke University Medical Center, Durham, North Carolina - Pediatrics

Tong, Betty Carolina (Atlanta, Georgia) Georgia Institute of Technology - The Johns Hopkins Hospital, Baltimore, Maryland - Surgery, The Johns Hopkins Hospital, Baltimore, Maryland - Otolaryngology - Head and Neck Surgery

Toth, Lori Renee (Cary, North Carolina) North Carolina State University - University of North Carolina Hospitals, Chapel Hill, North Carolina - Internal Medicine

Twersky, Joy Melinda (Randolph, New Jersey) Cornell University - University of Cincinnati, Cincinnati, Ohio - Dermatology

Venable, Carol Louise (Nashville, Tennessee) Duke University - Duke University Medical Center,

Durham, North Carolina - Internal Medicine  
 Vinson, Emily Nicole (Orange Park, Florida) Furman University - St. Vincent Hospital, Portland, Oregon - Internal Medicine, Duke University Medical Center, Durham, North Carolina - Radiology  
 Walton, Aaron Lea (Hampton, Virginia) College of William and Mary - Duke University Medical Center, Durham, North Carolina - Internal Medicine  
 Watke, Paula Lucile (Sacramento, California) University of California at Los Angeles - University of North Carolina Hospitals, Chapel Hill, North Carolina - Psychiatry  
 Whang, Peter Gregory (Beaver Dam, Wisconsin) Harvard College - University of California, Los Angeles, California - Surgery, University of California, Los Angeles, California - Orthopaedic Surgery  
 Williams, Matthew Lanier (Irondale, Alabama) Duke University - Massachusetts General Hospital, Boston, Massachusetts - Surgery  
 Wong, Carolyn (Walnut Creek, California) Stanford University - Residency Deferred - Internal Medicine  
 Worrell, Stewart Stivers (Lexington, Virginia) Duke University - University of Washington, Seattle, Washington - General Surgery  
 Wu, Sean Ming Yuan (Menlo Park, California) Stanford University - Duke University Medical Center, Durham, North Carolina - Internal Medicine  
 Wyatt, Christina Marie (Greensboro, North Carolina) Duke University - Mount Sinai Hospital, New York, New York - Internal Medicine  
 Ying, Anita K. (Houston, Texas) Rice University - Duke University Medical Center, Durham, North Carolina - Medicine/Pediatrics  
 Yu, Paul Borchyung (Williamsville, New York) Stanford University - University of California, San Francisco, California - Internal Medicine  
 Zhu, Hui (Beijing, China) Peking University - Washington University, St. Louis, Missouri - Urologic Surgery



## *Doctor of Physical Therapy Program*



## **Doctor of Physical Therapy Program**

### **The Profession of Physical Therapy**

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

### **Mission Statement of the Doctor of Physical Therapy Degree Program**

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

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

### **Doctor of Physical Therapy Curriculum.**

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

## Faculty

Chairman/Professor: J. K. Richardson, PT, PhD, OCS  
Director of Graduate Studies: J. Gwyer, PT, PhD  
E. Villanueva, PT, AM; C. Odom, PT, DPT, ATC; L. White, PhD; D. Dore, PT, MPA;  
C.C. Figuers, PT, EdD; L.M. Lawrence, PT, MS; M.E. Riordan, PT, MS; W.  
Richardson, PT, MEd; T. Worrell, PT, EdD; D. Erb, PT, PhD; E. Ross, PT, MMS; L.  
Fishman, PT, MS, NCS; J. Cavanaugh, PT, MS, NCS; L. Case, PT, MS, PCS; R.  
Crouch, PT, MS; E. Hegedes, PT, DPT; A. B. Taylor, PhD; D. Bongiorne, PT, MS;  
W.D. Roy, III, PT; K. Varvel, PT, MPH

**Program of Study.** The curriculum is comprised of 126 credits of academic work, completed over 8 academic semesters, requiring 33 months of full-time attendance. Course work includes didactic courses in basic sciences, clinical sciences, patient management, research, administration, education, and two five month clinical internships. The clinical internships are conducted in selected practice sites in North Carolina and across the country. Two elective courses and a required research project provide opportunity for the student to pursue areas of physical therapy throughout the entire scope of practice.

**Curriculum.** The curriculum is presented in an integrated format, such that successful completion of all courses in each semester is required prior to progressing on to the next semester.

### Year One

#### Fall Semester

PT-301. Human and Clinical Anatomy	5 credits
PT-302. Human Physiology and Histology	3 credits
PT-303. Cell Biology and Embryology	2 credits
PT-304. Normal Human Development	2 credits
PT-305. Physical Therapist Interventions I	2 credits
PT-306. Practice Management/Health Service Delivery	2 credits
PT-307. Movement Sciences I/Biomechanics	3 credits
PT-308. Clinical Experience I	1 credit
<b>Total</b>	<b>20 credits</b>

#### Spring Semester

PT-311. Neurosciences	4 credits
PT-312. Pathology and Tissue Biomechanics	3 credits
PT-313. Physical Therapist Intervention II	4 credits
PT-314. Integumentary Practice Management	2 credits
PT-315. Cardiopulmonary Practice Management	3 credits
PT-316. Clinical Examination, Evaluation, Diagnosis and Prognosis	3 credits
PT-317. Scientific Inquiry I	3 credits
PT-318. Clinical Experience II	1 credit
<b>Total</b>	<b>23 credits</b>

#### Summer Semester

PT-321. Movement Science II/ Motor Control	2 credits
PT-322. Arthrological and Pathological Movement Science	12 credits
PT-323. Diagnostic Imaging	3 credits

PT-324. Musculoskeletal Practice Management I	4 credits
PT-325. Medical Practice Management	3 credits
PT-326. Physical Therapist Intervention III	3 credits
PT-327. Integrated Health Care Seminar I	2 credits
PT-328. Clinical Internship	1 credit
<b>Total</b>	<b>20 credits</b>

### Year Two

#### Fall Semester

PT-401. Neuropathology	2 credits
PT-402. Arthrological and Pathological Movement Science II	4 credits
PT-403. Musculoskeletal Practice Management II	4 credits
PT-404. Neurological Practice Management I	4 credits
PT-405. Scientific Inquiry II	3 credits
PT-406. Integrated Health Care Seminar II	2 credits
<b>Total</b>	<b>19 credits</b>

#### Spring Semester (8 weeks)

PT-411. Psychosocial Aspects of Care	2 credits
PT-412. Neurological Practice Management II	4 credits
PT-413. Educational Theory and Practice	2 credits
PT-414. Administration I	3 credits
PT-415. Integrated Health Care Seminar III	2 credits
<b>Total</b>	<b>13 credits</b>

#### Spring/Summer Semester (20 weeks)

PT-416. Clinical Residency I	4 credits
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### Year Three

#### Fall Semester (8 weeks)

PT-501. Clinical Pharmacology and Nutrition	2 credits
PT-502. Administration II	3 credits
PT-503. Primary Care Practice	3 credits
PT-504. Advanced Practice Elective I	3 credits
PT-505. Advanced Practice Elective II	3 credits
<b>Total</b>	<b>14 credits</b>

#### Fall/Spring Semester (20 weeks)

PT-506. Clinical Residency II	4 credits
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#### Spring Semester (6 weeks)

PT-507. Professional Practice, Development and Evaluation	3 credits
PT-508. Scientific Inquiry III	3 credits
PT-509. Health Promotion and Injury Prevention	3 credits
<b>Total</b>	<b>9 credits</b>

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

**Program Policies and Grading Standards.** Enrolled students should reference the *2000-2003 DPT Student Handbook* for detailed program policies. Graduate stu-

dents 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.]

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

## I. Standards of Academic Progress

### A. Grades

1. Didactic Courses - For all didactic courses in the curriculum, the grading system will be *A, B, C, F, I*.

#### 2. Clinical Courses

For Clinical Education Experiences I and II (PT 308 and 318) and for the Clinical Internship (PT 328), the grading system will be *P, F, I*.

For the Clinical Residency I and II, (PT 416 and PT 506) the grading system will be *A, B, F, I*. Residency I and II will be graded on the letter grade scale of *A* or *B*. Students must have a grade of *A* or *B* to successfully complete the Clinical Residency. A grade of *F* will result in the requirement to repeat the Residency. Students may only repeat an unsuccessful residency one time. If the student is unsuccessful in the repeat attempt, they will receive a failing grade and will be dismissed from the program. Repeat residencies are scheduled at the discretion of the chairman and ACCE.

#### 3. Incomplete Grades

A grade of *I* Incomplete is given when at the time the grades are reported some portion of the student's work in a course is lacking, *for an acceptable reason such as student illness*. The course instructor will determine the manner in which the *I* grade will be converted to an earned grade. The instructor who gives an *I* for a course specifies the way by which the student must have made up the deficiency, not to exceed more than one calendar year from the date the course ended. "Incompletes" which are not satisfied within one calendar year automatically become grades of *F* (fail). If an extension to this time limit is required, a written appeal must be sent via U.S. Registered Mail or Federal Express to the chair prior to the time the extension is requested. When the faculty member certifies that an Incomplete has been satisfied, a passing grade is placed alongside the Incomplete on the permanent and official transcript. Grades of *I* are not removed from the permanent record.

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

#### 4. Failing Grades

A grade of Fail is recorded on the permanent record of a student by the registrar upon certification by the faculty member, the chair or director of Graduate Studies that unsatisfactory work has been done by the student. Failures cannot

be erased from the permanent record, but the requirements of the course may be satisfied by repeating the course in a satisfactory manner at which time, a passing grade is recorded on the official and permanent transcript.

#### B. Progression

All first year courses must be satisfactorily completed before a student may enroll in the sequential second year courses, and all second year courses must be satisfactorily completed before a student may enroll in the third year courses.

[When requested by the student, altered sequences for students who require remediation will be considered for recommendation by the faculty, with approval by the chair.]

## II. Determination of Academic Standing

All students' records are reviewed periodically by the faculty and each student is assigned to one of the following categories of academic standing.

#### A. Good Academic Standing

The student is considered to be in **good academic standing** if they complete, with a grade of 80 percent (*B*) or better, or pass for Clinical Experiences or Clinical Internship courses, every course in the curriculum attempted. The student will remain in **good academic standing** if they receive *no more than one grade of C*.

#### B. Academic Probation

Academic probation is an academic standing that indicates concern about the student's performance in the curriculum. By placing the student on academic probation, the student is notified of the faculty's concern regarding past performance. The student also is informed that future performance must improve or the student risks withdrawal from the program. When a student is placed on academic probation, they remain in this academic standing for the remainder of the curriculum. In these instances, the director of Graduate Studies will notify the registrar that the student should be placed on academic probation. The director of Graduate Studies will notify the student that his/her performance will be evaluated at the end of each succeeding semester, and that future poor performance may occasion withdrawal from the program (see following section).

The faculty of the Graduate Program in Physical Therapy will use the following standards for assigning the status of academic probation.

1. A student will be considered to be on **academic probation** following the attainment of *C* grades in two courses in the curriculum.
2. A student who successfully appeals a grade of *F* in one course in the curriculum will be considered to be on **academic probation**. (See Withdrawal)

A student who has been placed on **academic probation** may require remedial work to remediate areas of deficiency. Such remediation will be determined by the chair advised by the faculty, communicated to the student in writing by the director of Graduate Studies, and may entail additional registration costs for the student.

#### C. Withdrawal

A student who fails to demonstrate successful academic progress will be withdrawn from the program.

The faculty of the Doctor of Physical Therapy will use the following standards for withdrawing a student from the program.

1. A student will be asked to **withdraw** following the attainment of a grade of *F* Failure in one course in the curriculum.
2. A student who is currently on **academic probation** will be asked to **withdraw** following the attainment of a third letter grade of *C*.

### III. Appeals of Academic Status (Academic Probation or Withdrawal)

A student placed on *academic probation* or *withdrawn* from the program may appeal by indicating in writing by registered mail to the chair (a) reasons why he/she did not achieve minimum academic standards, and (b) factorial evidence why the academic standing should be changed. Each appeal will be considered on its merit. Individual cases will not be considered as precedent. The chair will notify the student of the decision on the appeal in writing within three weeks of receipt of the appeal.

### IV. Requirements for Graduation

#### A. Academic Standards for Graduation

The following standards must be met by the student to successfully complete the Doctor of Physical Therapy degree program.

1. Completion with a passing grade of a minimum of 126 units of course credit, including all required courses. This includes the successful completion of a research project and of all clinical education courses.
2. Passing, with a grade of 70 percent or better, of a written comprehensive examination, and all practical examinations administered by the faculty.

#### B. Time Limits on Meeting Requirements for Graduation

1. The standard required length of study to complete the academic standards is 8 continuous academic semesters of full time work (including 2 summer terms), completed in 33 calendar months.

Under extraordinary conditions, a student may be permitted a time limit of 2 semesters of full or part-time enrollment beyond the standard required length of study to complete the program. The student must apply in writing for such consideration, and the chair will review each case.

2. The student is expected to make continuous and successful progress towards the requirements for graduation throughout the curriculum. The student must register for all required courses during each semester of the curriculum, and may carry into succeeding semesters no more than one / course grade. Under extraordinary circumstances a student may apply in writing to the chair for an exception to the typical pattern of progress towards degree requirements.

#### C. Remediation of Failure

1. If a student successfully appeals a grade of *F* or "No Credit" in a course and is permitted to continue in the curriculum, a plan for remediation of the failed course work will be developed and communicated to the student in writing. The student will be responsibly for all financial implications of repeated course work. All remediation efforts must be completed within the outlined time limits for completion of the program. A grade of *F* (failure) will remain on the student's permanent record.
2. If a student achieves a failing grade (less than 70 percent) on the Comprehensive Examination, a specific remediation plan for the student may be developed. This remediation may involve retaking the entire examination, a portion of the examination, a new examination, or other performance evaluation as determined by the faculty. The remediation plan will be developed within two weeks of the date of the Comprehensive Examination and will be conducted at a date mutually agreeable to the student and the director of Graduate Studies, but no later than 4 weeks following the date of the original examination. The student will be afforded one opportunity to successfully remediate the Comprehensive

Examination. If the student is unsuccessful in their attempt to remediate the Comprehensive Examination with a passing grade of 70 percent or greater, the student will be immediately dismissed from the program.

**Attendance and Excused Absences.** Students are expected to attend all classes and clinical internship hours, and are excused only for illness or personal emergency. The chairman may approve a student's written request for a Leave of Absence for personal, medical or academic reasons, for a period not to exceed one year. Written notification of the approved time frame of the leave of absence to the student, the registrar and the director of financial aid will be provided. The student must provide written notification of their intent to return to the program at least 90 days prior to the anticipated date of re-entry. The student requesting an extension beyond one calendar year may be required to apply for readmission to the program, and or to repeat some or all course work. For purposes of deferring repayment of student loans during a school approved leave of absence, federal regulations limit the leave to six months.

**Prerequisites for Admission.** Requirements for admission to the physical therapist degree program include a baccalaureate degree, completion of prerequisite courses, Graduate Record Examination (G.R.E.) Aptitude Test scores from within the last five years, the filing of an application (including essays and reference letters) and upon invitation, a personal interview. The G.R.E. must be taken no later than the November test date.

Prerequisite course work: 3 semester hours of biological sciences (recommended courses include embryology, histology, microbiology), 3 semester hours of cell biology, 3 semester hours of human anatomy, 3 semester hours of human physiology, 6 semester hours of chemistry, 6 semester hours of physics (including principles of light, heat, electricity, mechanics and sound), 3 semester hours of statistics, 6 semester hours of psychology (recommended courses include abnormal psychology, child or developmental psychology), and 9 semester hours of humanities/social sciences (recommended courses include scientific and technical writing, social anthropology). Human anatomy and human physiology courses must be completed within five years of the date of the application. All prerequisite courses must be completed with a grade of C or better. No prerequisite credit can be given to advance placement courses or to those showing a Pass/Fail grade. A baccalaureate degree in the natural sciences is not a requirement for admissions; however a background of coursework in the natural sciences is strongly recommended.

**Application Procedures.** Application materials are available from July through December 1 each year, and may be obtained by writing: Admissions Secretary, Graduate Program in Physical Therapy, Box 3965, Duke University Medical Center, Durham, NC 27710. Telephone: 919-684-3135. The application and all supporting documents must be post-marked no later than December 31 of the year preceding admissions. The application must be received in the department within 14 days of the December 31 postmark. The application fee is \$75. An early application deadline of December 1 will require a reduced application fee of \$65. Fall semester transcripts containing any prerequisite course work must be submitted as soon as they are available. Only students for full-time study are accepted. State residence does not influence admissions policies or tuition costs.

Web based application: you may complete an electronic application, located at <http://www2@mc.duke.edu/depts/ptot>.

**Tuition and Expenses.** The faculty of the Doctor of Physical Therapy degree program practice a "need-blind admissions process," with adequate financial aid for those students with financial need. The tuition for the 126 credits of the program is budgeted in three annual payments of 42 credits/year. The 2000-2001 school-approved costs will be available from the Office of Financial Aid in February prior to admissions in the fall, and detailed student budgets are provided for all interviewed applicants.



**Financial Aid.** Qualified applicants may be eligible for federal educational loan programs or institution based loans. A small amount of need based scholarship awards are available for selected matriculated students. Financial aid information is available for all interested applicants by contacting the Office of Financial Aid, Box 3067, Duke University Medical Center, Durham, NC, 27710, or at the School of Medicine's Office of Financial Aid website: <http://www2.mc.duke.edu/som/finaid.html>.

## Courses of Instruction

**PT-301. Human and Clinical Anatomy.** This course involves a detailed study of the human body through lecture, laboratory presentations and cadaver dissection. The emphasis is on gross anatomy and the relationships between the musculoskeletal, neurological and vascular systems of the human body. In addition, the course introduces the student to the surface anatomy and palpation skills of clinically pertinent anatomical structures of the head, trunk, upper and lower limbs. Emphasis is placed on the location and differentiation of bony landmarks, muscle bellies, tendons, ligaments, bursas, nerves, arteries and joint cavities of a live subject.

**PT-302. Human Physiology and Histology.** This course will cover tissue structure and major physiological systems of the human body. Topics in this course will include: structure and function of the cells and tissues of the body, tissue diversity, histology of major organs, and organ physiology of the cardiovascular, respiratory, musculoskeletal, renal, gastrointestinal, lymphatic, endocrine and immune systems.

**PT-303. Cell Biology and Embryology.** This course will cover basic cellular anatomy and developmental biology/embryology. Cell structure, function, cell diversity and communication will be covered. The course will cover topics of embryology from conception through birth.

**PT-304. Normal Human Development.** This course covers normal human development from birth to death including the physical, psychological, cognitive, social, and economic aspects. Emphasis in the course is on physical development. This course highlights the diversity of development among individuals and cultures.

**PT-305. Physical Therapist Interventions I.** In this course, students will be introduced to the basic physical therapist patient interventions and examinations used to ensure safe patient interaction, including: patient communication, safe and effective patient positioning and movement, monitoring of vital signs, use of assistive ambulatory devices, protective bandaging/taping. An emphasis is placed on psychomotor performance including transfers, gait training, positioning and basic patient handling skills.

**PT-306. Practice Management/Health Delivery Systems.** Orientation to the role and function of the physical therapist in contemporary health care with an awareness of ethical principles, historical foundations of the profession, current health care issues, and health economics. Introduction to the patient management model in physical therapy including patient examination, evaluation, diagnosis, prognosis, intervention and outcomes. The course will include a discussion of practice policies, models of disability, models of clinical decision-making and documentation. Students will develop initial skills in patient interviewing.

**PT-307. Movement Sciences I/Biomechanics.** This course addresses basic concepts relating to the architectural design and function of synovial and non-synovial joints, the morphology and function of skeletal muscle, observational joint and movement analysis, anthropometry, and biomechanical force systems. Free body diagrams as well as trigonometric and algebraic functions are used to solve biomechanical problems related to physical therapy practice. Emphasis is on static analysis of both stationary and moving bodies.

**PT-308. Clinical Experience I.** This course will serve as the initial entry point into

the clinical environment. A variety of patient types and settings will be observed during eight half-day (4 hour) experiences. Emphasis will be placed on integrating didactic 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 3 students : 1 clinical instructor.

**PT-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-312. Pathology and Tissue Biomechanics.** In this course, an introduction to diseases commonly seen in patients receiving physical therapy will be presented. Body responses to injury and disease will be traced from the cellular level to the systems level. Typical disease processes in these areas will be covered: pulmonary, cardiac, neurological, infectious, genetic, immunosuppressive, metabolic and metastatic. The course also presents the basic science of tissue biomechanics, and the response of muscle, bone, joints and soft tissue to disease and injury. The normal repair process and the effects of physical therapist's interventions including rest, stress, stretch, resistance, immobilization and work will be discussed. Complications and benefits of interventions, the effects of nutrition, aging, exercise and immobility will be discussed.

**PT-313. Physical Therapists Intervention II.** This course covers strategies and techniques to manage pain, edema, loss of normal motion, soft tissue dysfunction and weakness through direct interventions. Interventions include: basic exercise, soft tissue mobilization, relaxation, splinting and compression garments, athermal modalities, cryotherapy, deep thermal modalities, electrotherapeutic modalities, and hydrotherapy.

**PT-314. Integumentary Practice Management.** The practice management model for patients with pathology or impairments to their integumentary system will be presented. Medical lectures and clinical physical therapist lectures will combine to present current management of patients who have skin lesions. Direct physical therapist intervention for wound examination, evaluation, diagnosis, prognosis and intervention will be presented.

**PT-315. Cardiopulmonary Practice Management.** This course gives an overview of the related pathologies of the cardiopulmonary system, examination and evaluation procedures, diagnostic procedures, goal setting, interventions and patient management. A major focus of this course will be laboratory sessions with cardiac and pulmonary patients, applying examination and evaluation procedures, and the direct interventions related to exercise and airway clearance. This course will cover the principles of training, exercise and health promotion as related to the cardiovascular system.

**PT-316. Clinical Examinations, Evaluations, Diagnosis and Prognosis.** This course gives students skill in observation, communication, gross screening of posture, gait, function, integument, neurological and musculoskeletal status. Additionally, students acquire skill in specific examination of flexibility, joint range (goniometry), anthropometric measures and muscle strength (MMT). This course further provides opportunity for students to integrate material in determining patient problems and establishing an initial plan of care.

**PT-317. Scientific Inquiry I.** This course covers the theory and methods of the research process in physical therapy, including research designs, research methods and basic data analysis. The course will emphasize the student's ability to access literature, read and critically evaluate research findings.

**PT-318. Clinical Experience II.** This course will continue to reinforce principles learned in the classroom to date. Under the guidance of licensed clinical faculty, students will integrate concepts, principles and techniques with emphasis on interventions learned during the first Spring semester. The structure of this phase of clinical education will be 4 full days of clinical education. The focus will be on the practice areas of cardiopulmonary care and integumentary care. Each student will spend 2 consecutive days in a practice setting in which they can experience and learn in these practice areas. The supervisory model for this experience will not exceed 3 students : 1 clinical instructor.

**PT-321. Movement Science II/Motor Control.** Current concepts of motor control and motor learning will be synthesized from multiple disciplines to provide a framework for physical therapy practice. Neurological mechanisms will be examined and integrated with other physiological, psychological and biomechanical contributions to movement and function. The role of task and environment in the control of movement also will be analyzed.

**PT-322. Arthrological and Pathological Movement Science I.** A critical examination of the morphology and function of the articulations of the axial skeleton, including the temporomandibular and lumbosacral joints. Course content stresses normal musculoskeletal biomechanics of the cervical, thoracic, and lumbar segments as well as the pathomechanics of common spinal deformities. Course exposes student to normal and pathological orthopedic radiology of the trunk, pertinent to clinical practice.

**PT-323. Diagnostic Imaging.** The study of the principles, procedures and interpretation of diagnostic imaging techniques. Emphasis on plain film radiography, myelograms, CT scans, magnetic resonance imaging and nuclear medicine.

**PT-324. Musculoskeletal Practice Management I.** This course starts with the introduction to principles of orthopedic medicine, the general concepts of selective tissue evaluation and joint mobilization. The course then goes on to cover the etiology, pathology, specific evaluation treatment prognosis and prevention of common musculoskeletal problems of the trunk, temporomandibular joint, headaches and sacroiliac regions. Included will be the basis of medical and surgical treatment of patients with spinal and TMJ pathologies as well as physical therapist intervention. The course will include lecture, laboratory, mock practicals, clinical hours, case problems, and outside projects.

**PT-325. Medical Practice Management.** This course will cover medical and physical therapy management of patients with general medical conditions. A systems approach will be utilized to cover the following areas: metabolic, malignancies, psychiatric, connective tissue, immunosuppressive and organ transplantation.

**PT-326. Physical Therapist Intervention III.** The final physical therapist intervention course will introduce the direct interventions of therapeutic exercise and ambulation, functional training in self-care and home management, functional training in community and work integration, and the prescription and application of assistive/orthotic/prosthetic devices and equipment. The effects of exercise across the lifespan will be discussed. Specific patient populations will be discussed as they are impacted by exercise training.

**PT-327. Integrated Health Care Seminar I.** This seminar provides the student with an opportunity to integrate and present medical and physical therapy management related to patients with general medicine conditions, cardiopulmonary and musculoskeletal diseases. Students will contrast different approaches to examination and intervention. They will analyze the influence of medical, social, and behavioral issues as well as age and developmental stage and will be able to discuss the clinical decision making process for specific patients.

**PT-328. Clinical Internship.** This first full time clinical experience will consist of a four week exposure in an inpatient setting, including: acute care, subacute, or skilled nursing. The focus of the experience will be the development of psychomotor skills, pro-

professional behaviors, gross and specific examination and intervention procedures and documentation skills. Exposure to the multiple roles of the PT will be emphasized (e.g. administration, case management, consultation). The student will be supervised by a licensed physical therapist. The supervisory model for this experience will not exceed 2 students : 1 clinical instructor.

**PT-401. Neuropathology.** In this course the pathological mechanisms of acute and chronic neurological disorders will be presented. Physiological mechanisms will be analyzed for peripheral, central, and autonomic nervous system dysfunction. Major neurological disorders representative of each category will be included. Rationale for current medical management will be presented.

**PT-402. Arthrological and Pathological Movement Science II.** A critical examination of the structure, morphology, and functions of each of the articulation of the upper and lower limbs. Course content stresses normal and pathological musculoskeletal biomechanics of each region and provides exposure to clinically pertinent orthopedic radiology of each segment. The last section of the course addresses the kinematics and kinetics of normal and pathological locomotion and provides opportunities for gait analysis of normal subjects and patients.

**PT-403. Musculoskeletal Practice Management II.** This course covers the etiology, specific evaluation, diagnosis, assessment, prognosis, treatment and prevention of common musculoskeletal problems of the upper and lower extremities. The class will include specific joint testing, joint mobilizations, medical and surgical management, prevention and physical therapy intervention. The class is composed of lecture, laboratory, mock practicals, written patient evaluations and clinical cases.

**PT-404. Neurologic Practice Management I.** An introduction to management of children and adults with neuromuscular disorders will be presented. Examination, evaluation, diagnosis, prognosis, and intervention will be discussed. Both concepts and skills will be addressed. Peripheral neuromuscular (e.g. muscular dystrophy, brachial plexus injury) and spinal cord disorders (e.g. spinal cord injury, spina bifida) will be included.

**PT-405. Scientific Inquiry II.** In this course students will develop a research proposal for their curriculum research requirement. Each student will develop a plan for implementation of either an empirical research study or a clinical case study. Content on epidemiological research and advanced statistical analysis will also be presented.

**PT-406. Integrated Health Care Seminar II.** This seminar provides the student with an opportunity to integrate and present medical and physical therapy management related to patients who have disorders of several systems (e.g. musculoskeletal, cardiovascular, and neuromuscular). Students will meet with an instructor to present a patient, including the patient history, examination, evaluation, diagnosis, prognosis, and intervention as well as objective determination of success of intervention. Students will be able to articulate and justify their clinical reasoning as they contrast different approaches to examination and treatment.

**PT-411. Psychosocial Aspects of Care.** In this course students will survey the various factors affecting the patient, the family and the patient therapist relationship in situations of chronic illness and loss. Students will increase skill in developing an effective helping relationship with other people. Experiential learning experiences and self-observation will be used to promote this development.

**PT-412. Neurological Practice Management II.** Management of children and adults with neuromuscular disorders will be continued with emphasis on more complex CNS and multisystem disorders. Examination, evaluation, diagnosis, prognosis, and intervention will be discussed. Both concepts and skills will be addressed. Acquired injuries (e.g. cerebrovascular disease, traumatic brain injury), degenerative disorders (e.g. Parkinson's disease, multiple sclerosis) and congenital disorders (e.g. cerebral palsy) will be included.

**PT-413. Educational Theory and Practice.** In this course, principles of teaching and learning will be covered and applied to the health care setting. Students will learn to use a variety of teaching methods, selected and developed for a specific audience. Students will formulate and implement a plan for personal and professional development as well as techniques for facilitating behavioral change.

**PT-414. Administration I.** Administration topics will include concepts and methods for the recruitment and effective utilization of personnel in a team atmosphere, and identification of factors encompassing professional practices.

**PT-415. Integrated Health Care Seminar III.** This seminar provides the student with an opportunity to present studies to demonstrate integration of medical and physical therapy management of patients with medical, musculoskeletal or neurologic disorders. Students will identify sequelae of these disorders e.g. musculoskeletal impairments with neurological injury, and will articulate management approaches that encompass both the acute management and the sequelae to the disease process.

**PT-416. Clinical Residency I.** This 20 week clinical internship may occur in varied settings under the supervision of a selected and trained clinical instructor. The required focus of this clinical experience will be in either the musculoskeletal or neuromuscular practice areas. Students will practice all clinical and administrative aspects of their professional roles during the internship.

**PT-501. Clinical Pharmacology and Nutrition.** This course will introduce students to the basic principles of pharmacology and nutrition. Study of pharmacologic intervention and nutritional practices for patients commonly seen in physical therapy are included.

**PT-502. Administration II.** The knowledge and skills required for planning and implementing a physical therapy practice in multiple settings, will be covered in this course. Students will be introduced to the primary legal and management issues required of physical therapy practices including strategies to ensure safe and effective delivery of high quality services.

**PT-503. Primary Care Practice.** This seminar provides the student with an opportunity to present, analyze and integrate case studies of physical therapy practice as primary care clinical providers. Case studies will be drawn from patient's with simple to complex problems in the general medicine, cardiopulmonary, musculoskeletal and neurologic systems, and who present to the physical therapist as a first point of contact for health care. Emphasis will be placed on the physical therapist's role, responsibilities, and risks when practicing as an entry point into the health care system.

**PT-504/505. Advanced Practice Electives I and II.** In these courses students will choose two electives in which to deepen their knowledge base for practice. Advanced practice electives will be offered in: pediatric, geriatrics, orthopedics, sports, cardiopulmonary, neurology, education, research, and administration.

**PT-506. Clinical Residency II.** This 20 week clinical internship may occur in varied settings under the supervision of a selected and trained clinical instructor. The required focus of this clinical experience will be in either the musculoskeletal or neuromuscular practice areas. Students will practice all clinical and administrative aspects of their professional roles during the internship.

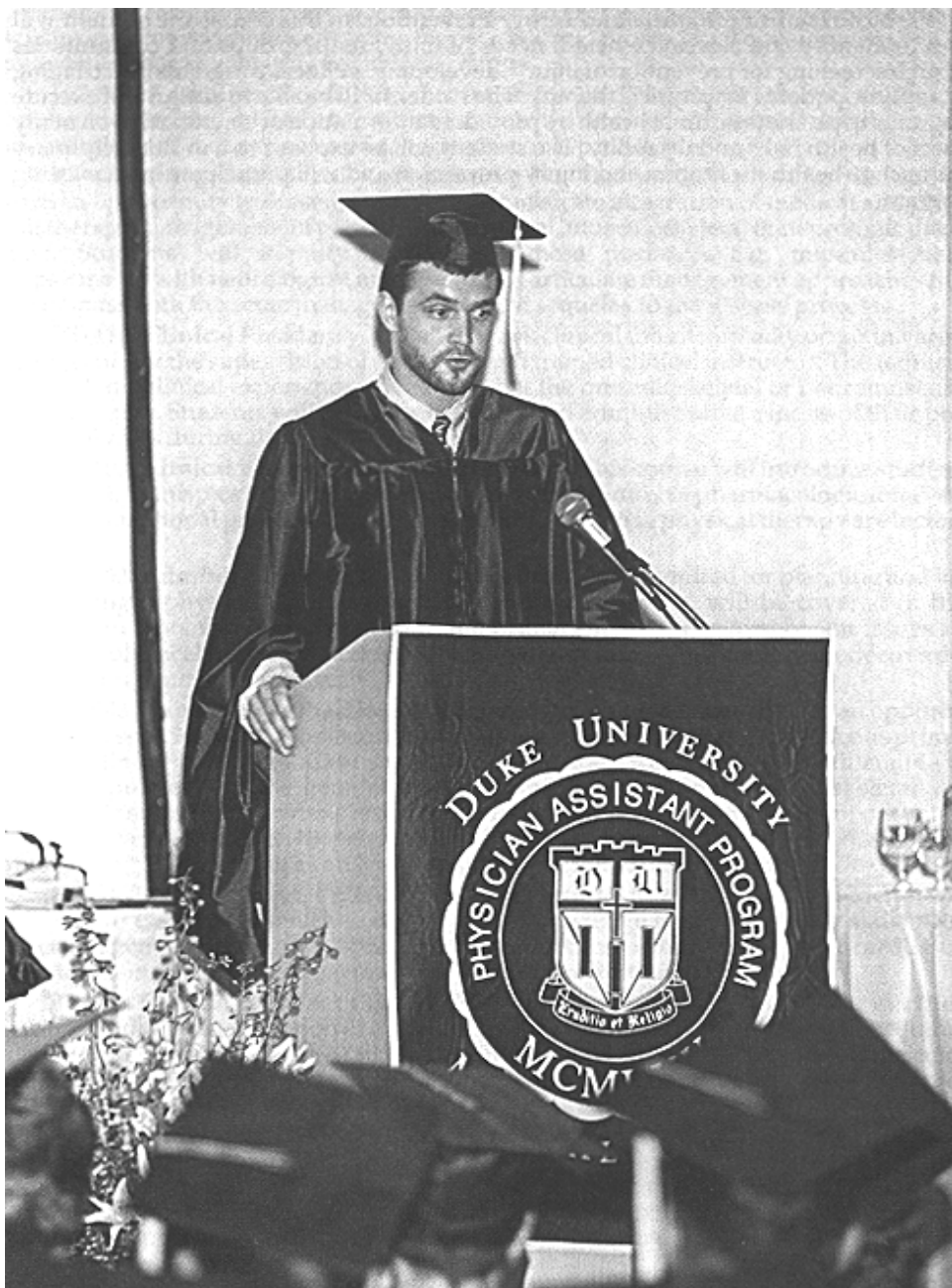
**PT-507. Professional Practice Development and Evaluation.** This course will integrate the didactic, clinical and research components of the student's experience in preceding course work, with the goal of evaluating the student's strengths and weaknesses for practice. During this course, the student will undergo extensive summative practical evaluations in an assessment center format. They will also complete a written comprehensive examination.

**PT-508. Scientific Inquiry III.** In this third course in the sequence, the student will finalize their research or scholarly project in written form, and will complete a formal re-

search presentation of their project results. Class time will also be spent discussing the role of critical inquiry in the first few years of practice.

**PT-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 aspect of health risks and disability. The student will be exposed to a multidisciplinary approach to health promotion and injury prevention and will participate in an existing program.

## *Master of Health Sciences Degree Programs*



# The Clinical Leadership Program

## MASTER OF HEALTH SCIENCES CURRICULUM

### Department of Community and Family Medicine

Chairman: James L. Michener, M.D.

Clinical Leadership Program Steering Committee:

Kathryn Andolsek, M.D., M.P.H.; Steve J. Bredehoeft, M.D., M.P.H.; Mary T. Champagne, R.N., Ph.D.; Christopher Conover, Ph.D.; Susan D. Epstein, M.P.A.; Linda K. Goodwin, Ph.D., R.N., C; Joseph S. Green, Ph.D.; Clark C. Havighurst, J.D.; J. Lloyd Michener, M.D.; Gwendolyn Murphy, Ph.D.; Adele Spitz Roth, M.S.; Kevin A. Schulman, M.D.; Justine Strand, M.P.H., PA-C; Duncan Yaggy, Ph.D.

The Clinical Leadership Program is designed to provide clinicians with the skills necessary to become leaders within today's changing health care environment. The MHS-CL, offered through the School of Medicine's Department of Community and Family Medicine in collaboration with Duke's Fuqua School of Business, Law School, Terry Sanford Institute for Public Policy, and the School of Nursing provides a comprehensive core curriculum that includes, from a health delivery perspective, management theory, health care administration, financial management, economics, law, organizational behavior, informatics, quality management, and strategic planning.

**Curriculum.** Students are grouped into interdisciplinary teams. Each student is assigned a faculty preceptor, complementary to the student's experience and goals. In teams, students move through the curriculum and complete a project that demonstrates their ability to draw upon the skills and material covered through coursework and individual preceptorship experiences. Preceptors and students are matched according to experience and the student's expected outcomes for completing the program. The purpose of the preceptorship, which lasts through the entirety of the program, is twofold. Running concurrently with the classroom experience, the preceptorship affords the student the opportunity to further explore topics covered in the formal classroom setting. The individualized attention provided through the preceptorship also allows the student to customize the program to meet specific needs. Each preceptor and student pair are expected to create measurable objectives that are subject to approval by the MHS-CL Steering Committee for each semester of the preceptorship.

During the Spring semester, students are placed in interdisciplinary teams to begin planning a summer project that allows them to apply gleaned skills and knowledge in recommending a solution or course of action for a real problem or opportunity. The prospectus for each student team project must be approved by the MHS-CL Steering Committee prior to the start of the summer semester.

In total, the MHS-CL degree program curriculum is four semesters and one summer session. Students take 6 credits or more per semester for the academic semesters and 9 credits during the summer session.



## Tentative Curriculum Sequence

### Year One

#### Fall Semester

PAP-250. Health Systems Organization	2
NUR-301. Population- Based Approaches to Health Care	3
CL-200. Preceptorship	2
<b>Total</b>	<b>7</b>

#### Spring Semester

NUR-401. Dynamics of Management	3
NUR-402. Financial Management and Budget Planning	4
CL-201. Preceptorship	2
<b>Total</b>	<b>9</b>

#### Summer Semester

MIS-233. Introduction to Medical Informatics	3
CL-205. Project	6
CL-202. Preceptorship	2
<b>Total</b>	<b>11</b>

### Year Two

#### Fall Semester

Law-347. Health Care Law and Policy	3
CL-206. Quality Management	3
CL-203. Preceptorship	2
<b>Total</b>	<b>8</b>

#### Spring Semester

CL -207. Operational Management	3
BUS 437. Strategic Management for Health Services	3
CL-204. Preceptorship	2
<b>Total</b>	<b>8</b>
<b>Grand Total</b>	<b>43</b>

Prerequisites for Admission. The prerequisites for admission to the MHS in Clinical Leadership curriculum include:

1. A clinical degree such as MD, PA, NP, or the equivalent.
2. Three years post-training clinical experience or the equivalent.
3. Prior preparation in statistics. A list of course offerings as well as online/self-paced tutorials are provided for students who do not have such training.
4. Prior experience in budgeting.
5. Computer Skills, including experience with: word processing, e-mail, spreadsheets, internet research, and presentation programs. (All students in the MHS-CL are required to have their own PC that is of Pentium class with Internet Access.)
6. Administrative experience desirable.

**Admissions Procedures.** Applicants seeking admission either as a degree candidate or as a non-degree participant should submit the application form and the following supporting documents.

1. Official transcripts from each post-secondary institution attended. Transcripts must be sent by the institutions attended directly to the Clinical Leadership Program. Personal copies are not accepted.

2. Three letters of recommendation, including one from an individual with direct knowledge of the candidate's clinical experience and one from someone with direct knowledge of the candidate's administrative experience. All letters should be written by persons who are qualified to testify to candidate's capacity for graduate work. The provided evaluation forms should be mailed to the Clinical Leadership Program directly by the evaluators.
3. Applicants who do not possess a graduate degree are required to provide Graduate Record Examination (GRE) General (Aptitude) Test results. Scores must not be more than five years old, and must be mailed directly to the Clinical Leadership Program from the Educational Testing Service.
4. Proof of current NC practice licensure. In addition, candidates must maintain license throughout enrollment in the Clinical Leadership Program.
5. Applicant finalists are required to complete an admissions interview.

**Application Deadline.** The deadline for receipt of applications for the 2000-2001 academic year is June 1, 2000. 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 July 1, 2000. 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 2000-2001 academic year is \$800.00 per unit. Duke faculty members may be eligible for the University's Educational Assistance Program. Other sources of support may exist in clinical departments; prospective applicants should consult with program directors and division chiefs regarding potential funding sources.

**Financial Aid.** Qualified students may be eligible for Stafford Loans up to \$8,500, and up to \$19,100 in tuition loans. Clinical Leadership students may be eligible for up to \$10,000 in unsubsidized federal Stafford Student Loans. The North Carolina Student Loan Program for Health, Science, and Mathematics provides financial assistance in the form of loans up to \$6,500 per year for North Carolina residents; these loans may be cancelled through approved service in shortage areas, public institutions, or private practice. Applicants may call 919-571-4182 for further information about this loan program. Limited 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.

This program is part-time. It is assumed that the candidate will continue to work part-time in a clinical capacity while working toward the Master of Health Science in Clinical Leadership.

**Grading Policies.** Grades for all courses and clinical rotations within the Clinical Leadership curriculum are assigned on the basis of the following: Honors (*H*), Pass (*P*), Low Pass (*L*), and Fail (*F*). The Clinical Leadership Program is designed to integrate classroom and clinical learning experiences considered necessary for competency as health care providers. Therefore, the failure of any required course prevents a student from continuing in the program. Also, a student can receive no more than a total of three grades of "Low Pass" in the twenty-seven required courses during the clinical and pre-clinical phases of the program. Determination of satisfactory academic progress is made by the PA faculty at the conclusion of each semester/term.

A grade of "Incomplete" (*I*) may remain on a student's transcript for one year only. After one year, a grade of "Incomplete" automatically is converted to an F (Fail). An extension to this one year limit may be granted by the program director; a request must

be submitted in writing to the program director no later than thirty days prior to the expiration of the one year time limit.

**Academic Progress.** A leave of absence will be granted upon request at the discretion of the Steering Committee.

### Courses of Instruction

**BUS-437. Strategic Management for Health Services.** This course explores the structural aspects of the health care delivery system for four perspectives: patients, hospitals, physicians and payers. The objective of the course is to provide students with a detailed understanding of the business aspects of health care delivery, and allow an assessment of the interrelationship between the public and private sectors in this market. Topics covered include the role of the consumer, provider organization (physician and hospital), insurance (organization and risk management), and government programs. The course finishes with a reflection on potential evolution of the market over the next 5 years. *Burton*

**CL-206. Quality Management.** Course provides a survey of all related aspects of quality management including a review of HEDIS, NCQA, JCAHO structures and guidelines. Special emphasis is placed on outcomes, clinical guidelines, evidence-based medicine, disease management, interdisciplinary team care, CQI/TQM, role of purchaser, and patient satisfaction. *Michener*

**CL-207. Operational Management.** Course covers the practical aspects of communication, meeting management, human resource management. Topics include performance appraisal, conflict management, - demand management, aligning incentives, labor substitution/ consolidation, role of extenders, analytical decision-making, project management, and process (systems) analysis. *Israel*

**Law-347. Health Care Law and Policy.** A survey of the legal environment of the health services industry in a policy perspective, with particular attention to the tensions and trade-offs between quality and cost concerns. Topics for study: access to health care; the clash between professionalism and commercialism, including antitrust law; personnel licensure; private personnel credentialing and institutional accreditation; hospital organization and staff privileges; professional and institutional liability; cost containment regulation, including certification of need; cost controls in government programs. Of interest to students interested in public policy and in law and economics as well as those with specific interests in the health care field. *Havighurst*

**MIS-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. *Lobach*

**NUR-301. Population-Based Approaches to Health Care.** Provides an overview of population-based approaches to assessment and evaluation of health needs. Selected theories are the foundation for using scientific evidence for the management of population-based care. Enables the health care professional to make judgements about services or approaches in prevention, early detection and intervention, correction or prevention of deterioration, and the provision of palliative care. Fall. *Goodwin and Epstein*

**NUR-401. Dynamics of Management.** This course is an in-depth analysis of selected organizational behavior topics and management practices related to patient care systems administration within a larger, integrated health care system. From a well developed theoretical orientation, students will critically identify issues, formulate questions, and pursue managerial interventions that will result in high quality, aggregate patient care and organizational outcomes that are socially relevant and clinically cost-effective. Spring. Prereq. NUR 400 or consent of instructor. *Allred*

**NUR-402. Financial Management and Budget Planning.** Designed for managers in complex organizations. Focuses on the knowledge and skills needed by the nurse manager to plan, monitor, and evaluate budget and fiscal affairs for a defined unit or clinical division. Health care economics, personnel, and patient activities are analyzed from a budgetary and financial management perspective within an environment of regulations and market competition. Spring. Prereq. NUR 303 suggested. *Zellman*

**PAP-250. Health Systems Organization.** An introduction to the structure and administrative principles in use in health care organizations. A lecture series taught by an interdisciplinary faculty and by community experts in health care organization. Topics include the patient as consumer, third-party payment, and public policy trends. *Strand and Conover*

## The Clinical Research Training Program

### MASTER OF HEALTH SCIENCES CURRICULUM

Program Director: William E. Wilkinson, Ph.D.

Associate Directors: Eugene Z. Oddone, M.D. and Linda S. Lee, Ph.D.

This training program meets an existing need at Duke University Medical Center for formalized academic training in the quantitative and methodological principles of clinical research. Designed primarily for clinical fellows who are training for academic careers, the program offers formal courses in research design, statistical analysis, health economics, research ethics and research management. 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 Division of Biometry in the Department of Community and Family Medicine with the participation of other members of the Medical Center faculty having 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. A bachelor's degree (or the equivalent) from an accredited institution is a prerequisite for admission either as a degree candidate or as a non-degree student.

A student seeking admission to the Clinical Research Training Program should obtain an application packet which contains the necessary forms and detailed instructions on how to apply. Requests for application forms or for additional information about the training program should be directed to the Clinical Research Training Program, Box 3827, Duke University Medical Center, Durham, North Carolina 27710, (919) 681-4560 or by e-mail to [crtp@mc.duke.edu](mailto:crtp@mc.duke.edu). Additional information may be found on the program's web site at <http://crtp.mc.duke.edu>.

A complete application for admission, either as a degree candidate or as a non-degree student, consists of the application form and the following supporting documents: (1) an official transcript from each post-secondary institution attended; (2) three letters of evaluation written by persons qualified to testify to the applicant's capacity for graduate work; (3) official scores on the Graduate Record Examination (GRE) General Aptitude Test. Medical students at Duke and at the NIH may substitute MCAT scores for GRE scores. Test scores are not required for applicants having an M.D., Ph.D. or equivalent degree.

**Program of Study.** The degree requires 24 units of graded course work and a research project for which 12 units of credit are given. Seven courses (241 -247) constituting 22 units 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, allowing the fellow/student to integrate the program's academic program with his or her clinical training. The course

work can be completed in one academic year consisting of two 16-week semesters, but many degree candidates choose to spread the course work over a two-year period. (The exact dates are determined by the Medical School's calendar for fourth year medical students.)

**Examining Committee.** Three faculty members constitute an examining committee to certify that the student has successfully completed the research project requirement for the degree. One member of this committee must be a clinician who is on the faculty of the Clinical Research Training Program (CRTP). A second member must be a statistician who is on the faculty of the Division of Biometry; the statistician may be on the CRTP faculty as well, although this is not a requirement. 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. The instructor who gives an Incomplete for a course may specify a date by which the student must make up the deficiency. In exceptional circumstances, an Incomplete that is not resolved within one calendar year from the date the course ended may be extended for one additional year with the written approval of the course instructor 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, *WF* (see below) and a permanent *I* are both 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 2000-2001 academic year is \$480 per unit. 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 units in the Clinical Research Training Program. A maximum of 6 units of credit may be transferred for graduate courses completed at other institutions. Such units 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 units for the degree. However, a student who is granted such transfer of credit may be permitted to register for as much as 18 units of research instead of the usual 12 units.

**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.** An introduction to the concepts of statistical estimation and hypothesis testing as applied in clinical research. Topics include probability distributions, descriptive statistics, graphical displays, parametric

and non-parametric tests for differences in central tendency, paired comparisons and correlation, simple linear regression, one-way analysis of variance, and logistic regression. Types of study designs and epidemiological concepts are woven into the statistical presentation. Several medical articles are critiqued to foster evaluation of the literature and to demonstrate proper application of statistical techniques. In addition, basic concepts and procedures of SAS are presented for computation of the statistical measures presented in the course. 4 units.

**CRP-242. Principles of Clinical Research.** General principles and issues in clinical research design. Formulating the research objective and the research hypothesis; specifying the study population, the experimental unit and the response variable(s). Classification of studies as experimental or observational, prospective or retrospective, case-control, cross-sectional, or cohort; their relative advantages and limitations and the statistical methods used in their analysis. Emphasis is placed on the traditional topics of clinical epidemiology such as disease etiology, causation, natural history, diagnostic testing, and the evaluation of treatment efficacy. Corequisite: CRP-241. 4 units.

**CRP-243. Ethical Issues in Clinical Research.** An introduction to the considerations necessary in designing and conducting clinical research that meets current ethical and regulatory guidelines. Topics include the emergence of research ethics, the underlying ethical principles relevant to the conduct of research, selection of subjects (e.g., the inclusion of women and minorities in research), informed consent, compensation, confidentiality, regulatory requirements, termination of clinical trials, conflict of interest and scientific integrity. Corequisite: CRP-242. 2 units.

**CRP-244. Health Economics in Clinical Research.** A practical foundation in economic evaluation of medical diagnostic procedures and therapeutic interventions. The focus is on the development, analysis, and communication of economic data in the context of clinical research. Topics include: basic finance and organization of health care, evidence tables, utility theory, tree-structured decision models, health care cost accounting, cost-effectiveness, cost-utility and cost-benefit analysis, special statistical issues in analysis of economic data. Corequisite: CRP-242. 2 units.

**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 units.

**CRP-246. Research Management.** An introduction to the critical issues and methods in the management of clinical research. The focus is on the understanding of concepts and skills related to the complex, multidisciplinary environment in which clinical research is conducted. Topics include budget construction and financial management, project management, regulatory affairs, negotiating skills, conflict resolution, manuscript preparation, public relations, presentation skills, and alternative means of disseminating medical information. Prerequisite: CRP-242. 4 units.

**CRP-247. Clinical Research Seminar.** This seminar integrates and builds on the core courses (CRP 241, 242, and 245) to provide practical experience developing and critiquing the methodological aspects of clinical research protocols and the clinical research literature. Assigned readings are drawn from contemporary literature and include both exemplary and flawed studies. Prerequisite: CRP-242. Corequisite CRP-245. 2 units.

**CRP-248. Clinical Trials.** Fundamental concepts in the design and analysis of clinical trials. Topics include protocol management, sample size calculations, determina-

tion of study duration, randomization procedures, multiple endpoints, study monitoring, and early termination. Corequisite: CRP-245. 2 units.

**CRP-249. Health Services Research.** Research methods in health services research. Topics include measurement of health-related quality of life, case mix and comorbidity, and quality of health care; analysis of variations in health care practice; physician profiling. Application of traditional research designs (e.g., randomized trials) to address health services research questions. The interface between health services research and health policy. Prerequisite: CRP-242. Corequisite CRP-245. 2 units.

**CRP-250. Genetic Analysis of Human Disease.** An introduction to the use of statistics for the analysis of genetic data, with a focus on applied projects aimed at identifying genes leading to human disease. The course provides an overview of modern statistical techniques in the analysis of complex human disease. Topics include: 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, DNA fingerprinting (forensic and paternity issues), and a molecular overview of DNA techniques and evolving methodologies (SNPs, etc). Students will be introduced to specialized software and internet-based resources for the analysis of genetic data. Prerequisite: CRP 241 and basic knowledge of genetics. 2 units.

**CRP-251. Psychometrics and Reliability.** An introduction to the elements of psychometric theory that are relevant to the conduct of clinical research. Topics include reliability and validity; the definitions and use of intraclass correlation, classical test theory and generalizability theory as models of reliability; questionnaire design and scale construction; methods for assessing the psychometric properties of scales such as factor analysis and Cronbach's alpha; the use of reliability in sample size estimation. Prerequisite: CRP-242. Corequisite CRP-245. 2 units.

**CRP-270. Research.** An individualized research project under the direction and supervision of the student's mentor and examining committee. 12 units.

## The Pathologists' Assistant Program

### MASTER OF HEALTH SCIENCES CURRICULUM

Professor and Chairman, Department of Pathology: Salvatore V. Pizzo, M.D., Ph.D.

Director, Pathologists' Assistant Program: James G. Lewis, Ph.D.

Medical Director: Alan D. Proia, M.D., Ph.D.

Medical Director for Surgical Pathology: Marcia Gottfried, M.D.

Surgical Pathology Training Coordinator: Pamela Vollmer, B.H.S.

Director, Autopsy Service, Veterans Affairs Medical Center: Jane Gaede, M.D.

Director of Surgical Pathology, Veterans Affairs Medical Center: Robin Vollmer, M.D.

Chief, OB-GYN Pathology: Stanley Robboy, M.D.

Chief, Pediatric Pathology: William D. Bradford, M.D.

**Program of Study.** This is a twenty-four month program beginning with the start of the medical school academic year in August of each year. It provides a broad, graduate level background in medical sciences in support of intensive training in anatomic pathology. With the background in anatomy, histology, physiology, and microbiology, the students learn pathology at the molecular level in the classroom and are trained and given experience in the microscopic and gross morphology of disease in close one-on-one training with pathology department faculty. They learn dissection techniques and all technical aspects of anatomic pathology in summer rotations. The curriculum is designed to produce individuals who fill the gap between the pathologist on the autopsy and surgical pathology services and other technical personnel who work in the tissue processing laboratory.

**Accreditation.** The curriculum, faculty, facilities, and administration of the program are accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Graduates are able to sit for the American Association of Pathologists'

Assistants fellowship examination.

**Degree Requirements.** Passage of sixty-nine units of graduate credit is required for the MHS degree. An additional eleven credits are required to receive a certificate at the end of the program, there are mandatory comprehensive written, oral, and practical examinations administered by a panel of pathology department faculty which all students must pass for successful completion of the program.

**Grading Policies.** Grades for courses except the comprehensive final examination are assigned as follows: Excellent/High Pass (*H*), Good/Pass (*P*), Satisfactory/Low Pass (*L*), Failing (*F*), and Incomplete (*I*). In some medical school courses grades of *H* (Honors), *P* (Pass), and *F* (Fail) may be assigned. Failure in any course may result in removal from the program. If a student receives two *L*s, the student is placed on academic probation and is required to perform additional studies for the director. All incomplete grades automatically revert to *F* if work is not completed within one semester or one summer session following award of the grade. The comprehensive final examination is pass/fail with the award of honors for outstanding students. Students who fail the final can register for one semester to prepare and take the examination again. Any student who fails the final twice cannot complete the program.

## Curriculum

### Year 1

#### Fall

CBI-200. Cell and Tissue Biology	3 credits
CBI-201. Microscopic Anatomy	3 credits
CBI-202. Medical Physiology	4 credits
BAA-200. Human Anatomy	3 credits
PTA-205. Immunology	3 credits

### Year 1

#### Spring

PTH-250. General Pathology	4 credits
PTH-251. General Pathology Laboratory	4 credits
MIC-221. Medical Microbiology	4 credits
PTA-200. Introduction to Dissection	2 credits
PTA-201. Basic Neuroanatomy	1 credit

### Year 1

#### Summer

PTA-210. Introduction to Autopsy Pathology	4 credits
PTA-220. Introduction to Surgical Pathology	4 credits
PTA-215. Histology Techniques	1 credit

### Year 2

#### Fall

PTH-364. Systemic Pathology	3 credits
PTH-361. Autopsy Pathology	4 credits
PTA-230. Surgical Pathology	4 credits
PTH-258. Cellular and Subcellular Pathology	2 credits
PTA-216. Histology Techniques	1 credit
PTA-240. Photography	1 credit

### Year 2

#### Spring

PTH-364. Systemic Pathology	3 credits
PTA-231. Surgical Pathology	4 credits
PTH-362. Autopsy Pathology	4 credits
PTA-217. Histology Techniques	1 credit



PTA-241. Photography	2 credits
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## Year 2

### Summer

PTA-300. Autopsy Practicum	4 credits
PTA-301. Surgical Pathology Practicum	4 credits
PTA-302. Forensic Rotations	3 credits
<b>Total</b>	<b>80 credits</b>

### Prerequisites for Admission

1. A baccalaureate degree in a biological or chemical science from an accredited institution.
2. A baccalaureate degree in a non-science major but at least 12 credit hours in biological sciences and six credit hours in chemistry.
3. Scores for the Graduate Record Examination (G.R.E.) taken within the last five years.

Candidates who receive their baccalaureate degrees from institutions outside the United States must submit a transcript evaluation showing degree equivalency and subject matter description.

**Application Procedures.** Application materials are mailed to prospective candidates for admission up to January 31st of the year of expected matriculation. Applications can be obtained by writing to: Dr. James G. Lewis, Director, Pathologists' Assistant Program, Department of Pathology, Box 3712, Duke University Medical Center, Durham, NC 27710. Telephone: (919) 684-2159. All applications must be received by February 28.

Applications must include:

1. A completed application form and a nonrefundable application fee of \$35;
2. Official transcripts of all colleges and universities attended;
3. G.R.E. scores;
4. Three letters of recommendation.

Candidates are notified of the admission committee's decision no later than April 15. Accepted candidates are required to submit a nonrefundable deposit of \$300 to retain their places in the class. This deposit applies to tuition.

### Tuition, Fees and Estimated Costs for Year One

Tuition	\$12,400 (40 credits at \$310/credit)
Fees	500
Books	460
Lab coats	140
Student health fee	\$222/semester) 666
Student accident	778 (single)
Vehicle registration	120
Lodging	4,980
Food	4,080
Miscellaneous	4,180
<b>Total</b>	<b>28,250</b>

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://www2.mc.duke.edu/som/rofinaid.html>.

### Courses of Instruction

**BAA-305. Gross Human Anatomy.** This is the medical school and anatomy gradu-

ate course in human anatomy. Students participate in a complete lecture series and in laboratory dissections of cadavers. Lectures and laboratory work are supplemented by conferences which emphasize biological and evolutionary aspects. 3 credits. *Staff*

**CBI-200. Cell and Tissue Biology.** This is the introductory medical school and graduate course in microscopic anatomy. Students participate in lectures and laboratories on the structure and function of cells and tissues of the body. The course provides practical experience in the use of the light microscope analyzing an extensive slide collection of mammalian tissues. 3 credits. *McIntosh and staff*

**CBI-201. Microscopic Anatomy.** Histology of all major organs of the body. Structure and cell biology at both the level of the light and electron microscope. 3 credits. *McIntosh and staff*

**CBI-202. Medical Physiology.** Medical and graduate level course on organ and cell physiology. Human and medical aspects are stressed. 4 credits. *Anderson and staff*

**MIC-221. Medical Microbiology.** Intensive study of common bacteria, viruses, fungi, and parasites that cause human disease. The didactic portion focuses on the nature and biological properties of microorganisms causing disease, the manner of replication, and their interaction with the entire host as well as specific organs and cells. 4 credits. *Staff*

**PTH-250. General Pathology.** This is the medical school core course in pathology. Lectures deal with broad concepts of disease and underlying molecular mechanisms. 4 credits. *Staff*

**PTH-251. Laboratory Course in General Pathology.** Fundamentals of pathology are presented by correlating gross and microscopic material to illustrate the structural changes in disease. Laboratories are broken into small groups of students and are held under the guidance of staff pathologists. 4 credits. *Staff*

**PTH-258. Cellular and Subcellular Pathology.** The course consists of lectures and seminars on the alterations of cellular structure and associated functions that accompany cell injury. 2 credits. *Shelburne and staff*

**PTH-361, 362. Autopsy Pathology.** A detailed consideration of the morphologic, physiologic, and biochemical manifestations of disease. Includes gross dissection, histologic examinations, processing, analyzing of all autopsy findings under tutorial supervision. 6 credits each course. *Lewis and staff*

**PTH-364. Systemic Pathology.** This is the medical school and graduate course in the detailed pathology of major organ systems. The course consists of lectures and seminars presenting the latest scientific concepts of disease. 6 credits. *Bradford and staff*

**PTA-200. Introduction to Dissection.** This is a course in basic tissue dissection techniques taught through participation in autopsies and using autopsy tissues. 3 credits. *Lewis and staff*

**PTA-205. Immunology.** This is a basic survey course in immunology that includes lectures on the function and interaction of the cells of the immune system, cytokine secretion and function, and the generation of humoral and cellular immune responses. 3 credits. *Kostyu*

**PTA-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 prosecution and workup. Students assist residents in full autopsy dissections. 4 credits. *Lewis and staff*

**PTA-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*

**PTA-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*

**PTA-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*

**PTA-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*

**PTA-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 prosecutions in all possible situations, and write full preliminary autopsy reports. In addition, special dissection skills are taught in this course. 4 credits. *Lewis and staff*

**PTA-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*

**PTA-302. Forensic Rotation.** Students rotate through the laboratories of the Chief Medical Examiner assisting in forensic autopsies. 3 credits. *Butts and staff*

## The Physician Assistant Program

### MASTER OF HEALTH SCIENCES CURRICULUM

#### Department of Community and Family Medicine

Chairman: James L. Michener, M.D. Education Division

Division Chief: Justine Strand, M.P.H., PA-C

Program Director: Reginald D. Carter, Ph.D., PA

Medical Director: Joyce A. Copeland, M.D.

Associate Program Director: Patricia M. Dieter, M.P.A., PA-C

Director of Preclinical Education: J. Victoria Scott, MHS, PA-C

Director of Clinical Education: Philip A. Price, MHS, PA-C

Director of Recruitment and Minority Affairs: Lovest Alexander, MHS, PA-C

Surgical Coordinator: Paul C. Hendrix, MHS, PA-C

Clinical Laboratory Coordinator and Coordinator, ECU MHS Option: Margaret Schmidt, Ed.D., M.T. (A.S.C.P.)

Clinical Medicine Coordinator: John C. Lord, B.H.S., PA-C

Instructor: Peggy R. Robinson, MHS, PA-C

Regional Clinical Coordinators: Toby S. Brown, MHS, PA-C; Gloria J. Jordan, MHS, PA-C; Brenda L. Kaminski, PA-C

Emergency Department Coordinator: Robert Giggey, B.A., PA-C

The physician assistant (PA) concept originated at Duke over three decades ago. Dr. Eugene A. Stead Jr., then chairman of the Department of Medicine, believed that 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 who, working interdependently with physicians, provide diagnostic and therapeutic patient care in virtually all medical specialties and settings. They take patient histories, perform physical examinations, order laboratory and diagnostic studies, and develop patient treatment plans. In forty-six states, the District of Columbia, and Guam, PAs have the authority to write prescriptions. Their job descriptions are as diverse as those of their supervising physicians, and also may include patient education, medical education, health administration, and research.

The role of the graduate PA has evolved substantially over the past thirty years. While the majority of PAs in clinical practice continue to provide primary care services, the percentage serving in solo practice or private group settings has declined while the percentage practicing in institutional settings has risen. Today, over half of all graduate PAs are employed in large clinics, hospitals, and institutional settings. There are also

more nonclinical positions developing for PAs; while these positions do not involve patient care, they depend on a strong clinical knowledge base (e.g., drug study coordinator, clinical services coordinator, etc.).

In recognition of the increased responsibilities and expanded roles of PAs, the increased number of applicants with college degrees, and the quality of the PA educational program, the university began offering the Master of Health Sciences (MHS) degree to graduates in 1992. The MHS curriculum is designed to provide PAs with a greater depth of knowledge in the basic medical sciences and clinical medicine, as well as skills in administration and research. With these expanded skills, graduates can take advantage of the wide diversity of positions available to PAs.

**Program of Study.** The curriculum is twenty-five consecutive months in duration and is designed to provide an understanding of the rationale for skills used in patient assessment, diagnosis, and management. The first twelve months of the program are devoted to preclinical studies in the basic medical and behavioral sciences, and the remaining thirteen months to clinical experiences in primary care, medical and surgical specialties, and research study. Laptop computers are leased to each student for both the first and second years. Computers are used for a variety of in-class and clinical assignments and activities, as well as for communications and Internet services.

The preclinical curriculum is integrated to introduce the student to medical sciences as they relate to specific organ systems and clinical problems. Learning strategies include the traditional lecture format and basic science laboratory, small group tutorials, and computer-assisted diagnostics using simulated patients. Regular patient contact is an important part of the first year curriculum. Students begin to see patients during the spring semester as part of the Patient Assessment course; this patient contact continues throughout the summer term of the first year.

As part of the clinical practicum, students are required to take rotations in inpatient medicine, surgery, emergency services, outpatient medicine, pediatrics, obstetrics/gynecology, and behavioral medicine. In addition, two elective clinical rotations are included in the clinical year schedule, as is a four-week period devoted to development of a written research protocol. At least one clinical rotation must be completed in a medically underserved site. The final four weeks of the clinical year are spent in a final preceptorship which often serves as a bridge to employment as a practicing PA.

Because the clinical teaching is carried out in many practice settings throughout North Carolina, students should plan on being able to travel away from the Durham area for many of their clinical experiences. Housing will be made available for out-of-town clinical rotations.

**Curriculum.** Before proceeding into the clinical phase of the curriculum, students must satisfactorily complete the following:

#### **Preclinical Year**

##### **Fall Semester**

PAP-200. Basic Medical Sciences	5 credits
PAP-205. Anatomy	4 credits
PAP-210. Laboratory Medicine	4 credits
PAP-215. Physical Diagnosis	3 credits
PAP-220. Clinical Medicine I	4 credits
<b>Total</b>	<b>20 credits</b>

##### **Spring Semester**

PAP-211. Laboratory Medicine II	1 credit
PAP-221. Clinical Medicine II	9 credits
PAP-230. Fundamentals of Surgery	5 credits
PAP-235. Patient Assessment I	2 credits

PAP-240. Behavioral Aspects of Medicine	2 credits
<b>Total</b>	<b>19 credits</b>

#### **Summer Term**

PAP-222. Clinical Medicine III	7 credits
PAP-236. Patient Assessment II	1 credit
PAP-245. Perspectives on Health	2 credits
PAP-250. Health Systems Organization	2 credits
PAP-255. Introduction to Research and Epidemiologic Principles	3 credits
<b>Total</b>	<b>15 credits</b>

#### **Clinical Year**

Following successful completion of the preclinical courses, students enter the clinical phase of the program, completing the following experiences:

PAP-300. Outpatient Medicine	8 credits
PAP-305. Research Period	3 credits
PAP-310. Behavioral Medicine	4 credits
PAP-320. Inpatient Medicine	8 credits
PAP-340. General Surgery	4 credits
PAP-350. Emergency/Outpatient Surgery	4 credits
PAP-360. Pediatrics	4 credits
PAP-370. Obstetrics/Gynecology	4 credits
Elective	4 credits
Elective	4 credits
PAP-390. Preceptorship	4 credits
<b>Total</b>	<b>51 credits</b>

The student receives four credits for rotations which are four weeks in length, and eight credits for rotations which are eight weeks in length.

In addition to successful completion of the preclinical and clinical phases of the program, the PA student must also complete BLS, ACLS, and the research period. The four-week research period is scheduled during the clinical year.

**Program Policies and Grading Standards.** Grades for all courses and clinical rotations within the Physician Assistant curriculum are assigned on the basis of the following: Honors (*H*), Pass (*P*), Low Pass (*L*), and Fail (*F*). The Physician Assistant Program is designed to integrate classroom and clinical learning experiences considered necessary for competency as health care providers. Therefore, the failure of any required course prevents a student from continuing in the program. Also, a student can receive no more than a total of three grades of "Low Pass" in the twenty-seven required courses during the clinical and preclinical phases of the program. Determination of satisfactory academic progress is made by the PA faculty at the conclusion of each semester/term.

A grade of "Incomplete" (*I*) may remain on a student's transcript for one year only. After one year, a grade of "Incomplete" automatically is converted to an F (Fail). An extension to this one year limit may be granted by the program director; a request must be submitted in writing to the program director no later than thirty days prior to the expiration of the one year time limit.

Students in the Physician Assistant Program are participants in a professional training program whose graduates assume positions of high responsibility as providers of health care. Accordingly, students are evaluated not only on their academic and clinical skills, but also on their interpersonal skills, reliability, appearance, and professional conduct. Deficiencies in any of these areas are brought to the student's attention in the form of a written evaluation and may result in probation, suspension, or expulsion from the program.

**Satisfactory Academic Progress.** Satisfactory academic progress for students in the Physician Assistant Program is construed as the successful completion of all requirements necessary for the advancement from one semester to the next. These requirements are as follows:

*Preclinical Year:* Completion of all required courses (a total of 54 credits) during the fall, spring, and summer terms within the scheduled semester or term and within one year of initial matriculation.

*Clinical Year:* Completion of all required core rotations, elective rotations, and a final preceptorship (a total of 51 credits) during the fall, spring, and summer terms; these rotations begin in the semester immediately following the completion of the preclinical year and must proceed as scheduled without interruption for three semesters/terms (thirteen and one-half months).

In unusual circumstances (including illness, academic remediation or irregular sequencing of courses) the determination of satisfactory progress for academic purposes is made by the program director of the Physician Assistant Program.

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

**Attendance and Excused Absences.** Students are expected to attend all lectures, laboratories, and seminars. Absences are excused only for illness or personal emergency, and students must notify program faculty in advance of an expected absence.

**Leave of Absence.** A PA student, after presenting a written request to the PA program director, may be granted an official leave of absence for personal, medical, or academic reasons for a period not to exceed one calendar year. If the leave of absence is approved, the program director provides written notification including applicable beginning and ending dates to the student, the medical school registrar, and the director of financial aid. The student must apprise the program director in writing of his or her wish to return to the PA Program or to extend the personal leave at least sixty calendar days prior to the anticipated date of re-entry. The student desiring an extension beyond one calendar year may be required to apply for readmission to the PA Program. When a leave of absence is taken, the program director may require the student to repeat some or all of the courses completed prior to the leave of absence. In all cases of leave of absence, the student is required to complete the full curriculum to be eligible to earn the PA certificate.

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

**Prerequisites for Admission.** The prerequisites for admission to the MHS physician assistant curriculum include:

1. A baccalaureate degree from an accredited institution. College seniors are eligible to apply, provided they receive the baccalaureate degree prior to the August starting date for the PA Program. Those candidates who received their baccalaureate degrees from colleges and institutions outside of the United States must complete at least one year (30 semester credits) of additional undergraduate or graduate study at a U.S. college or university prior to application to the program.
2. At least 11 semester credits in the biological sciences, including at least 3 credits each in anatomy and physiology. Courses in human anatomy and human physiology are recommended. At least 8 semester credits in chemistry are also required. These courses must be completed with grades of "C" or better (not C minus). Courses in microbiology and statistics are recommended, and preference is given to candidates who have completed these courses.

Applicants from all academic disciplines are welcome, provided they meet the preparatory science course prerequisites.

3. Scores of the Graduate Record Examination (G.R.E. general test), taken within the last five years. No other test scores are accepted in lieu of the G.R.E.
4. A minimum of six months (1,000 hours) of patient care experience, with direct "hands-on" patient contact.

**Application Procedures.** Application materials are mailed to prospective applicants from June 1 through October 18 each year, and may be obtained by writing to: Admissions Coordinator, Physician Assistant Program, DUMC 3848, Duke University Medical Center, Durham, NC 27710, telephone: (919) 681-3155. Applications are accepted by the university no earlier than July 1 and no later than November 1 for the new class which enters in August each year. Applications must contain:

1. A completed official diskette application, including a nonrefundable application fee of \$55;
2. Official transcripts from all colleges/universities and other postsecondary institutions attended;
3. Scores of the Graduate Record Examination (G.R.E.). The G.R.E. must be taken in advance of the application deadline, and scores must be reported on the application;
4. Three letters of recommendation, including one from a health care provider with whom the applicant has worked.

All of the above are submitted by the applicant in one envelope, no later than November 1.

**Selection Factors.** The program has a specific interest in enrolling students from diverse social, ethnic, and educational backgrounds. Emphasis is placed upon personal maturity, quality of health care experience, dedication to the health field, and academic potential. Information submitted by each applicant is carefully reviewed by the Committee on Admissions and selected applicants are invited to Duke University for personal interviews. These interviews take place in January and February; forty-four students are chosen from among those interviewed. Only full-time students are admitted.

Candidates are notified of the admissions committee's decision as soon as possible after the interview, and no later than April 1. Those candidates who have been accepted are asked to respond in writing with their decision and to confirm their place in the class by submitting the nonrefundable registration and deposit fees by May 1. Each year, a ranked alternate list of 10-15 candidates is selected from those candidates who have been interviewed for a position in the class. Should an accepted candidate withdraw from the program prior to the start of classes, the position is offered to the highest ranked candidate on the alternate list.

**Tuition and Fees.** On notification of acceptance, prospective PA students are required to pay a nonrefundable first registration fee of \$55, as well as a nonrefundable program deposit of \$275. For those who do matriculate, the program deposit is applied to the cost of tuition.

Expenses for the 2000 entering class of the Master of Health Sciences Physician Assistant Program are as follows:

Tuition	\$420/credit (average annual tuition \$22,050 per year)
Books, uniforms, and instruments	1,750
Laptop computer rental fee	1,450
Internet Connection fee	200
Other fees (Student government, recreational, parking)	175
Food	4,170
First Year Fee (laboratory, etc.)	800

Lodging	5,124
Student Health Fee	690
Student Accident and Hospitalization Insurance	778 per year-single
Miscellaneous (travel, clothing, etc.)	4,180

**Health Insurance.** All students are required to carry full major medical health insurance throughout their enrollment in the PA program. If the student does not elect to take the Duke Student Accident and Hospitalization Insurance policy, evidence of other comparable health insurance coverage must be provided. The Student Health Fee is mandatory for all students.

**Financial Aid.** Qualified students may be eligible for Stafford Loans up to \$8,500, and up to \$19,100 in tuition loans. Physician Assistant 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.

The U.S. Public Health Service has several programs which offer scholarships, stipends, and loan repayment to PA students who commit to varying periods of employment within U.S.P.H.S. facilities. Interested applicants can call the National Health Service Program directly at 1-800-221-9393 for further information.

Applicants are encouraged 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.

Some first year students are employed part-time; however, the rigor of the academic curriculum may prevent the student from maintaining part-time employment. Because of the demands of the clinical year, it is difficult or impossible for the second-year student to work.

More detailed information regarding financial aid can be obtained from the Office of Financial Aid, Box 3067, Duke University Medical Center, Durham, NC 27710.

**Commencement.** To receive the MHS degree at the May commencement ceremony, the physician assistant student must successfully complete 89 credits including all pre-clinical courses, the research period, and all clinical rotations scheduled to that date. The PA program certificate of completion is awarded four months later in early September, following the student's completion of a total of 105 credits, the remaining clinical rotations, and the final preceptorship.

PA students should be aware that failure to begin or complete a clinical rotation as scheduled could delay receipt of both the MHS degree and the PA program's certificate of completion. Furthermore, any incomplete rotations must be completed prior to receiving the PA Program certificate.

## Courses of Instruction

Course credits are the recognized units for academic work in the PA Program. **All courses are required and no transfer credit is accepted.**

## Preclinical Year Courses

**PAP-200. Basic Medical Sciences.** The basic facts, concepts, and principles that are essential in understanding the fundamental mechanisms of human physiology, pathology, pharmacology, and nutrition. This course presents the basic methods of clinical problem solving and serves as a prerequisite to the clinical medicine course by empha-



sizing the underlying principles of the etiology, management, and prevention of disease processes. 5 credits. *Carter*

**PAP-205. Anatomy.** Functional and applied anatomy stressing normal surface landmarks and common clinical findings. Topics for this course are sequenced with physical diagnosis (PAP-215). Cadaver prosections, anatomic models, lectures, and computer software are utilized in teaching this course. 4 credits. *Hendrix*

**PAP-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*

**PAP-215. Physical Diagnosis.** An introduction to the techniques for performing and recording the physical examination. Taught in small-group format; lectures and audiovisuals are used, as well as extensive small group practice sessions. The final weeks of this course focus on orthopaedic physical diagnosis and common orthopedic problems. 3 credits. *Price*

**PAP-220, 221, 222. Clinical Medicine I, II, III.** The essentials of diagnosis and management of the most common clinical problems seen by primary care practitioners. Using an organ systems approach, clinical information is presented in conjunction with appropriate correlative lectures and labs in pathophysiology, pharmacotherapeutics, radiology, and nutrition. Patient simulations are used in the small group setting to enhance readings and lectures. This is a core course around which most other courses are organized. 20 credits. *Lord and Scott*

**PAP-230. Fundamentals of Surgery.** The basic surgical concepts needed for the PA to function in primary care settings as well as major surgical areas. The course emphasizes surgical technique and emergency procedures as well as asepsis, minor procedures, and anesthesia. The animal surgery laboratory is an essential component of this course. 5 credits. *Hendrix*

**PAP-235, 236. Patient Assessment I, II.** An introduction to medical interviewing and the recording and presentation of clinical information. Teaching methods include lectures, small groups, and clinical assignments to inpatient areas as well as outpatient settings. In January and February, students concentrate primarily on history-taking, and are assigned by their small-group instructors to interview patients on the wards. From March through May, students are assigned in small groups to fellows from the Department of Medicine. Weekly, each student is assigned to a hospitalized patient to perform a complete history and physical examination. 3 credits. *Dieter*

**PAP-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*

**PAP-245. Perspectives on Health.** A professional issues review. This course emphasizes current issues facing the profession, including legal and ethical problems and the unique place of PAs within the health care system. 2 credits. *Scott*

**PAP-250. Health Systems Organization.** An introduction to the structure and administrative principles in use in health care organizations. A lecture series taught by an interdisciplinary faculty and by community experts in health care organization. Topics include the patient as consumer, third-party payment, public policy trends, and organizational behavior. 2 credits. *Strand*

**PAP-255. Introduction to Research and Epidemiologic Principles.** Foundations of research methodology related to the study of disease distribution and issues in study design, data collection, and methods of analysis. The PA student develops a critical review of the literature pertaining to an assigned clinical research question. 3 credits. *Yankaskas*

## Clinical Year Courses

### COMMUNITY AND FAMILY MEDICINE

**PAP-300. Outpatient Medicine.** This eight-week rotation emphasizes the outpatient evaluation and treatment of conditions common at the community and family medicine level, and the appropriate health maintenance measures for different age groups. An alternative track in outpatient medicine is also available for those students who have a specific interest in interdisciplinary training. 8 credits. *Staff*

**PAP-305. Research Period.** During a four-week research period in the clinical year, the student attends weekly seminars and develops a written research protocol. This course is a practical application of principles learned in PAP-255. 3 credits. *Lief*

**PAP-310. Behavioral Medicine.** The student is assigned to a psychiatric and/or behavioral clinical setting, either inpatient or outpatient. This rotation facilitates the acquisition of communication and behavioral modification skills which are useful in the primary care setting. 4 credits. *Staff*

### MEDICINE

**PAP-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

**PAP-370. Obstetrics/Gynecology.** The student learns about common gynecological problems, pregnancy, and delivery. Assisting at operations may be a significant aspect of the rotation. The rotation emphasizes routine gynecological and prenatal care, clinical experience with cancer detection techniques, abnormal menstruation and bleeding, infections, and contraception counseling. 4 credits. *Staff*

### PEDIATRICS

**PAP-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

**PAP-340. General Surgery.** This rotation emphasizes preoperative evaluation and preparatory procedures, assisting at the operating table, and management of patients through the postoperative period to discharge. 4 or 8 credits (4 or 8 weeks). *Staff*

**PAP-350. Emergency/Outpatient Surgery.** This rotation stresses the evaluation and management of surgical problems of the ambulatory patient. In the emergency room, the student gains experience in the initial evaluation of potential surgical conditions and performing problem-specific examinations. Orthopedic evaluation and minor surgical technique are emphasized. There is also the opportunity to follow up patients on return visits. 4 credits. *Giggey*

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

PAP-301. Occupational Medicine

PAP-302. Geriatrics

## **MEDICINE**

- PAP-321. Cardiology
- PAP-322. Dermatology
- PAP-323. Endocrinology
- PAP-324. Emergency Medicine
- PAP-325. Hematology/Oncology
- PAP-326. Hyperbaric Medicine
- PAP-327. Infectious Diseases
- PAP-331. Nephrology
- PAP-332. Neurology
- PAP-333. Pulmonary Medicine
- PAP-334. Rheumatology
- PAP-335. AIDS Clinical Trials Unit
- PAP-336. Medical ICU
- PAP-337. Coronary Care Unit

## **OPHTHALMOLOGY**

- PAP-381. Ophthalmology

## **PEDIATRICS**

- PAP-361. Pediatric Cardiology
- PAP-362. Pediatric Surgery/Cardiothoracic Surgery
- PAP-363. Pediatric Hematology/Oncology
- PAP-364. Pediatric Allergy/Respiratory
- PAP-365. Pediatric Endocrinology
- PAP-366. Pediatric Infectious Disease
- PAP-367. Intensive Care Nursery

## **SURGERY**

- PAP-341. Cardiothoracic Surgery
- PAP-342. Otolaryngology
- PAP-343. Neurosurgery
- PAP-344. Orthopedics
- PAP-345. Plastic Surgery
- PAP-346. Sports Medicine
- PAP-347. Urology
- PAP-351. Emergency Medicine
- PAP-352. Trauma
- PAP-353. Adult Surgical ICU

Each of these electives is 4 credits. More detailed information on elective and required rotations may be obtained from the Director of Clinical Education of the Physician Assistant Program.

The final rotation in the PA program, immediately prior to receiving the program certificate of completion in September, is the preceptorship (PAP-390, 4 credits). This required rotation must be completed by all students. Students are encouraged to select a preceptor in the area of their anticipated employment and, during this period of time, to explore the tasks and team aspects of functioning as a mid-level practitioner.

## **Duke/ECU Master of Health Sciences Program**

In May, 1997 an affiliation agreement was established between the Duke University Medical Center and East Carolina University (ECU) School of Allied Health Sciences to

offer qualified students enrolled in the Physician Assistant Program of ECU the opportunity to earn the Master of Health Sciences Degree from Duke University. ECU students enrolled in this optional program must meet all academic and experiential prerequisites established for the ECU PA Program and possess a baccalaureate degree from an accredited institution at the time of their matriculation at ECU. GRE scores of 1500 or above and other eligibility criteria also apply for entrance to this optional program. In addition to ECU program requirements, the successful completion of three courses at Duke is required to earn the MHS degree. These are PAP 250, PAP 255, and PAP 305 described elsewhere in this Bulletin. Financial Aid is available for the Option Program students. Option students must meet all continuation requirements and remain in good academic standing at ECU throughout the program. For further information about this degree option program, contact the MHS Option Program, Physician Assistant Division, Department of Community and Family Medicine, DUMC 3848, Duke University Medical Center, Durham, NC 27710, 919-684-3872.

## *Allied Health Certificate Programs*



# Allied Health Certificate Programs

Duke University Medical Center has responded to the increased need for qualified individuals at all levels in the health care system by developing educational programs designed to equip people for a variety of positions. These programs, which vary in admission requirements and length of training, offer students both clinical and didactic experience. Graduates of these programs are awarded certificates.

Financial information is noted within each program's informational section. For all certificate programs, tuition is refunded according to the following schedule:

Withdrawal from Certificate Programs	Refund*
Before classes begin	full amount
During first week	80 %
After first week of classes	None

## Clinical Psychology Internship

Director of Clinical Training: Karen C. Wells, Ph.D.

The Division of Medical Psychology, Department of Psychiatry, Duke University Medical Center, offers internship training in clinical psychology to students who are currently enrolled in APA-approved Ph.D. programs in clinical psychology and who have already completed three years of graduate study. The program, approved by the American Psychological Association, provides experience in many contexts with a wide diversity of patients. Internship training provides experience in the traditional activities of clinical psychologists: assessment, consultation, treatment, and research.

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\* Includes involuntary withdrawal for academic reasons.

Those successfully completing the requirements for the internship are awarded a Duke University Medical Center certificate. Requests for additional information and correspondence concerning admission to the program should be directed to the Director, Clinical Psychology Internship Program, Box 3320, Duke University Medical Center, Durham, North Carolina 27710.

### **Ophthalmic Medical Technician**

Medical Director: W. Banks Anderson, M.D.

Program Director: Karen Summerville, C.O.M.T.

The Ophthalmic Medical Technician program is sponsored by the Department of Ophthalmology, Duke University Medical Center. This is a one-year certificate program designed to prepare the student to perform adequately as an ophthalmic medical technician. The program consists of didactic lectures designed to provide the basic clinical background necessary for the student to understand and perform the technical tasks designated to them by an ophthalmologist. The educational program begins July 1, and consists of fifty-two instructional weeks including twelve days of personal leave. The core curriculum is covered within the first three months supplemented by clinical experience under close supervision of clinical support staff and faculty. The following nine months consist of clinical rotations with the student working under the close supervision of qualified clinical support staff and faculty. Students are evaluated on a routine basis as their skills develop.

Upon satisfactory completion of the curriculum, students receive a certificate from Duke University Medical Center and are eligible to sit for the national certification examination offered by the Joint Commission of Allied Health Personnel in Ophthalmology at the level of ophthalmic medical technician.

**Prerequisites for Admission.** Applicants to the program must have two years of college or the equivalent. Priority is given to students with a college degree or extensive work experience in some field of ophthalmology.

**Application Procedures.** Applications are reviewed between January 1 and May 1 of the year for which admission is requested and must contain the following:

1. The completed Duke University Medical Center Allied Health application form, including a nonrefundable processing fee;
2. Official transcript(s) from all colleges and universities attended;
3. Three letters of recommendation; and
4. A personal interview with members of the admissions committee may be requested following receipt of the application and other information.

The deadline for applications is May 1 of the year for which admission is requested. It is strongly recommended that applications be submitted as early as possible. Applicants are notified no later than June 1 regarding admission to the program. 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.

**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.** It may be necessary for students to rotate at clinical sites other than at Duke University Medical Center and transportation may be necessary. It is the responsibility of the student to provide a means of transportation to and from the facility selected for learning experiences.

**Financial Aid.** For information, please contact the Financial Aid Office, Box 3067,

Duke University Medical Center, Durham, NC 27710.

**Courses of Instruction.** Students must satisfactorily complete the following courses. The curriculum includes but is not limited to the following:

<b>COURSE TITLE</b>	<b>CLOCK HOURS</b>
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
<b>Total</b>	<b>1574</b>

### **Pastoral Care and Counseling**

Associates in Instruction: Charla B. Littell, M.Div.; James L. Travis, Ph.D.

A graduate program in pastoral care and counseling is available to clergy, theological students, members of religious orders, and lay persons of all religious faith groups. There are five distinct program structures of Clinical Pastoral Education offered at Duke University Medical Center. All programs are designed to train individuals who desire to specialize in pastoral care, to enhance their skills as parish clergy, or to broaden their understanding of ministry. With the exception of the Parish-Based Extended Basic CPE Program, all who enroll in any of the programs of Clinical Pastoral Education are required to serve as chaplains in the Medical Center. All programs are accredited by the Association for Clinical Pastoral Education, Inc.

**Programs of Study.** One unit of Clinical Pastoral Education is offered in three forms: summer full-time CPE (June-August), hospital-based extended CPE, and parish-based extended CPE. The extended units are offered concurrently with the fall and spring semesters of Duke Divinity School. The year-long residency program (June-May) earns four progressing units of CPE. Supervisory CPE is designed for those seeking to be certified as a clinical pastoral education supervisor and is offered as available.

Requests for application and further information about any of the programs should be directed to the Director, Pastoral Services, Box 3112, Duke University Medical Center, Durham, North Carolina 27710. Admission procedures to each program include:

1. Completion and submission of written application materials;
2. An admission interview by a qualified interviewer;
3. Acceptance by the Duke University Medical Center CPE Center.

In addition to the above admission procedures, requirements for admission to specific CPE programs include:

1. Completion of a consultation process between a Duke University Medical



- Center CPE supervisor and a church board (Parish-Based Extended CPE);
2. Graduation from college and seminary (equivalences may be considered); and adequate ministry formation/development and experience in ministry which indicates readiness for this program (Residency CPE Program);
3. A personal interview with Duke University Medical Center faculty (Residency and Supervisory CPE);
4. Ecclesiastical endorsement; pastoral experience of usually not less than three years; completion of program objectives of ACPE; residency and consultation by the appropriate committee in the region with respect to his/her readiness to pursue supervisory training (Supervisory);
5. Submission of previous basic CPE unit(s) final evaluation by student and supervisor(s) (Residency and Supervisory CPE).

**Salary and Fees.** Stipends are available for students in the Residency Program and the Supervisory CPE Program. For 2000-2001, the salary for the Residency Program is \$22,000. For the Supervisory CPE Program the salary is \$22,750. There is no salary available for summer full-time and extended CPE units. Salaried students are eligible for the same benefit package as Duke University employees of comparable levels.

Tuition is \$425 per unit when enrolled through the Allied Health Division of Duke University Medical Center (\$325 for two or more consecutive units), and \$2,680 per unit when enrolled through Duke University Divinity School for academic credit. (A unit of CPE equals two academic courses.)

Fees include the following:

1. An application fee of \$30 must accompany an Allied Health form unless applying with intention of enrolling through Duke University Divinity School;
2. \$100 tuition deposit for those accepted into the year-long Residency Program;
3. \$50 tuition deposit for students accepted into the summer full-time and extended CPE programs;
4. \$55 per unit for mid-Atlantic region fee.

## Residency in Pharmacy Practice

Director, Pharmacy Practice Residency: D. Byron May, Pharm.D., B.C.P.S.  
 Director of Pharmacy Services: Steven C. Dedrick, M.S.

The Pharmacy Practice Residency is a twelve-month postgraduate program conducted by the Department of Pharmacy at the Duke University Medical Center. The residency is designed to give the graduate pharmacist extensive training in pharmacy practice.

**Admission Standards.** Applicants must be graduates of accredited schools of pharmacy and must have a Doctor of Pharmacy (Pharm.D.) degree. Residency candidates must demonstrate superior academic and leadership capabilities and be eligible for licensure in North Carolina. It is preferable that the applicant have previous hospital experience.

**Application Procedures.** Applications must be submitted by early January of the year for which admission is requested and include the following:

1. ASHP/National Matching Services resident matching program application code number;
2. Official transcript from pharmacy school and other professional programs attended;
3. Completed residency application forms; and
4. Letters of recommendation from a minimum of four persons who have known the applicant professionally at least two of which should be from clinical preceptors.

Applicants are notified in April regarding admission to the program. Requests for further information and application forms should be directed to D. Byron May, Pharm.D., B.C.P.S., Director for Residency Training, Box 3089, Duke University Medical Center, Durham, North Carolina 27710. E-mail: [byron.may@duke.edu](mailto:byron.may@duke.edu) or visit our website at: <http://pharmacy.mc.duke.edu>.

**Stipend.** A stipend of \$32,400 is granted for the twelve-month residency.

# *The Duke University School of Nursing Program*



## The Duke University School of Nursing

The Duke University School of Nursing provides leadership in the health care of people through education, research, and health care delivery. We provide advanced and comprehensive education to prepare students for a lifetime of learning and for careers as leaders, practitioners, or as researchers. In addition, faculty and students conduct research that adds to our understanding of health promotion and illness prevention, human responses to illness, and systems of care that facilitate better patient outcomes; and through their practice faculty and students provide compassionate research-based nursing care. Through such work, Duke faculty, students, and graduates are shaping the future of professional nursing practice.

### Programs

#### THE MASTER OF SCIENCE IN NURSING PROGRAM

The School of Nursing offers a flexible, 39 to 49 credit program leading to the Master of Science in Nursing degree. And, in conjunction with the Fuqua School of Business, a joint MSN-MBA degree is offered. Graduates are prepared as clinical nurse specialists in gerontology, oncology, pediatrics, or neonatal care; as adult nurse practitioners (with specialization in primary care, acute care, cardiovascular care, or oncology/ HIV); as gerontological nurse practitioners, family nurse practitioners, neonatal nurse practitioners, pediatric acute care nurse practitioners, or pediatric nurse practitioners; and as nurse managers and clinical research managers, and critical care nurse specialists. Graduates are also prepared as advanced practice nurses who will serve faith communities through the Health and Nursing Ministries Program, jointly held with the Duke School, of Divinity. Students pursue their educational endeavors with faculty and clinical/consulting associates who have expertise and research in the student's chosen area of specialization. The curriculum is designed to provide maximum flexibility for full-time or part-time study.

The integration of education, practice, and research undergirds the entire curriculum and the behavior of those individuals involved in the educative process. Upon completion of the program, the graduate is able to:

1. synthesize concepts and theories from nursing and related disciplines to form the basis for advanced practice,
2. demonstrate expertise in a defined area of advanced practice,
3. utilize the process of scientific inquiry to validate and refine knowledge relevant to nursing, demonstrate leadership and management strategies for advanced practice,
4. demonstrate proficiency in the use and management of advanced technology related to patient care and support systems,
5. analyze socio-cultural, ethical, economic, and political issues that influence patient outcomes,
6. demonstrate the ability to engage in collegial intra- and inter-disciplinary relationships in the conduct of advanced practice.

A student may choose to major in one of the following areas: (1) health systems leadership and outcomes (with the option of an informatics minor or as a combined MSN-MBA with the Fuqua School of Business); (2) clinical research management; (3) adult nurse practitioner (with primary care, acute care, cardiovascular, or oncology/HIV focus); (4) family nurse practitioner; (5) oncology/HIV clinical nurse specialist; (6) gerontology (nurse practitioner or clinical nurse specialist); (7) pediatrics (nurse practitioner or clinical nurse specialist); (8) pediatric acute care nurse practitioner; (9) neonatal (nurse practitioner or clinical nurse specialist); (10) critical care clinical nurse specialist; (11) leadership and community-based long-term care; and (12) health and nursing ministries.

## **THE POST-MASTER'S CERTIFICATE PROGRAM**

The School of Nursing offers a post-master's certificate to students who have earned an MSN from a National League for Nursing or Commission on Collegiate Nursing Education (accredited) program and are seeking specialized knowledge within a major offered in the School's master's program. The number of credits required to complete the certificate program varies by major; the student must successfully complete the required courses in the chosen nursing major. Completion of the certificate program is documented in the student's academic transcript. Depending upon the major, the student may then meet the qualifications for advanced practice certification in the specialty area. For example, students who complete the post-master's certificate in the nurse practitioner majors are eligible to sit for certification examinations.

## **Admission and Progression**

### **ADMISSION REQUIREMENTS FOR THE MASTER'S DEGREE**

1. Bachelor's degree with an upper division nursing major from a program accredited by the National League for Nursing (NLN) or the Commission on Collegiate Nursing Education (CCNE).
2. Completion of application for admission, including two copies of all post-secondary educational transcripts. The bachelor's or post-bachelor's course work must include satisfactory completion of a course in descriptive and inferential statistics.
3. It is recommended that applicants have a minimum of one year of nursing experience before matriculation. Students for whom an exception is made will be advised to take core courses in the first year of study and to work to meet the experience requirement.
4. Undergraduate grade point average of 3.0 on a 4.0 scale.
5. Satisfactory performance on the Graduate Record Examination (G.R.E.) or Miller Analogies Test (M.A.T.).
6. Licensure or eligibility for licensure as a professional nurse in North Carolina.\*
7. Three references attesting to personal and professional qualifications. At least two references must be from former employers, faculty members, or deans.
8. Personal interview. Other arrangements will be made when distance is a factor.
9. Basic computer skills are required prior to matriculation.

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\* Candidates for admission to the Master of Science of Nursing program of the Duke University School of Nursing must obtain a license to practice as a registered nurse in the state of North Carolina before matriculation. Offers of admission to the School of Nursing cannot be considered final until matriculants present proof of licensure to the Office of Admissions and Student Services no later than the end of the first day of class during the semester of matriculation. Students enrolled in the Graduate School of Nursing must maintain a current North Carolina license and are required to show proof of licensure, or status of renewal of license, to the Student Services Office on a yearly basis (January). Information on licensure procedures for the state of North Carolina may be obtained from the North Carolina Board of Nursing, P. O. Box 2129, Raleigh, North Carolina 27602, or by calling 919-782-3211 or 919-733-5356.

Selection will be based on the applicant's qualifications, intellectual curiosity, potential for professional growth, and contributions to the profession. Exception to any of the admission requirements will be considered on an individual basis.

### **ADMISSION REQUIREMENTS FOR THE POST-MASTER'S CERTIFICATE OPTION**

1. A master's degree from an NLN or CCNE accredited school of nursing.
2. Completion of application for the certificate program including undergraduate and graduate transcripts. The bachelor's or post-bachelor's course work must include satisfactory completion of a course in descriptive and inferential statistics.
3. Minimum of one year's experience in nursing.
4. Licensure or eligibility for licensure as a registered nurse in North Carolina.
5. Three letters of academic and/or professional reference.
6. Interview with a faculty member in the specialty area.

### **OFFICE OF ADMISSIONS AND STUDENT SERVICES CONTACT INFORMATION**

Prospective students wishing to obtain program information and admissions materials may contact the Director, Office of Admissions and Student Services, toll-free at 1-877-415-3853 or at 919-684-4258 or by email at [admission@son3.mc.duke.edu](mailto:admission@son3.mc.duke.edu). Information can also be accessed at the School of Nursing's web site at <http://son3.mc.duke.edu>.

### **HEALTH AND IMMUNIZATION RECORD**

North Carolina law requires that all new students present proof of selected immunizations before matriculation. The Duke University Student Health Immunization Form and Report of Medical History, furnished by Duke University, should be completed and returned to the Director of Student Health Services, Box 2899 DUMC, Duke University, Durham, North Carolina 27710 (919-684-3367).

Students should arrive on campus with complete, verified immunization forms. For those who are unable to do so, the Durham County Health Department (560-7600) on Main Street provides some of the necessary inoculations free of charge. On-campus inoculations are available through Student Health Services (684-3367). A special immunization clinic is held during the days when new students arrive on campus, with a nominal charge for on-campus immunizations.

### **ADDITIONAL ADMISSION REQUIREMENTS FOR INTERNATIONAL APPLICANTS**

Duke welcomes the unique cultural and personal perspectives of all people. International students are encouraged to apply early in the academic year prior to the year they wish to attend Duke to ensure time to complete the following additional requirements:

1. evidence of adequate financial support for the duration of the program;
2. a minimum score of 550 on the paper-based test or of 213 on the computer-based test on the Test of English as a Foreign Language (TOEFL) if English is not the primary language;
3. a passing score on the Commission on Graduates of Foreign Nursing Schools (CGFNS) examination.

The Commission on Graduates of Foreign Nursing Schools (CGFNS) examination is a prerequisite for taking the Registered Nurse Licensing examination in the state of North Carolina and for obtaining a nonimmigrant occupational preference visa (H1-A) from the United States Immigration and Naturalization Service. CGFNS offers a two-

part certification program that includes a credentials review followed by a test of nursing and English language skills. The CGFNS examination dates can be found at <http://www.cgfns.org>. Application materials may be requested from CGFNS, 3624 Market Street, Philadelphia, Pennsylvania 19014 (215-349-8767) or via the CGFNS web site. The registration deadlines for these exams are approximately four months prior to their administration. Early application is therefore essential.

TOEFL information can be obtained at P.O. Box 6151, Princeton, NJ (609-771-7100) or from the TOEFL web site at <http://www.toefl.org>.

## **ADMISSION PROCEDURE**

An applicant to the Duke University School of Nursing Graduate Program must obtain an application form from the School of Nursing Office of Admissions and Student Services. A check or money order for the nonrefundable processing fee of \$50 must accompany each application. In addition, the applicant should provide the following supporting documents:

1. two copies of the official transcript from each college or university attended, to be sent directly to the School of Nursing Office of Admissions and Student Services;
2. two supplementary transcripts showing completion of work that was in progress when the earlier transcripts were obtained, if necessary;
3. three letters of recommendation (on forms provided by the School of Nursing) by persons qualified to judge the applicant as a prospective graduate student, to be mailed directly to the Office of Admissions and Student Services (at least two must be from current or former employers, faculty members, or deans);
4. for master's degree applicants, scores from the Graduate Record Examination (G.R.E.) or Miller Analogies Test (M.A.T.) that are not more than five years old.

Testing dates and locations for the Graduate Record Examination can be obtained from most colleges or from the Educational Testing Service, P. O. Box 6000, Princeton, New Jersey 08541-6000 (609-771-7670 or 510-654-1200). Information for the Miller Analogies Test can be obtained from The Psychological Corporation, 555 Academic Court, San Antonio, Texas 78204-3956 (210-921-8801 or 800-622-3231). Information also may be obtained from Duke University's Office of Counseling and Psychological Services (C.A.P.S.) (919-660-1020). The number to use on the G.R.E. to indicate that you want a copy of your scores sent to the School of Nursing is R5173. The number to use on the M.A.T. is 2734.

Once all of the above information is received by the Office of Admissions and Student Services, a faculty member will contact the applicant and arrange a personal interview.

## **CONSIDERATION OF APPLICATION**

The application will be considered when all forms have been received by the School of Nursing Office of Admissions and Student Services. Complete applications to the Duke University School of Nursing Graduate Program must be submitted by the following dates:

- March 1 (Fall and Summer semesters);
- October 1 (Spring semester).

It is the responsibility of the applicant to ensure that the School of Nursing Office of Admissions and Student Services receives all required materials before the deadline.

## **NOTIFICATION OF STATUS**

Admission may be approved, deferred, or rejected. If admission is approved, the applicant will receive a letter of admission and acceptance forms. The process of admission is not complete until the acceptance forms and nonrefundable tuition deposit of

\$150 have been received by the School of Nursing Office of Admissions and Student Services. This fee will be credited toward tuition or forfeited if the student decides not to matriculate. Applicants whose admission is deferred or rejected will be notified by letter. Applicants who wish to be considered for financial assistance are highly encouraged to complete and submit a Free Application for Federal Student Aid as soon as possible before applying for admission. An application for the School of Nursing Merit Scholarship must also be submitted prior to the application deadlines. These forms are available at the Office of Admissions and Student Services at the School of Nursing.

### **FULL-TIME AND PART-TIME DEGREE STATUS**

Opportunities for part-time and full-time study are available. For on-campus students, full-time status is defined as taking a minimum of nine (9) credits or three (3) courses per semester, except when fewer credits are needed to complete program requirements. Students who wish to change from full-time or part-time status must notify both their academic advisor and the Office of Admissions and Student Services. Full-time status in distance based programs is defined as taking 18 credits per year.

### **NON-DEGREE STUDENTS**

An individual may take graduate level courses as a non-degree student, provided he or she has a bachelor's degree. Non-degree students are admitted to individual classes by permission of the instructor on a space available basis. To apply, an official copy of all nursing transcripts must be sent to the School of Nursing Office of Admissions and Student Services along with a completed Application for Admission as a non-degree student and a \$50 application fee. Students who register for clinical courses must also submit two letters of reference from their employer and evidence of licensure as a nurse in the state of North Carolina. All non-degree application requirements must be received by the deadline for the semester during which the course will be offered (cf. "Consideration of Application" for dates). Requests for non-degree status will be considered within two weeks after the appropriate deadline. If permission is granted by the faculty, the student will be notified by the Office of Admissions and Student Services. (Non-degree students requesting a second course make the request to the School of Nursing Office of Admissions and Student Services.). If the non-degree student is later admitted to the master's program a maximum of seven credits earned as a non-degree student will be accepted for credit towards the MSN degree.

### **TRANSFER OF GRADUATE CREDITS**

A maximum of six units of graduate credit may be transferred for graduate courses completed at other accredited institutions (or in other graduate programs at Duke). Transfer credit will be given only for academic work completed within the five years prior to matriculation at Duke. Such units are transferable only if the student has received a grade of *B* (3.0 or its equivalent) and after the student has earned a minimum of 6 units of graduate credit at Duke University School of Nursing. A student wishing to transfer course work should make a written request to his/her academic advisor and provide a syllabus or some other description of the course he/she wishes to have considered for transfer credit.

### **TRANSFER TO ANOTHER GRADUATE NURSING MAJOR**

A change of graduate nursing major may be made, contingent upon approval of the faculty involved. Should a change be made, a student must meet all requirements of the new major.

### **TIME FOR COMPLETION OF THE MASTER'S DEGREE**

The master's degree student should complete all requirements for the degree within five calendar years from the date of initial matriculation. No full-time residence is required; however, all students enrolled in the school who have not been granted a leave



of absence by the dean must register each fall, spring, and summer until all degree requirements are completed.

## **ADVISEMENT**

Upon admission to the program, each student is assigned an interim academic advisor. This advisor will direct the student's academic activities until the student selects a permanent academic advisor. The permanent academic advisor is selected following consultation with both the interim and proposed academic advisors, and in accordance with the student's clinical and research interests. The permanent academic advisor then assists the student in planning and implementing his/her course of study throughout the master's program.

## **GRADES**

All courses counting toward the master's degree must be taken for the following grades: *A* (4.0); *A-* (3.7); *B+* (3.3); *B* (3.0); *B-* (2.7); *C+* (2.3); *C* (2.0).

Master's degree students with a GPA of less than 2.7 after completing 20 credits will be asked to withdraw from the program. Post-master's certificate students with a GPA of less than 2.7 after completing 10 credits will be asked to withdraw from the program. An *F* (0.0) in any graduate level course will result in administrative withdrawal from the program at the end of the semester in which the grade is received.

In case of illness or other nonacademic problems, it is the student's responsibility to negotiate with the professor for an *I* (incomplete grade). In the case of an *I*, the professor issuing the *I* will specify the date by which the student is to remove the deficiency; in no case will this be more than one calendar year from the date the course ended.

## **WITHDRAWAL FROM A COURSE**

Students may make changes in their schedule during the two-week drop/add period at the beginning of each semester. A fee is charged by the university if changes are made after that period. If a student withdraws from a course after the drop/add period, the progress of the student at the time of withdrawal from the course will be indicated on the record as Withdrew Passing (*WP*) or Withdrew Failing (*WF*). A student who is failing a course may withdraw from the course no later than one (1) week prior to the last day of classes (if there is no final exam). A student who withdraws failing (*WF*) from more than one course will be administratively withdrawn from the program. In exceptional circumstances, the student may petition the dean to receive a Withdrew (*W*). Refunds of tuition and fees will not be made except as applicable within the established parameter of a total withdrawal from the program.

## **INTERRUPTION OF PROGRAM AND WITHDRAWAL FROM THE GRADUATE PROGRAM**

The School of Nursing reserves the right, and matriculation by the student is a concession of this right, to request the withdrawal of any student whose performance at any time is not satisfactory to the School of Nursing. If a student for any reason wishes to withdraw from the school, notification should be made to the dean before the expected date of withdrawal. Students who have withdrawn from the program must re-apply for admission according to regular admission policies.

Students who find it necessary to interrupt their program of study should request in writing a leave of absence addressed to the dean of the School of Nursing. A maximum of one calendar year's leave may be granted; this will be counted toward the total time allowed to complete the program.

## **COMMENCEMENT**

Graduation exercises are held once a year, in May, when degrees are conferred and diplomas issued to students who have completed all requirements. Students who complete degree requirements by the end of the fall or by the end of the summer term receive

diplomas dated December 30 or September 1, respectively. There is a delay in the mailing of September and December diplomas because diplomas cannot be issued until they are approved by the Academic Council and Board of Trustees. All graduates, including those receiving degrees in December and September, are expected to attend graduation exercises in May.

## Requirements for the Master's Degree

Each of the school's majors requires the completion of 39 to 49 units of credit. These units include core courses required of all master's students, the research option (a thesis, a research project, or a course in research utilization), courses in the major, and electives. Each major requires the student to complete a clinical residency.

<b>Required Core Courses<sup>1</sup></b>	<b>Credits</b>
N301. Population-Based Approaches to Health Care	3
N303. Health Services Program Planning and Outcomes Analysis	3
N307. Research Methods	3
N308. Applied Statistics	2
<b>Total</b>	<b>13</b>
<b>Research Options (Select One)<sup>1</sup></b>	<b>Credits</b>
N312. Research Utilization in Advanced Nursing Practice	3
N313. Thesis	6
N314. Non-thesis Option	6
<b>Total</b>	<b>3-6</b>
<b>Program Specific Elective</b>	

Students matriculating in the Fall of 2000 are no longer required to enroll in N302 as part of core course requirements for the Master of Science in Nursing. Students must consult with either their program director or individual academic advisor to learn the sequence of courses necessary for completion of their chosen major. In most cases, electives will replace N302 as part of the program requirements for completion of the degree in a specialty area.

## Major Fields of Study

### HEALTH SYSTEMS LEADERSHIP AND OUTCOMES

The Duke University School of Nursing is committed to creating health care leaders for the 21st century. The MSN program in Health Systems Leadership and Outcomes is founded upon strong core and research courses. This foundation is augmented by a series of industry specific courses in complex systems, organizational theory, strategic management, financial management, informatics, and outcomes analysis. Students also select a concentration area based upon individual professional interests and goals. For example, Duke offers an MSN minor and post-master's certificate in informatics. The minimum number of credits required for graduation is 39. Course work in the major includes the following:

<b>Health Systems Leadership And Outcomes</b>	<b>Credits</b>
N400. Organizational Theory for Integrated Health Care Delivery Systems	3
N401. Dynamics of Management	3
N402. Financial Management and Budget Planning	4
N419. Leadership Residency	4
Electives/Independent Study	9
<b>Total</b>	<b>23</b>

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<sup>1</sup>Required of all MSN candidates.

**TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION<sup>39-42</sup>****Informatics Option**

N410. Informatics Issues in Nursing Systems	3
N411. Nursing Informatics Theory and Application	3
N418. Nursing Informatics Residency	4-6
<b>Total</b>	<b>10-12</b>

**MSN – MBA Program**

The School of Nursing also offers, in conjunction with the Fuqua School of Business, a joint MSN/MBA degree. Course work for the joint MSN/MBA includes the following:

**Credits****YEAR 1 – Fall Semester**

N301. Population-Based Approaches to Health Care	3
N303. Health Services Program Planning and Outcomes Analysis	3
N400. Organizational Theory for Integrated Health Care Delivery Systems	3

**YEAR 1 – Spring Semester**

N307. Research Methods	3
N308. Applied Statistics	2
N401. Dynamics of Management	3

**YEAR 1 – Summer Semester**

N312. Research Utilization in Advanced Nursing Practice	3
N419. Leadership Residency	4

**Sub-Total****24****YEAR 2 – Fall Semester**

BA 390. LE I: Team Building and Leadership Development	2
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**Term 1:**

BA 300. Managerial Economics	3
BA 311. Probability and Statistics	3
BA 320. Managerial Effectiveness	3
BA 395. Individual Effectiveness	2

**Term 2:**

BA 340. Financial Accounting	3
BA 350. Global Financial Management	3
BA 360. Marketing Management	3
BA 396. Individual Effectiveness	2

**YEAR 2 – Spring Semester****Term 1:**

BA 312. Decision Models	3
BA 341. Managerial Accounting	3
BA 370. Operations Management	3
BA 397. Individual Effectiveness	2
BA 391. ILE II: <i>Competitive Business Strategy</i>	2

**Term 2:**

BA 301. Global Economic Environment of the Firm	3
BA 398. Individual Effectiveness	2
BA Elective	6

**YEAR 3 – Fall Semester**

ILE III: <i>Competitive Advantage Through People and Processes</i>	2
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**Term 1:**

BA Elective	6
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Term 2:	
BA Elective	6
<b>YEAR 3 – Spring Semester</b>	
Term 1:	
BA Elective	
<i>LE IV: Complex Management Problems: Age of Asia</i>	2
Term 2:	
BA Elective	5
<b>Total</b>	<b>69</b>
<b>TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION</b>	<b>93</b>

## CLINICAL RESEARCH MANAGEMENT PROGRAM

Duke University and Duke University Health Systems are internationally recognized for excellence in research, education and patient care. Graduates from the Clinical Research Management Program at Duke University will have an opportunity to access a world class learning environment and call on resources that are among the best in the nation. The Clinical Research Management Program integrates training from many disciplines to provide a solid program strong in business and financial practices, regulatory affairs, and research management with an emphasis in the management of clinical drug, biological, and device trials. Graduates of this program will be prepared to work in research in industry, service or academic settings. This program is intended to be flexible and conducive to the adult learner. Students will complete the core MSN courses plus four specialty courses in the major. The program will be rounded out by 3 electives from sciences, management, or other specialty courses. The capstone course, a 300-hour residency, places the student as a member of a project team working on a drug, biological, or device development project in industry, academia, or government. Seminars in the residency will address issues associated with transition to the role of clinical trial manager.

<b>Clinical Research Management Core Courses MSN</b>	<b>Credits</b>
N490. CRM: Trials Management	4
N491. CRM: Business and Financial Practices	4
N492. CRM: Regulatory Affairs	4
N499. CRM: Residency	4
Electives	10
<b>TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION</b>	<b>39</b>

## ADULT NURSE PRACTITIONER MAJORS: Acute Care, Adult, Family, and Gerontology

Nurse practitioner majors focus on developing the knowledge and skills necessary to provide primary and/or acute care across settings, including care of individuals in rural and under-served areas. The adult nurse practitioner majors include family, primary care, cardiovascular, oncology/HIV, and gerontology. Each of these majors requires specialty course work consistent with the clinical practice of the major. The general pattern includes two courses that are didactic or a combination of clinical and didactic, and a residency course that is the capstone course. All adult nurse practitioner majors have at least 600 hours of clinical experience, the minimum recommended by the National Organization of Nurse Practitioner Faculties (NONPF) and the AACN. The number of clinical hours varies by major: gerontology includes 600 hours, while majors that cover multiple age groups, such as the family nurse practitioner major, include 800 hours. As a capstone experience, all NP students are required to complete a final clinical

residency under the mentorship of an experienced clinician in their respective areas of expertise. The residency includes seminars that encourage the synthesis of clinical learning and the transition to the role of nurse practitioner in the major area of practice. The total minimum number of credits required for graduation varies by major. Course work in the major generally includes 16 credits of practitioner core courses and 11 to 13 additional credits including the residency in the major. The minimum number of credits for the NP is 43-48.

<b>Practitioner Core Courses</b>	<b>Credits</b>
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
<b>Total</b>	<b>16</b>
<b>Acute Care Nurse Practitioner</b>	
N442. Sexual and Reproductive Health	2
N450. Management of Critically Ill Adult Patients I	3
N451. Management of Critically Ill Adult Patients II	3
N458. Nurse Practitioner Residency: Adult Acute Care	3
<b>Total</b>	<b>11</b>
<b>Adult Nurse Practitioner – General Primary Care</b>	
N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Primary Care Clinical Elective	3
Elective	3
<b>Total</b>	<b>11</b>
<b>Adult Nurse Practitioner – Cardiovascular</b>	
N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Primary Care	2
N460. Advanced Management of Patients with Cardiovascular Diseases	3
N461. Care Management of Patients with Selected Cardiovascular Illnesses	3
N469. Nurse Practitioner Residency: Adult Cardiovascular	2
<b>Total</b>	<b>12</b>
<b>Adult Nurse Practitioner – Oncology/HIV</b>	
N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Primary Care	2
N470. Oncology/HIV AIDS Nursing I: Epidemiology and Pathophysiology	3
N471. Oncology/HIV AIDS Nursing II: Symptom and Problem Management	3
N479. Nurse Practitioner Residency: Adult Oncology/HIV AIDS	2
<b>Total</b>	<b>12</b>
<b>Family Nurse Practitioner</b>	
N440. Well Child Physical and Developmental Assessment for Family Nurse Practitioners	1
N441. Child Health in Family Care	4

N442. Sexual and Reproductive Health	4
N449. Nurse Practitioner Residency: Family	4
<b>Total</b>	<b>13</b>

#### **Gerontology Nurse Practitioner**

N442. Sexual and Reproductive Health	1
N480. Social Issues, Health, and Illness in the Aged Years	3
N481. Managing Care of the Frail Elderly	4
N489. Nurse Practitioner Residency: Gerontology	3
<b>Total</b>	<b>11</b>

**TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION 43-48**

### **NURSE PRACTITIONER: PEDIATRIC AND NEONATAL**

The neonatal and pediatric nurse practitioner majors prepare graduates as nurse practitioners in tertiary, secondary, primary, long-term, or home care settings for pediatric patients across the age and illness continuum. Emphasis is placed on family-centered culturally sensitive care. The Pediatric Nurse Practitioner, Pediatric Acute Care Nurse Practitioner and Neonatal Nurse Practitioner majors build on core specialty courses that include neonatal/pediatric pathophysiology, neonatal/pediatric pharmacology, and neonatal/pediatric physical assessment. Courses in the specialty address management of pediatric or neonatal patients within the framework of the patient's stage of growth and development. The specialty courses are supplemented by clinical hours which may include primary care pediatric clinics, pediatric intensive care, pediatric cardiology, neonatal/pediatric radiology, pediatric surgery, pediatric/ neonatal transport, neonatal intensive care, neonatal transitional care, pediatric and neonatal step-down units, pediatric rehabilitation, pediatric home care, and school based health clinics. The capstone course is the residency. Under the guidance of a mentor, students manage cohorts of patients in selected clinical facilities. Integral to the residency are seminars that address transition to the practitioner role, integration of clinical and didactic learning, and preparation for a position as a nurse practitioner. The total clinical hours required for graduation is 600 hours. This meets the requirements of the specialty organizations and qualifies the student to sit for certification examinations in the specialty.

<b>Practitioner Core Courses</b>	<b>Credits</b>
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
<b>Total</b>	<b>10</b>

#### **Pediatric Nurse Practitioner**

N322. Common Pediatric Management Issues I	4
N323. Common Pediatric Management Issues II	4
N430. Issues in Infant and Young Child Development	3
N431. Issues in School Age Child and Adolescent Development	3
N439. Nurse Practitioner Residency: Pediatrics	3
<b>Total</b>	<b>17</b>

#### **Pediatric Acute Care Nurse Practitioner**

N426. Managing Acute and Chronic Health Conditions in Children I	4
N427. Managing Acute and Chronic Health Conditions in Children II	4
N428. Nurse Practitioner Residency: Pediatric Acute Care	4
N430. Issues in Infant and Young Child Development	3
Elective	3
<b>Total</b>	<b>18</b>

**Neonatal Nurse Practitioner**

N420. Managing Acute and Chronic Health Conditions in the Newborn I	4
N421. Managing Acute and Chronic Health Conditions in the Newborn II	4
N423. Nurse Practitioner Residency: Neonatal	4-6
N430. Issues in Infant and Young Child Development	3
Electives	2-3
<b>Total</b>	<b>17-20</b>
<b>TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION 43-49</b>	

**CLINICAL NURSE SPECIALIST**

The clinical nurse specialist (CNS) major focuses on developing the knowledge and skills necessary to provide care to patients with complex health problems and their families; care is provided in a variety of settings. Course work includes core courses and 9 to 14 credits in the major. Elective credits are used to support the major. The three courses in the Clinical Nurse Specialist core are the same as the core courses for nurse practitioners: physical assessment, pharmacology, and pathophysiology. Clinical Nurse Specialist students take courses specific to their specialty areas. The number of courses and clinical hours vary by major; however, each major requires a residency as the capstone course. The minimum number of credits required for the master's degree for CNS students is 39-43.

<b>CNS – Gerontology</b>	<b>Credits</b>
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	1
N480. Social Issues, Health, and Illness in the Aged Years	3
N481. Managing Care of the Frail Elderly	4
<b>Total</b>	<b>24</b>

**CNS – Oncology/HIV**

N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N442. Sexual and Reproductive Health	2
N470. Oncology/HIV AIDS Nursing I: Epidemiology and Pathophysiology	3
N471. Oncology/HIV AIDS Nursing II: Symptom and Problem Management	3
N478. Clinical Nurse Specialist Residency: Oncology	3
Electives/Independent Study	2 - 4
<b>Total</b>	<b>23 - 25</b>

**CNS – Pediatrics**

N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N332. Diagnostic Reasoning and Physical Assessment in	

Advanced Nursing Practice	4
N430. Issues in Infant and Young Child Development	3
N431. Issues in School Age Child and Adolescent Development	3
N438. Clinical Nurse Specialist Practicum: Pediatrics	3
Electives/Independent Study	4
<b>Total</b>	<b>23</b>
<b>CNS – Neonatal</b>	
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N420. Managing Acute and Chronic Health Conditions in the Newborn I	4
N421. Managing Acute and Chronic Health Conditions in the Newborn II	4
N424. Clinical Nurse Specialist Residency: Neonatal	3
N430. Issues in Infant and Young Child Development	3
<b>Total</b>	<b>24</b>
<b>CNS – Critical Care Adult</b>	
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N442. Sexual and Reproductive Health	2
N450. Management of Critically Ill Adult Patients I	3
N451. Management of Critically Ill Adult Patients II	3
N457. Clinical Nurse Specialist Practice: Critical Care-Adult	3
Electives/Independent Study	5
<b>Total</b>	<b>26</b>
<b>TOTAL MINIMUM NUMBER OF CREDITS FOR GRADUATION</b>	<b>39-44</b>

## HEALTH AND NURSING MINISTRIES PROGRAM

### Master of Science in Nursing

The Master of Science in Nursing with a major in Health and Nursing Ministries is a two-year (full time) degree. It is designed to offer nurses significant advance nursing preparation as clinicians, clinical investigators and coordinators of health and nursing ministries while equipping them with a basic theological education offered by the Divinity School. Graduates of this program will be prepared to serve as parish nurses, health systems parish nurse coordinators, health systems care managers, and community health nurses. The degree requires the completion of forty-seven semester hours (or equivalents), including the summer field experience. The typical applicant for this degree will be an accomplished nurse with a desire and aptitude for advance nursing education that also understand the value of a basic core theological education. Coursework in the major includes the following:

	<b>Credits</b>
N301. Population-based approaches to Health Care	3
N303. Health Services Program Planning and Outcomes Analysis	3
N307. Research Methods	3
N308. Applied Statistics	2
N312. Research Utilization in Advance Nursing Practice	3



N332. Diagnostic Reasoning and Physical Assessment in Advance Nursing Practice	4
N500. Seminar in Parish Nursing I	1
N501. Seminar in Parish Nursing II	1
N502. Health Promotion and Disease Prevention.	3
N503. Health and Nursing Ministries Residency	3
N504. Seminar on Care at the End of Life: Suffering and Dying Well	3
N509. Seminar in Health and Nursing Ministries	3
CM Limited Elective	3
Divinity Elective	3
CT32. Christian Theology	3
CHE33. Christian Ethics	3
CHE 266 Ethics in Health Care	3
<b>Total</b>	<b>47</b>

### **Joint Master of Church Ministries/Master of Science in Nursing**

The MCM/MSN is a three-year (full time), joint degree program offered by the Divinity School and the School of Nursing for those students who desire both thorough preparation in advance nursing practice and a significant theological education. Graduates of this program will be well prepared to develop, implement, and coordinate comprehensive parish and community nursing programs. This program requires the completion of 56 semester hours, including 300 hours of clinical field experience. The typical applicant for this degree will be a nurse who sees the need for both advance clinical education and substantial theological preparation, interested in advancing the scope of parish nursing practice at a conceptual level. Applicants for this program must meet all requirements for admission to both the Divinity School and the School of Nursing. Courses required for this dual degree include:

	<b>Credits</b>
N301. Population-based approaches to Health Care	3
N303. Health Services Program Planning and Outcomes Analysis	3
N307. Research Methods	3
N308. Applied Statistics	2
N312. Research Utilization in Advance Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advance Nursing Practice	4
N500. Seminar in Parish Nursing I	1
N501. Seminar in Parish Nursing II	1
N502. Health Promotion and Disease Prevention.	3
N503. Health and Nursing Ministries Residency	3
N504. Seminar on Care at the End of Life: Suffering and Dying Well	3
N509. Seminar in Health and Nursing Ministries	3
CT32. Christian Theology	3
CHE33. Christian Ethics	3
OT11. Introduction to the Old Testament	3
NT18. Introduction to the New Testament	3
CH13. Early and Medieval Christianity	3
CH14. Modern European Christianity	3
CHE266. Ethics and Heath Care	3
CM Limited Elective	3
<b>Total</b>	<b>56</b>

### **Leadership in Community-based Long-term Care**

The Duke School of Nursing houses an innovative program in gerontology administration called *Leadership In Community Based Long Term Care*. This program offers students the opportunity to combine study in management, gerontology, and informatics science. Graduates will be prepared to assume clinical nursing and managerial positions in corporate, community and hospital long-term care facilities. The curriculum builds on four distinct components: foundations of advanced practice, gerontology, management, and information science. The program culminates in a mentor-guided residency that will allow students to synthesize knowledge and skills learned. Required courses for this major include:

	Credits
N301. Population-based Approaches to Healthcare	3
N303. Health Services Program Planning	3
N307. Research Methods	3
N308. Applied Statistics	2
N340. Organizational Theory for Integrated Systems	3
N344. Dynamics of Management	3
N348. Financial Management and Budget Planning	4
N370. Social Issues, Health and Illness in the Aged Years	3
N376. Managing Care of the Frail Elderly	4
N403. Synthesis of Clinical and Management Decision Making	4
N345. Leadership Residency	4
Research Options (Select One)	
N312. Research Utilization	3
N313 Thesis	6
N314. Non-Thesis Research Project	6
<b>Total</b>	<b>51</b>

## POST-MASTER'S CERTIFICATE PROGRAMS

The purpose of the post master's certificate program is to provide opportunities for students who already have an MSN degree to gain specialized knowledge within a major provided at Duke University School of Nursing. The post MSN certificate represents the student's successful completion of the required courses in the chosen nursing major. Course requirements for the post MSN certificate are listed below.

HEALTH SYSTEMS LEADERSHIP AND OUTCOMES	Credits
N400. Organizational Theory for Integrated Health Care Delivery Systems	3
N401. Dynamics of Management	3
N402. Financial Management and Budget Planning	4
N419. Leadership Residency	4
<b>Total</b>	<b>14</b>
INFORMATICS	
N410. Informatics Issues in Nursing Systems	3
N411. Nursing Informatics Theory and Application	3
N418. Nursing Informatics Residency	4-6
<b>Total</b>	<b>10-12</b>
CLINICAL RESEARCH MANAGEMENT PROGRAM	
N490. CRM: Trials Management	4
N491. CRM: Business and Financial Practices	4
N492. CRM: Regulatory Affairs	4
N499. CRM: Residency	4
<b>Total</b>	<b>16</b>
ACUTE CARE NURSE PRACTITIONER	

N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	2
N450. Management of Critically Ill Adult Patients I	3
N451. Management of Critically Ill Adult Patients II	3
N458. Nurse Practitioner Residency: Adult Acute Care	3
<b>Total</b>	<b>27</b>
<b>ADULT NURSE PRACTITIONER – GENERAL PRIMARY CARE</b>	
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Primary Care Clinical Elective	3
Elective	3
<b>Total</b>	<b>27</b>
<b>ADULT NURSE PRACTITIONER – CARDIOVASCULAR</b>	
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Primary Care	2
N460. Advanced Management of Patients with Cardiovascular Diseases	3
N461. Care Management of Patients with Selected Cardiovascular Illnesses	3
N469. Nurse Practitioner Residency: Adult Cardiovascular	2
<b>Total</b>	<b>28</b>
<b>FAMILY NURSE PRACTITIONER</b>	
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N440. Well Child Physical and Developmental Assessment for Family Nurse Practitioners	1

N441. Child Health in Family Care	4
N442. Sexual and Reproductive Health	4
N449. Nurse Practitioner Residency: Family	4
<b>Total</b>	<b>29</b>
<b>GERONTOLOGICAL NURSING</b>	
Clinical Nurse Specialist	
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproduction Health	1
N480. Social Issues, Health, and Illness in the Aged Years	3
N481. Managing Care of the Frail Elderly	4
<b>Total</b>	<b>24</b>
<b>Nurse Practitioner</b>	
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3
N442. Sexual and Reproductive Health	1
N480. Social Issues, Health, and Illness in the Aged Years	3
N481. Managing Care of the Frail Elderly	4
N489. Nurse Practitioner Residency: Gerontology	3
<b>Total</b>	<b>27</b>
<b>ONCOLOGY/HIV NURSING</b>	
Clinical Nurse Specialist	
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N470. Oncology/HIV AIDS Nursing I: Epidemiology and Pathophysiology	3
N471. Oncology/HIV AIDS Nursing II: Symptom and Problem Management	3
N478. Clinical Nurse Specialist Residency: Oncology	3
<b>Total</b>	<b>19</b>
<b>Adult Nurse Practitioner – Oncology/HIV</b>	
N330. Selected Topics in Advanced Pathophysiology	3
N331. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N333. Managing Common Acute and Chronic Health Problems I	3
N334. Managing Common Acute and Chronic Health Problems II	3

N442. Sexual and Reproductive Health	2
N459. Nurse Practitioner Residency: Adult Primary Care	2
N470. Oncology/HIV AIDS Nursing I: Epidemiology and Pathophysiology	3
N471. Oncology/HIV AIDS Nursing II: Symptom and Problem Management	3
N479. Nurse Practitioner Residency: Adult Oncology/HIV AIDS	2
<b>Total</b>	<b>28</b>
<b>NEONATAL NURSING</b>	
Clinical Nurse Specialist	
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N420. Managing Acute and Chronic Health Conditions in the Newborn I	4
N421. Managing Acute and Chronic Health Conditions in the Newborn II	4
N424. Clinical Nurse Specialist Residency: Neonatal	3
N430. Issues in Infant and Young Child Development	3
<b>Total</b>	<b>24</b>
<b>Nurse Practitioner</b>	
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N420. Managing Acute and Chronic Health Conditions in the Newborn I	4
N421. Managing Acute and Chronic Health Conditions in the Newborn II	4
N423. Nurse Practitioner Residency: Neonatal	4-6
N430. Issues in Infant and Young Child Development	3
<b>Total</b>	<b>25-27</b>
<b>PEDIATRIC NURSING</b>	
<b>Clinical Nurse Specialist</b>	
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N430. Issues in Infant and Young Child Development	3
N431. Issues in School Age Child and Adolescent Development	3
N438. Clinical Nurse Specialist Practicum: Pediatrics	3
<b>Total</b>	<b>19</b>
<b>Pediatric Nurse Practitioner</b>	
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N322. Common Pediatric Management Issues I	4
N323. Common Pediatric Management Issues II	4
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N430. Issues in Infant and Young Child Development	3

N431. Issues in School Age Child and Adolescent Development	3
N439. Nurse Practitioner Residency: Pediatrics	3
<b>Total</b>	<b>27</b>
<b>PEDIATRIC ACUTE CARE NURSE PRACTITIONER</b>	
N320. Neonatal and Pediatric Pathophysiology	3
N321. Neonatal and Pediatric Pharmacology	3
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N426. Managing Acute and Chronic Health Conditions in Children I	4
N427. Managing Acute and Chronic Health Conditions in Children II	4
N428. Nurse Practitioner Residency: Pediatric Acute Care	4
N430. Issues in Infant and Young Child Development	3
Elective	3
<b>Total</b>	<b>28</b>
<b>HEALTH AND NURSING MINISTRIES</b>	
N332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N500. Parish Nursing I	1
N501. Parish Nursing II	1
N502. Health Promotion and Disease Prevention	3
N503. Clinical Field Experience	3
N504. Seminar on Care at the End of Life: Suffering and Dying Well	3
N509. Seminar in Health and Nursing Ministries	3
CT32. Christian Theology	3
CHE33. Christian Ethics	3
Divinity Electives	6
<b>Total</b>	<b>30</b>

## Courses of Instruction

**301. Population-Based Approaches to Health Care.** Provides an overview of population-based approaches to assessment and evaluation of health needs. Selected theories are the foundation for using scientific evidence for the management of population-based care. Enables the health care professional to make judgements about services or approaches in prevention, early detection and intervention, correction or prevention of deterioration, and the provision of palliative care. Fall, summer. Instructor: Staff. Three credits.

**302. Nursing Informatics.** An introduction to computer technology in health care with a focus on computer applications commonly used in managing health care information. The effects of automated data management on nursing administration, educa-

tion, practice, and research are addressed in the context of information systems and nursing informatics. Fall, spring, summer. Instructor: Hewitt. Two credits.

**303. Health Services Program Planning and Outcomes Analysis.** An analysis of theory and practice in the design implementation and evaluation of the outcomes of health services programs within an integrated health care system. From a health services planning paradigm, students conduct organizational and community needs assessments, determine priorities, plan and monitor implementation, manage change, evaluate outcomes, and provide planning reports. Spring, summer. Prerequisite: Nursing 307. Instructor: Anderson. Three credits.

**307. Research Methods.** Focuses on research methods needed for systematic investigation and expansion of nursing knowledge. Critical appraisal of research and development of a research proposal are covered. Fall, spring. Instructor: Turner. Three credits.

**308. Applied Statistics.** Emphasizes the application and interpretation of statistical procedures used in health care and nursing research. Data management and the relationship between research design and statistical techniques are also studied. Spring, fall. Prerequisite or concurrent: Nursing 307 or consent of instructor. Instructors: Champagne, Coombs, and McConnell. Two credits.

**312. Research Utilization in Advanced Nursing Practice.** Focuses on methods of implementing research findings to solve identified clinical problems. Students develop skill in creating and writing research-based protocols and in using research methods to evaluate nursing care. Summer. Prerequisite: Nursing 302, 307, and 308, or consent of instructor. Instructor: Staff. Three credits.

**313. Thesis.** 1 to 6 credits. Fall, spring, summer. Instructor: Staff. Variable credit.

**314. Nonthesis Option.** 1 to 6 credits. Fall, spring, summer. Instructor: Staff. Variable credit.

**315. Directed Research.** Working on active research protocols under the guidance of a faculty member, students gain experience and skills in study design, implementation, and/or analysis. Human and animal use issues in research are explored throughout the experience. Course may be repeated for up to 6 units. If taken in lieu of Nursing 312, 313, or 314, a minimum of 3 units is required for graduation. Consent of instructor required. Prerequisites: Nursing 307 and 308 recommended but not required as pre/co-requisites. Instructor: Staff. Variable credit.

**320. Neonatal and Pediatric Pathophysiology.** Focuses on advanced pathophysiologic knowledge as a basis for understanding alterations in biologic processes in the developing organ systems of neonatal and pediatric patients. With this foundation, students learn to differentiate normal from abnormal findings in patients from birth through eighteen years. Instructors: Bradshaw and Turner. Three credits.

**321. Neonatal and Pediatric Pharmacology.** Focuses on principles of pharmacologic management of pediatric patients with various conditions. Data collection and diagnostic reasoning are emphasized in relation to drug selection, delivery, monitoring, and evaluation of pharmacologic interventions. Family education is incorporated. Spring. Instructors: Bradshaw, Miller-Bell, and Turner. Three credits.

**322. Common Pediatric Management Issues I.** Focus on comprehensive assessment and management of selected pediatric primary care problems. Includes information on acute and chronic illnesses, health maintenance issues, and recognition of circumstances that require interdisciplinary collaboration or referral within the areas of dermatology, ophthalmology, otolaryngology, cardiac, pulmonary, immunology, rheumatology, gastrointestinal, and urology. Integration of pathophysiology and the pharmacological management of common problems. Emphasis on advanced practice role development in care management discussions and supervised clinical practice. Clinical practice opportunities in a variety of settings are arranged with the course instructor.

Spring. 104 clinical hours. Prerequisites: Nursing 330, 331 (331 may be taken concurrently), and 332. Instructors: Lorimer and Pounds. Four credits.

**323. Common Pediatric Management Issues II.** Focus on comprehensive assessment and management of selected pediatric primary care problems. Includes information on acute and chronic illnesses, health maintenance issues, and recognition of circumstances that require interdisciplinary collaboration or referral within the areas of hematology, gynecology, neoplastic disorders, endocrinology, musculoskeletal disorders, neurology, emergency care, and HIV/AIDS. Integration of pathophysiology and the pharmacological management of common problems. Emphasis on advanced practice role development in care management discussions and supervised clinical practice. Clinical practice opportunities in a variety of settings are arranged with the instructor. Summer. 104 clinical hours. Prerequisites: Nursing 322, 330, 331, and 332. Instructors: Lorimer and Pounds. Four credits.

**330. Selected Topics in Advanced Pathophysiology.** Focuses on developing advanced pathophysiological knowledge sufficient for understanding alterations in biological processes that affect the body's dynamic equilibrium or homeostasis. With this knowledge, students learn to differentiate normal from abnormal physiological function and to consider the causality of pathophysiological alterations in illness. Topics covered include the pathophysiology of common health problems and complex physiological alterations encountered in advanced clinical practice. Fall. Instructor: Staff. Three credits.

**331. Clinical Pharmacology and Interventions for Advanced Nursing Practice.** Combines lecture and case analyses to increase skills in assessment and pharmacological management of patients with a variety of common acute and chronic health problems. Data collection and diagnostic reasoning are emphasized in relation to drug selection, patient/family education, monitoring, and evaluation of pharmacological interventions. Spring. Instructor: Staff. Three credits.

**332. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice.** Combines lecture and laboratory experiences to develop advanced skills in assessment of physical, cognitive, nutritional, cultural, and functional domains. Practitioner-patient interactions, data collection, diagnostic reasoning, and oral and written presentation of data are emphasized. Consent of instructor required. Fall. Instructors: Ouimette and staff. Four credits.

**333. Managing Common Acute and Chronic Health Problems I.** Emphasizes assisting adult patients to reach or maintain the highest level of health and functioning, with a focus on health promotion, health maintenance, and primary care management of common acute or chronic respiratory, cardiac, genitourinary, endocrine, dermatological, and musculoskeletal problems encountered by patients and families. Pharmacological management is systematically integrated. Clinical practice is in a variety of primary care settings including public and private internal and family medicine practices and community health clinics. Advanced practice role development is examined in seminars and supervised clinical practice. Spring. 104 clinical hours. Prerequisites: Nursing 330 and 332; prerequisite or concurrent: Nursing 331. Instructors: Adinolfi, Brown, Denman, Friedman, Ouimette, Price, and staff. Three credits.

**334. Managing Common Acute and Chronic Health Problems II.** Emphasizes assisting adult patients to reach or maintain the highest level of health and functioning, with a focus on primary care management of common acute or chronic respiratory, cardiac, gastrointestinal, musculoskeletal, neurological, and mental health problems encountered by patients and families. Pharmacological management is systematically integrated. Clinical practice is in a variety of primary care settings including public and private internal and family medicine practices and community health clinics. Advanced practice role development is examined in seminars and supervised clinical practice.



Summer. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, and 333. Instructors: Adinolfi, Brown, Denman, Friedman, Ouimette, Price, and staff. Three credits.

**336. Pediatric Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice.** Combines lecture and laboratory experiences to develop advanced skills in assessment of physical, cognitive, nutritional, cultural, and functional domains of pediatric patients ranging in age from newborn to adolescent. Practitioner-patient interactions, data collection, diagnostic reasoning, and oral and written presentation of data are emphasized. Consent of instructor required. Fall. Instructors: Bradshaw and Lorimer. Four credits.

**351. Scientific Writing.** This course provides a review of the principles and practice of scientific writing, with emphasis on research proposals, theses, other scientific papers, and articles for publication. Students are expected to complete a proposal for a thesis or a nonthesis option, an article, or other scientific work as part of the course. Fall. Instructor: Tornquist. Three credits.

**353. Advanced Physiology.** Focuses on developing advanced knowledge for understanding normal human physiological phenomena with an emphasis on cellular and molecular mechanisms of homeostasis. Summer. Prerequisite: Bachelor of Science in Nursing or consent of instructor. Instructor: Staff. Three credits.

**355. Concepts of Teaching and Learning.** Focuses on the key concepts and principles that form the bases for the teaching and learning process. Educational theories of teaching and learning, and real-life situations and issues serve as the framework for developing instructional strategies used in advanced nursing practice roles. Spring, summer. Instructor: Staff. Three credits.

**356. Ethics in Nursing.** Focuses on the historical development of ethics in nursing, analysis of moral language, codes of ethics, frameworks for ethical decision making with case analysis, and strategies for discussion of ethics in nursing. Summer. Instructor: Staff. Three credits.

**357. Physiological Monitoring.** Provides an in-depth understanding of selected invasive and noninvasive physiologic monitors used in clinical settings. Emphasis is placed on monitors used in intensive care. Content on the reliability, validity, sensitivity, stability, drift, and artifacts with respect to mechanisms of measurement assists students to interpret output. Highly recommended for students in acute care majors. Summer. Instructor: Turner. Two credits.

**358. Genetics, Embryology, and Fetal Development.** This course is designed to give the neonatal nurse practitioner student knowledge and understanding of genetic and fetal development. Particular emphasis is placed on patterns of inheritance, multifactorial influences on fetal development, the interrelationship of genetics and patterns of fetal development. Societal issues arising from gene research/alteration/replacement will be incorporated using Duke University's pioneering research in this area. Instructor: Staff. Two credits.

**359. Selected Topics or Independent Study.** Students select a topic of professional interest within the specialty area or in support of the specialty area, to be studied with a faculty member. Specific objectives, evaluation method, and other requirements are determined prior to registering for the course of study. Consent of instructor required. 1 to 3 credits. Fall, spring, summer. Prerequisite: matriculation into nursing curriculum. Instructor: Staff. Variable credit.

**400. Organizational Theory for Integrated Health Care Delivery Systems.** Focuses on organizational behavior theory and research as the foundation for managerial and leadership interventions in integrated health care systems. Students learn how patient care system behaviors, structures, processes, and outcomes are affected by the actions of health system leaders. Fall. Instructor: Allred. Three credits.

**401. Dynamics of Management.** An in-depth analysis of organizational behavior and management practices within integrated health care systems. Students identify is-

sues, formulate questions, and pursue managerial interventions that will result in high quality patient care and organizational outcomes that are socially relevant and clinically cost-effective. Spring. Prerequisite: Nursing 400 or consent of instructor. Instructors: Allred and Anderson. Three credits.

**402. Financial Management and Budget Planning.** Designed for managers in complex organizations. Focuses on the knowledge and skills needed by the manager to plan, monitor, and evaluate budget and fiscal affairs for a defined unit or clinical division. Health care economics, personnel, and patient activities are analyzed from a budgetary and financial management perspective in an environment of regulations and market competition. Spring. Prerequisite: Nursing 303 suggested. Instructor: Zelman. Four credits.

**403. Synthesis of Clinical and Management Decision Making.** This course prepares health care leaders to be informed decision-makers. Students use information-processing techniques to synthesize the theoretical and practical components of strategic management and clinical gerontology. Using various organizational information systems, students will analyze administrative and clinical problems common in health care settings and design system level managerial and clinical interventions to resolve these problems. The course includes classroom, computer laboratory, and clinical leadership experiences. Prerequisite: Nursing 400, 401, 402, 480, 481 (may be taken concurrently), OR by consent of instructor. Instructor: Anderson. Four credits.

**407. Leadership for Ethical Decision Making in Health Care.** Applied ethical principles and decision-making models to complex healthcare organizations and administrative structures. Course content assists students to understand the relationships between the current state of patient care, organizational and administrative functions, and the complex issues involved in health care leadership. Research, ethical, social, cultural, economic, privacy/confidentiality, professional standards, and legal issues are discussed. Consent of instructor required. Summer. Instructor: Goodwin. Three credits.

**408. New Ventures in Health Care.** Focuses on imparting personal, organizational, and/or economic value to an idea in the current health care environment. The conditions and actions necessary for successful entrepreneurial and/or intrapreneurial endeavors in a managed care environment will be examined. Consent of instructor required. Summer. Prerequisite: demonstrated computer competency. Instructor: Allred. Three credits.

**410. Informatics Issues in Nursing Systems.** Focuses on the field of "nursing informatics" which combines nursing science, computer science, and information/decision science. Students examine issues in applying nursing informatics in complex health care organizations and administrative structures and master problem-solving skills on selected issues. Research, ethical, social, cultural, economic, privacy/confidentiality, and legal issues are included. Consent of instructor required. Summer. Prerequisites: Nursing 302 and 303. Instructor: Goodwin. Three credits.

**411. Nursing Informatics Theory and Application.** Focuses on nursing informatics and examines both theoretical and practical issues for nursing. Students develop theoretical knowledge and technology skills through laboratory application of didactic content and a real world project involving systems analysis, information specification, and project management. Consent of instructor required. Fall. Prerequisites: Nursing 302, 303, and 410. Instructor: Goodwin. Three credits.

**418. Nursing Informatics Residency.** Builds the student's knowledge and experience in nursing informatics within the context of advanced nursing practice. Students develop independent problem-solving skills in the synthesis of advanced practice nursing and informatics under the guidance and mentorship of a practicing informatics specialist (preceptor). Consent of instructor required. 3 to 9 credits. Spring. Minimum 156 residency hours. Prerequisites: Nursing 410 and 411. Instructor: Goodwin. Variable

credit.

**419. Leadership Residency.** Provides the student an opportunity to develop beginning competence in the role of nurse manager/administrator/executive under the guidance of a preceptor. Emphasis on incorporation of clinical and business skills into the role of health systems leader in an integrated health care delivery system. Students make a comprehensive assessment of the organizational setting and design strategies for agenda setting, network building, problem resolution, and outcome attainment. Experiential learning is emphasized. Summer. Requires 156 residency hours. Prerequisites: Nursing 301, 302, 303, 307, 308, 400, 401, 402, and/or consent of instructor. Instructor: Allred. Four credits.

**420. Managing Acute and Chronic Health Conditions in the Newborn I.** Comprehensive assessment and management of the newborn from birth through hospitalization and discharge. Course content includes anatomical, pathophysiological, and pharmacological management of the newborn with a focus on high-risk delivery, transport, and cardiorespiratory alterations. Integration of the newborn into the family is an overarching theme. Clinical practice opportunities in a variety of settings. Spring. 104 clinical hours. Prerequisite: Nursing 332. Instructors: Bozzette, Bradshaw, and Turner. Four credits.

**421. Managing Acute and Chronic Health Conditions in the Newborn II.** Comprehensive assessment and management of the newborn infant during hospitalization. Course includes anatomical, pathophysiological, and pharmacological management of the newborn with varying conditions. Advanced practice role development is emphasized. Clinical practice opportunities in a variety of settings. Summer. 104 clinical hours. Prerequisite: Nursing 420. Instructors: Bozzette, Bradshaw, and Turner. Four credits.

**423. Nurse Practitioner Residency: Neonatal.** Focuses on the synthesis of theory and clinical management skills for the neonatal nurse practitioner within a collaborative model of practice in Level I, II, and III newborn units as well as follow-up clinics and transport. 4 to 6 credits. Fall, spring, summer. 400 to 600 residency hours. Prerequisites: Nursing 320, 321, 332, 420, 421, and 430. Instructors: Bozzette and Turner. Variable credit.

**424. Clinical Nurse Specialist Residency: Neonatal.** Focuses on the synthesis of theory and clinical skills for the clinical nurse specialist within a collaborative practice. Emphasis is placed on education, consultation, research, and clinical practice. 1 to 3 credits. Summer. 100 to 300 residency hours. Prerequisites: Nursing 320, 321, 332, 420, 421, and 430. Instructors: Bozzette and Turner. Variable credit.

**426. Managing Acute and Chronic Health Conditions in Children I.** Focuses on the pathophysiological mechanisms, clinical decision making, and treatment modalities in managing health problems seen in acutely, intensively, and chronically ill pediatric patients in the hospital, home, or long-term care facility. Integration of the family into the health care plan is an overarching theme. Primary care issues such as immunization and minor illness and health promotion are emphasized. Students have clinical rotations in a variety of settings. Fall. 104 clinical hours. Prerequisites: Nursing 320, 321, and 332. Instructors: Cameron and staff. Four credits.

**427. Managing Acute and Chronic Health Conditions in Children II.** Addresses the complex management issues with critically, chronically, and acutely ill children cared for in hospitals, the home, or long-term facilities. Complex technology used in the management of pediatric patients is integrated into the course. The role of the family in the child's illness and developmentally appropriate care are emphasized. Spring. 104 clinical hours. Prerequisites: Nursing 320, 321, and 332. Instructors: Cameron and staff. Four credits.

**428. Nurse Practitioner Residency: Pediatric Acute Care.** Provides the students an opportunity to synthesize theory and clinical management skills in the management of

acutely and intensively ill pediatric patients in a collaborative model of practice. Residency sites and preceptors are individually arranged based on the needs of the students and availability of clinical sites. The emerging role of nurse practitioners in tertiary care settings is discussed. Consent of instructor required. 2 to 4 credits. Fall, spring, summer. 200 to 400 residency hours. Prerequisites Nursing 320, 321, 332, 426, 427, and 430. Instructor: Cameron. Variable credit.

**430. Issues in Infant and Young Child Development.** The discussion of important issues related to health maintenance and of complex medical and social problems in the first five years of life. Normal cognitive, motor, social/emotional, and language development, and the usual developmental challenges of each age group are addressed. Spring. Prerequisite: Nursing 332 or consent of instructor. Instructor: Blood-Siegfried. Three credits.

**431. Issues in School Age Child and Adolescent Development.** The discussion of important issues related to health maintenance and of complex medical and social problems in children from school age through adolescence. Normal cognitive, motor, social/emotional, and language development, and the usual developmental challenges of each age group are discussed. Summer. Prerequisites: Nursing 332 and 430 or consent of instructor. Instructor: Blood-Siegfried. Three credits.

**438. Clinical Nurse Specialist Practicum: Pediatrics.** Supervised clinical practicum exploring the role of the clinical nurse specialist in a pediatric setting of the student's choice. Fall, spring, summer. Minimum 300 clinical hours. Prerequisites: Nursing 330, 331, 332, 430, and 431 (431 may be taken concurrently). Instructors: Blood-Siegfried and Lorimer. Three credits.

**439. Nurse Practitioner Residency: Pediatrics.** Supervised clinical practice which allows opportunities for practice as a pediatric nurse practitioner. 1 to 4 credits. Fall, spring, summer. 100 to 400 residency hours. Prerequisites: Nursing 322, 323, 330, 331, 332, 430, and 431. Instructors: Blood-Siegfried and Lorimer. Variable credit.

**440. Well Child Physical and Developmental Assessment for Family Nurse Practitioners.** Focuses on the physical and developmental assessment of well children from infancy through adolescence. Lectures and course assignments are designed to increase assessment skills needed in the care of children in the primary care setting. The newborn nursery, developmental evaluation centers, schools, clinical facilities that treat pediatric patients, and daycare centers are used as settings to increase pediatric assessment skills. Summer. Prerequisites: Nursing 330, 331, 332, 333, and 334. Instructors: Friedman, Mesick, and Sanford. One credit.

**441. Child Health in Family Care.** Focuses on children from infancy through adolescence within the contextual frameworks of family, school, and community. The course addresses growth and development, health maintenance, and anticipatory guidance needs of various age groups. The role of the family nurse practitioner in the management of common primary health care problems of children is emphasized. Clinical practice is in primary care settings that serve children: public health departments, school-based clinics, public and private family and pediatric practice sites, and rural/urban community health clinics. Fall. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, 333, 334, and 440. Instructors: Blood-Siegfried and staff. Four credits.

**442. Sexual and Reproductive Health.** Focuses on women and men from adolescence through maturity within the context of their sexual and reproductive development. Module I will cover prenatal and postnatal care. Module II will cover preconceptual health, family planning, sexually transmitted diseases, and sexual health of special populations. Module III will cover adult reproductive problems and changes in sexual health of men and women related to aging. The clinical practice component is in primary care settings that serve women and men at different points in the sexual and reproductive continuum. 1 to 4 credits depending on the major. Fall, spring. Family nurse practitioner majors are required to have 104 hours of direct patient care including Nursing 442. Prerequisites: for family nurse practitioner majors: Nursing 330, 331, 332,

333, and 334; for other majors: Nursing 332. Instructors: Adinolfi, Denman, Friedman, and Price. Variable credit.

**449. Nurse Practitioner Residency: Family.** Supervised practice in family primary care nursing. Management of common acute and chronic illnesses of patients across the life span. Development of the domains and competencies of nurse practitioner practice in family health care settings. Intense clinical practice under the mentorship of experienced clinicians including performing health assessments; ordering, performing, and interpreting diagnostic tests; determining a plan of care for patients and families; collaborating with the health care team; and referring patients to other health care providers. Seminars encourage the synthesis of clinical learning and the transition to the role of family nurse practitioner. 1 to 4 credits. Fall, spring, summer. 100 to 400 residency hours. Prerequisites: Nursing 330, 331, 332, 333, 334, 440, 441, and 442. Instructor: Friedman. Variable credit.

**450. Management of Critically Ill Adult Patients I.** Focuses on pathophysiological mechanisms (cardiovascular, pulmonary, and hepatic), clinical decision making, and treatment modalities for managing common problems seen in acutely/critically ill patients. Integration of technological aspects of care is emphasized in both the didactic and clinical components. Fall. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, 333, and 334. Instructors: Cheek, Harshaw-Ellis, and McFetridge. Three credits.

**451. Management of Critically Ill Adult Patients II.** Focuses on pathophysiological mechanisms (neurologic, endocrine, abdominal, trauma), clinical decision making, and treatment modalities for the management of health problems seen in acutely/critically ill patients. Consent of instructor required. Spring. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, 333, 334, 442, and 450. Instructors: Cheek, Harshaw-Ellis, and McFetridge. Three credits.

**457. Critical Care Clinical Nurse Specialist Residency.** Focuses on the synthesis of research, theory, and clinical management skills in the care of adults in acute/critical care settings. Uses a collaborative practice model in delivering education, consultation, case management, research, and administrative issues in the acute/critical care unit. Sites and preceptors are individually arranged based on the needs of students. Prerequisites: Nursing 330, 331, 332, 333, 334, 450, and 451. Instructor: Cheek. Three credits.

**458. Nurse Practitioner Residency: Adult Acute Care.** Focuses on the synthesis of theory and clinical management skills with implementation of the acute care nurse practitioner role in a collaborative model of practice. Consent of instructor required. 1 to 3 credits. Fall, spring, summer. Minimum 300 residency hours. Prerequisites: Nursing 330, 331, 332, 333, 334, 442, 450, and 451. Instructors: Cheek, Harshaw-Ellis, and McFetridge. Variable credit.

**459. Nurse Practitioner Residency: Adult Primary Care.** Supervised practice in adult primary care nursing. Management of common acute and chronic illnesses of adult patients. Development of the domains and competencies of nurse practitioner practice in primary care settings. Intense clinical practice under the mentorship of experienced clinicians including performing health assessments; ordering, performing, and interpreting diagnostic tests; determining a plan of care for patients and families; collaborating with the health care team; and referring patients to other health care providers. Seminars encourage the synthesis of clinical learning and the transition to the role of adult nurse practitioner. 1 to 3 credits. Fall, spring, summer. 100 to 300 residency hours. Prerequisites: Nursing 330, 331, 332, 333, 334, and 442. Instructors: Adinolfi and staff. Variable credit.

**460. Advanced Management of Patients with Cardiovascular Diseases.** Focuses on the pathophysiology and management of patients with major cardiovascular disorders. Content includes diagnostic and treatment options, recovery of patients following major cardiac events, symptom management during chronic illness, and prevention of

disease. Students also obtain skill in ECG interpretation and cardiac physical exam. Fall. Prerequisites: Nursing 330, 332, and 334; concurrent: Nursing 331 and 333. Instructors: Bowers and McFetridge. Three credits.

**461. Care Management of Patients with Selected Cardiovascular Illnesses.** Provides the student with supervised experience in care management of adult patients with selected cardiovascular illnesses in a variety of clinical settings. Students use the knowledge and critical thinking skills developed in Nursing 460 in patient evaluations and care management. Weekly seminars focus on paradigm cases from clinical practice and provide students opportunities for experience in making case presentations. Spring. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, 333, 334, and 460. Instructors: Bowers and McFetridge. Four credits.

**469. Nurse Practitioner Residency: Adult Cardiovascular.** Provides the student with supervised practice as a nurse practitioner. Clinical experiences focus on the management of common acute and chronic illness through transitions in care. Emphasis is on development of the domains and competencies of nurse practitioner practice in the care of cardiovascular patients. Consent of instructor required. 1 to 4 credits. Fall. 100 to 400 residency hours. Prerequisites: Nursing 330, 331, 332, 333, 334, 460, and 461. Instructors: Cheek, Harshaw-Ellis, and McFetridge. Variable credit.

**470. Oncology/HIV AIDS Nursing I: Epidemiology and Pathophysiology.** Focuses on the epidemiology, pathophysiology, and biobehavioral aspects of cancer/HIV AIDS across the adult years. Major topics include cancer physiology, prevention, detection, role of the immune system, treatment, and responses to cancer/HIV AIDS. Spring. Instructor: Schneider. Three credits.

**471. Oncology/HIV AIDS Nursing II: Symptom and Problem Management.** Provides the student with a broad framework for coordinating the domains and competencies of advanced practice roles in adult oncology/HIV AIDS nursing. The Oncology Nursing Society (ONS) Guidelines for Advanced Oncology Nursing Practice and Competencies in Advanced Practice Oncology Nursing, including HIV/AIDS and rehabilitation, serve as a framework for examination of problems and symptom management in patients. Case management and case studies are used to explore clinical problems. Summer. 104 clinical hours. Prerequisite: Nursing 470. Instructors: Adinolfi and staff. Three credits.

**478. Clinical Nurse Specialist Residency: Oncology.** Provides the student with supervised practice as a clinical nurse specialist in a specialized area of interest including ambulatory/clinic care, inpatient care, bone marrow transplant care, community/preventive care, home or hospice care, and care of persons with HIV and AIDS. Case management, care maps, case studies, and ONS Guidelines for Oncology Nursing Practice serve as frameworks for the practicum and seminars. 2 to 3 credits. Fall, spring, summer. 200 to 300 residency hours. Prerequisites: Nursing 330, 331, 332, 470, and 471. Instructor: Schneider. Variable credit.

**479. Nurse Practitioner Residency: Adult Oncology/HIV AIDS.** Supervised practice in adult oncology nursing. Management of the care of patients with cancer/HIV AIDS in ambulatory and inpatient settings. Development of the domains and competencies of nurse practitioner practice in oncology settings. Intense clinical practice under the mentorship of experienced clinicians including performing health assessments; ordering, performing, and interpreting diagnostic tests; determining a plan of care for patients and families; collaborating with the health care team; and referring patients to other health care providers. Seminars encourage the synthesis of clinical learning and the transition to the role of adult nurse practitioner. 1 to 3 credits. Fall, spring, summer. 100 to 300 residency hours. Prerequisites: Nursing 330, 331, 332, 333, 334, 442, 470, and 471. Instructor: Schneider. Variable credit.

**480. Social Issues, Health, and Illness in the Aged Years.** Examines diversity in development and adaptation to environmental, social, psychological, and biological changes. Theories of aging, health and aging, intimacy and sexuality, rural-urban health

care patterns, minority health care patterns, demographic trends, and death, dying, and loss are discussed. Spring. Instructor: Staff. Three credits.

**481. Managing Care of the Frail Elderly.** Emphasizes assessment, rehabilitation, and management of complex problems of elders who reside in community and institutional settings. Research projects and innovative care strategies are explored. Organizational and managerial effectiveness and consultative roles of the geriatric nurse practitioner/clinical nurse specialist are examined. Fall. 104 clinical hours. Prerequisites: Nursing 330, 331, 332, 333, and 334. Instructor: Ouimette. Four credits.

**489. Nurse Practitioner Residency: Gerontology.** Supervised practice as a nurse practitioner in gerontological nursing. Management of common acute and chronic illnesses of the elderly. Development of the domains and competencies of nurse practitioner practice in geriatric care settings. Intense clinical practice under the mentorship of experienced clinicians including performing health assessments; ordering, performing, and interpreting diagnostic tests; determining a plan of care for patients and families; collaborating with the health care team; and referral of patients to other health care providers. Seminars encourage the synthesis of clinical learning and the transition to the role of gerontological nurse practitioner. 1 to 3 credits. Fall, spring, summer. 100 to 300 residency hours. Prerequisites: Nursing 330, 331, 332, 333, 334, 442, 480, and 481. Instructor: Ouimette. Variable credit.

**490. Clinical Research Management: Trials Management.** Focuses on the overall management of Phase I, II, and III clinical trials in industry, academia, and government settings. Emphasis is placed on development, initiation, and execution of clinical trials. Course content includes intensive training in the processes involved in site evaluation and selection, preparation for investigator meetings, site initiation, site management, clinical research monitoring, auditing and compliance practices, clinical research management tracking and reporting systems, adverse event reporting, data safety review boards, data management, site termination, and clinical trial material. Fall. Instructors: Dren and Turner. Four credits.

**491. Clinical Research Management: Business and Financial Practices.** Familiarizes the student with the drug, device, and biologic development industry as a business. The overarching framework is the organizational structure, processes, procedures, and legal and ethical standards common to the industry. Integral to the course is the development/refinement of critical thinking skills with respect to problem solving real life actual and potential problems arising out of drug development. Knowledge of contracts, business ethics, cultural differences, and legal issues will be stressed. Spring. Instructors: Dren and Turner. Four credits.

**492. Clinical Research Management: Regulatory Affairs.** Provides the student with an overview of the FDA and regulatory requirements in the drug development process. In-depth content includes: the development and submission of Investigational New Drug Applications, New Drug Applications, Biological License Applications, Orphan Drug Applications; biomedical auditing and compliance; MedWatch and Safety reports; Phase-IV studies and Post Marketing Surveillance; and International Harmonization Guidelines for multinational pharmaceutical development projects. Instructors: Dren and Turner. Four credits.

**499. Clinical Research Management: Residency.** Focuses on the synthesis and integration of previous course work in clinical research management applied in research settings. Students spend rotations in industry, academia, or government setting gaining skills and experience working as an integral member of a project team on clinical product development research projects. Prerequisites: Nursing 490, 491, and 492, or consent of instructor. Instructors: Dren and Turner. Four credits.

**500. Introduction to Parish Nursing.** This seminar provides a basic introduction to the fundamentals of parish nursing ministry. Students are introduced to an overview of the various roles filled by the parish nurse: health educator, health counselor, referral agent, coordinator, facilitator, advocator, and supporter. Consent of instructor required.

Also taught as Health and Nursing Ministries 11. Instructors: Ouimette and Meador (Divinity). One credit.

**501. Parish Nursing II.** Building upon the principles of Introduction to Parish Nursing, students in Parish Nursing II begin to implement the aspects of basic parish nursing within the context of a faith community. This course provides opportunities for discussion and exploration of parish nursing as both a ministry of the church and a subspecialty of professional nursing. 50 hours field experience. Prerequisite: Nursing 500. Also taught as Health and Nursing Ministries 12. Instructors: Ouimette and Meador (Divinity). One credit.

**502. Health Promotion and Disease Prevention.** This course provides the student the opportunity to incorporate health promotion and disease prevention assessment and intervention into the health of clients across the life span. Applying the principles of health education, the course prepares students to use the tools and skills necessary to provide health promotion and disease prevention services to individuals, families, groups, and communities. The definition of health and the factors that impact an individual's or group's health framework is the basis for understanding health maintenance interventions. Instructors: Ouimette and staff. Three credits.

**503. Health and Nursing Ministries Field Experience.** This course provides the student with opportunity to implement the nursing component of health ministry within a faith community. The student integrates the theological dimensions of faith while utilizing skills in individual and group assessment, principles of health education, and program planning and evaluation. Students have the opportunity to develop a continuity relationship within a specific faith community. The field experience includes 300 hours over three semesters with weekly seminars. Prerequisites: Nursing 500 and 501. Also taught as Health and Nursing Ministries 200. Instructors: Ouimette and Meador (Divinity). Three credits.

**504. Seminar on Care at the End of Life: Suffering and Dying Well.** In this course, students examine contemporary efforts to recover the ancient practice of *ars moriendi*, the "art of dying." Students examine the phenomena of chronic illness, suffering, and dying from a variety of historical, biblical, theological, medical-physiological, and psychosocial perspectives. Students also examine contemporary modalities of care for persons at the end of life, including tertiary palliative care, the hospice movement, and ancillary "death with dignity" organizations. Course goals include developing the student's ability to imagine ways of caring for individuals with chronic and terminal illness. Also taught as Health and Nursing Ministries 290. Instructors: Ouimette and Meador (Divinity). Three credits.

**509. Seminar in Health and Nursing Ministries.** In this course, students work toward the development of a philosophy of parish-based health care grounded in the core practices and the corresponding central theological commitments of their respective religious communities. Under the leadership of faculty from both the School of Nursing and the Divinity School, students analyze contemporary theories and practices of health care; particular attention given to the complex relationship between faith and health. Prerequisites: Nursing 500, 501, 502, 503, and 504. Also taught as Health and Nursing Ministries 300. Instructors: Ouimette and Meador (Divinity). Three credits.



## *Graduate Medical Education*



## Graduate Program Information

**Accreditation Council for Graduate Medical Education Programs.** Appointments are from July 1 through June 30 with a few exceptions. Residents receive stipends, professional liability insurance, disability insurance, life insurance, health insurance, parking, on-call meals, psychological counseling, uniforms, and laundry of uniforms.

Programs offered with the program training director of each service are as follows:

Allergy and Immunology	Dr. Rebecca Buckley
Anesthesiology: Critical Care	Dr. Chris Young
Anesthesiology: Pain Management	Dr. Joel Goldberg
Anesthesiology	Dr. Catherine Lineberger
Cardiovascular Disease	Dr. Thomas Bashore
Child Neurology	Dr. Darrel Lewis
Child Psychiatry	Dr. Myra McSwain-Kamran
Clinical Cardiac Electrophysiology	Dr. J. Marcus Wharton
Clinical Neurophysiology	Dr. Rodney Radtke
Critical Care Pediatrics	Dr. Eva Grayck
Dermatology	Dr. Sarah Myers
Dermatopathology	Dr. Christopher Shea
Endocrinology/Metabolism	Dr. Marc Drezner
Family Practice	Dr. Margaret Gradison
Gastroenterology	Dr. Rodger Liddle
General Pediatrics	Dr. Dennis Clements
Hematology/Oncology	Dr. Marilyn Telen
Infectious Diseases	Dr. John Hamilton
Internal Medicine: Geriatric Medicine	Dr. Harvey Cohen
Internal Medicine	Dr. Ralph Corey
Medical Genetics	Dr. Marie McDonald
Medical Microbiology	Dr. Barth Reller
Medicine: General	Dr. Harvey Cohen (acting)
Medicine/Pediatrics	Drs. Ralph Corey/Deborah Kredich
Medicine/Psychiatry	Drs. Ralph Corey/Grace Thrall
Neonatal/Perinatal Medicine	Dr. Marie Pane
Nephrology	Dr. Thomas M. Coffman
Neurological Surgery	Dr. Allan Friedman
Neurology	Dr. Joel Morganlander
Neuropathology	Dr. Roger McLendon
Nuclear Medicine	Dr. Edward Coleman
Obstetrics-Gynecology	Dr. Charles Hammond
Ophthalmology	Dr. Terry Kim
Orthopaedic Hand Surgery	Dr. James Urbaniak

Orthopaedic Surgery  
 Otolaryngology  
 Pathology: Cytopathology  
 Pathology: Hematology  
 Pathology  
 Pathology - Forensic  
 Pediatric Cardiology  
 Pediatric Endocrinology  
 Pediatric Hematology-Oncology  
 Pediatric Infectious Disease  
 Pediatric Nephrology  
 Pediatric Rheumatology  
 Pediatric Pulmonology  
 Pediatric Radiology  
 Pediatrics  
 Plastic Surgery  
 Preventative Medicine: Occupational  
 Psychiatry  
 Psychiatry: Addiction  
 Psychiatry: Geriatric  
 Pulmonary Diseases/Critical Care Medicine  
 Radiology: Neuroradiology  
 Radiation Oncology  
 Radiology: Diagnostic  
 Radiology: Diagnostic (Nuclear)  
 Radiology: Vascular/Interventional  
 Rheumatology and Genetics  
 General Surgery  
 Surgery: Critical Care  
 Thoracic Surgery  
 Urology

Dr. James Urbaniak  
 Dr. Joseph Farmer  
 Dr. Sandra Bigner  
 Dr. Patrick Buckley  
 Dr. William Bradford  
 Dr. Sally Johnson  
 Dr. Brenda Armstrong  
 Dr. Michael Freemark  
 Dr. Philip Rosoff  
 Dr. Ross McKinney  
 Dr. John Foreman  
 Dr. Deborah Kredich  
 Dr. Thomas Murphy  
 Dr. George Bissett  
 Dr. Deborah Kredich  
 Dr. Scott Levin  
 Dr. Dennis Darcey  
 Dr. Grace Thrall  
 Dr. Roy Stein  
 Dr. Dan Blazer  
 Dr. Neil MacIntyre  
 Dr. James Provenza  
 Dr. Larry Marks  
 Dr. Linda Gray  
 Dr. Edward Coleman  
 Dr. Paul Suhocki  
 Dr. David Pisetsky  
 Dr. Theodore Pappas  
 Dr. Mark Sebasdian  
 Dr. Walter Wolfe  
 Dr. Glenn Preminger

Duke University Medical Center is a participating member of the National Resident Matching Program, 2450 N Street N.W., Suite 201, Washington, DC 20037-1141. All applicants for first-year postmedical school appointments must register with this program.

Steps 1 and 2; the ECFMG Clinical Skills Assessment (CSA); and the ECFMG English Exam or another English examination acceptable to ECFMG. Some physicians may have taken an earlier version of the USMLE under a different name such as NBME, FMGEMS, or VQE. Physicians must contact ECFMG to determine if those exams are acceptable for ECFMG certification. Write to ECFMG, 3624 Market Street, Philadelphia, Pennsylvania, 19104, or visit the web site at <http://www.ecfm.org/>. Physicians who are not United States citizens or lawful permanent residents and who need visa sponsorship by ECFMG as J-1 exchange visitors must hold a currently valid ECFMG certificate based on the two-day USMLE Steps 1 and 2, or the equivalent earlier versions. The old, one-day, ECFMG exam is not acceptable for J-1 visa purpose. Under U.S. law, ECFMG is the only J-1 program that has authority to sponsor physicians for clinical training in J-1 exchange visitor status. No other J-1 program is permitted to sponsor physicians in clinical training. Physicians who have passed additional exams and hold additional qualifications may qualify for visas other than the J-1.

Applicants should send applications directly to a department or training program. For program information and on-line applications, visit the House Staff Office web site at <http://www2.mc.duke.edu/gme/>. An application from an IMG that does not include a copy of a valid ECFMG certificate, or other evidence from ECFMG confirming passage of all of the required exams, is considered incomplete and may be discarded without further notice to the applicant.

For further information regarding special requirements for IMGs contact Catheryn Cotten, International Office, Box 3882 Duke University Medical Center, Durham, North Carolina 27710, or visit the web site at: <http://www.international.duke.edu>.



Reasonable requests for reduced scheduling are considered. Inquiries should be directed to the program training directors of approved residencies.

The Durham Veterans Administration Medical Center adjoins the Duke University Campus and is affiliated with Duke University Medical Center. The full-time professional staff of the V.A. Medical Center are all faculty members of the School of Medicine. All training programs are integrated with corresponding programs at the Duke University Medical Center, including rotation of house officers at each hospital.

All trainees are required to be licensed by the State of North Carolina. This may be accomplished by: (1) a residency training license that covers only training by Duke and is not convertible to a full North Carolina license, or (2) a full North Carolina license that is a complete medical license. A complete medical license is obtained either by state boards (North Carolina Boards can only be taken upon completion of internship) F.L.E.X., U.S.M.L.E. Step III, or National Boards. North Carolina is not reciprocal with other states for full licenses. Duke University Medical Center cannot make applications for full license. Since house staff members must have a license before beginning duties, arrangements for the license should be made in advance. All incoming house staff must contact the House Staff Office, Box 3951, DUMC, Durham, North Carolina 27710 for current licensure requirements, and to make application for a training license.

**Auditing of Courses by House Staff.** Residents and fellows at the Medical Center may audit courses through the undergraduate and graduate divisions of Duke University by obtaining the written permission of the course instructor and the dean for continuing education and by paying the current audit fees. House staff members are not permitted to take courses offered through the division of undergraduate medical education. For more information, please contact Dr. Paula Gilbert, Academic Dean for Continuing Education, The Bishop's House, Duke University, Durham, North Carolina 27708, (919) 684-2621; Website: [www.learnmore.duke.edu](http://www.learnmore.duke.edu).

## Roster of House Staff by Departments

### Anesthesiology

Chief Residents 1999-2000: Garrett Scales, M.D. (Texas, San Antonio, 1996); Bo Wu, M.D. (China Med Univ., 1985).

Senior Residents: Randall Brewer, M.D. (Louisiana, 1993); Andrea Crawford, M.D. (Stanford, 1996); Will Curtis, M.D. (Ohio, 1996); Adil Kamal, M.D. (K.A.U. Jeddah, 1992); Christopher Kerr, M.D. (Kansas, 1996); Robert Panten, M.D. (Virginia, 1996).

Junior Residents: Peter Baek, M.D. (Duke, 1998); Jason Burke, M.D. (North Carolina, 1996); Anthony Colantonio, M.D. (Georgetown, 1998); Peter DeBalli, M.D. (Pennsylvania, 1996); Tarsha Garvin, M.D. (East Carolina, 1997); Keith Hanson, M.D. (Wisconsin, 1998); Jon-Paul Harmer, M.D. (Texas-San Antonio, 1997); Scott Helsley, M.D. (Buffalo, 1998); Russel Jacobe, M.D. (Texas-Houston, 1997); Laura Kihlstrom, M.D. (Duke, 1998); Kurt Knauth, M.D. (Texas-Houston, 1997); Marcella Lanzinger, M.D. (T.U.M. Munich, 1995); Graham Lashley, M.D. (Utah, 1997); James McCurdy, M.D. (Oklahoma, 1997); Bill Norcross, M.D. (Pennsylvania State, 1998); Cathleen Peterson-Layne, M.D. (Duke, 1998); David Schinderle, M.D. (Michigan, 1997); Matt Taylor, M.D. (Texas-Houston, 1998); Andrienne Wells, M.D. (Rush, 1998); Holly Williams-Davis, M.D. (Texas-San Antonio, 1997); Julie Woosley, M.D. (Oklahoma, 1997).

Interns: Shazia Choudry, M.D. (South Carolina, 1999); Carrie Clarke, M.D. (Oklahoma, 1999); Will Corky, M.D. (Duke, 1999); Daniel DeMeyts, M.D. (North Carolina, 1998); Richard Griggs, M.D. (Pennsylvania State, 1999); Daphne Jones, M.D. (George Washington, 1999); John Mitchell, M.D. (Michigan, 1999); Adam Schow, M.D. (Utah, 1999).

### Community and Family Medicine

Chief Residents: David M. Bronstein, M.D. (Duke, 1997); Leila C. Morris, M.D. (Boston, 1997).

Residents: Stephen P. Arles, M.D. (Duke, 1996); Anu R. Bommareddi, M.D. (Ohio, 1997); Christopher S. Byrd, M.D. (East Carolina, 1999); Anthony J. Choe, M.D. (Wayne State, 1998); Maria V. Gibson, M.D. (Russia, 1983); George E. Harrison, M.D. (Morehouse, 1998); Frederick K. Hilton, Jr., M.D. (Louisville, 1993); Shannon S. Hinner, M.D. (Wisconsin, 1999); Rajya L. Kanuri, M.D. (India, 1992); Jamie A. Lovdal, M.D. (Duke, 1998); Christine A. McDevitt, M.D. (Georgetown, 1995); Jane Ann Moore, M.D. (Mississippi, 1999); David A. Pawlowski, M.D. (SUNY, 1999); Anelia Rose Petree, M.D. (Bowman Gray,

1998); Christopher A. Post, M.D. (Wisconsin, 1999); Geeta S. Ramchandani, M.D. (India, 1994); Steven L. Sanderson, M.D. (Cincinnati, 1997); Margaret A. Scannell, M.D. (Tufts, 1999); Wendy M. Scinta, M.D. (SUNY, 1998); Valarmathi Sundar, M.D. (India, 1987); Kevin Brewer Yow, M.D. (North Carolina, 1997); Guangbin Zeng, M.D. (China, 1985).

## Medicine

Chief Residents: Daniel A. Nikcevich, M.D. (Rush, 1995); John L. Petersen, M.D. (Washington, 1995); Cathy A. Petti, M.D. (Duke, 1995).

Senior Assistant Residents: Jamy D. Ard, M.D. (Duke, 1997); Marvin W. Ashford, M.D. (Stanford, 1996); John W. Cronin, M.D. (Vanderbilt, 1997); Jephtha P. Curtis, M.D. (Columbia, 1997); Timm M. Dickfeld, M.D. (J.W. Goethe, 1995); Anedi Eme-Akwari, M.D. (Nigeria, 1989); Nishan H. Fernando, M.D. (Duke, 1997); Diane Gesty-Palmer, M.D. (Duke, 1997); John F. Heitner, M.D. (Albert Einstein, 1997); Denise M. Hilliard, M.D. (Hahnemann, 1997); JoAnn Hong-Curtis, M.D. (Columbia, 1997); Danny D. Hu, M.D. (East Carolina, 1997); Alice T. Hughes, M.D. (Mount Sinai, 1997); Christian M. Hull, M.D. (Michigan, 1997); George N. Ioannou, M.D. (Oxford, 1996); Kimberly S. Johnson, M.D. (Johns Hopkins, 1997); David K. Johnston, M.D. (Kentucky, 1997); Geoffrey A. Kunz, M.D. (Ohio State, 1997); Manjula Kurella, M.D. (Albany, 1997); David R. Levitan, M.D. (Ohio, 1997); W. Lance Lewis, M.D. (Miami, 1997); Mallory L. McClure, M.D. (Virginia, 1997); Phillippa H. Miranda, M.D. (Duke, 1997); Jennifer L. Muller, M.D. (Northwestern, 1997); S-H Ig Ou, M.D. (Southwestern, 1997); Manesh R. Patel, M.D. (Emory, 1997); Josh F. Peterson, M.D. (Vanderbilt, 1997); Neeraja Peterson, M.D. (Vanderbilt, 1997); Xiao Yan Qian, M.D. (Shanghai, 1987); N. Joan Sago, M.D. (Hopkins, 1997); Troy D. Schmidt, M.D. (Southwestern, 1997); Rahman Shah, M.D. (Aga Khan, 1994); Joseph C. Shanahan, M.D. (Robert Wood Johnson, 1997); Jonathan A. Stiber, M.D. (New York, 1997); Amy J. Stough, M.D. (South Carolina, 1997); Gordana Vlahovic, M.D. (Zagreb, 1985); Jason F. Vollweiler, M.D. (Northwestern, 1997).

Senior Assistant Residents-Medicine/Pediatrics: Eric A. Higginbotham, M.D. (Texas-Houston, 1996); Rajiv K. Jain, M.D. (SUNY-Buffalo, 1996); Russell Rothman, M.D. (Duke, 1996); Ann M. Valente, M.D. (Vermont, 1996).

Junior Assistant Residents: Daniel R. Bensimhon, M.D. (Pittsburgh, 1998); James B. Brugarolas, M.D. (Navarra Medical, 1993); Jason T. Call, M.D. (Vanderbilt, 1998); Anna Lisa Chamis, M.D. (Ohio State, 1998); Christine Chen, M.D. (Duke, 1997); Lisa Criscione, M.D. (Duke, 1998); Chandan M. Devireddy, M.D. (Michigan, 1998); W. Lane Duvall, M.D. (Yale, 1998); Amanda L. Green, M.D. (Baylor, 1998); Jonathan S. Green, M.D. (Duke, 1998); Nathan E. Green, M.D. (Washington, 1998); Susan B. Gurlley, M.D. (Washington, 1998); Ali Haddadzadeh, M.D. (Chicago Med. Sch., 1997); S. Susan Hedayati, M.D. (George Washington, 1998); Todd E. Helton, M.D. (East Carolina, 1998); Peter D. Higgins, M.D. (Duke, 1998); Kimberley J. Johnson, M.D. (UMDNJ, 1998); Glenn C. Jones, M.D. (Chicago, 1998); Catherine P. Kaminetzky, M.D. (Duke, 1998); James A. Kong, M.D. (Duke, 1998); David A. Martin, M.D. (Rochester, 1998); Matthew W. McClure, M.D. (Duke, 1998); Jay R. McDonald, M.D. (Oregon Health Sciences, 1998); Sarah A. McGarry, M.D. (Georgetown, 1997); Trip J. Meine, M.D. (Duke, 1998); Christopher G. Nelson, M.D. (St. Louis, 1998); Richard E. Nettles, M.D. (Duke, 1998); W. Jeff Petty, M.D. (North Carolina, 1998); Cheryl A. Russo, M.D. (SUNY-Syracuse, 1998); Thomas R. Smarz, M.D. (Georgetown, 1998); Srikanth Sola, M.D. (Louisville, 1998); Jeremy Spector, M.D. (Vanderbilt, 1998); Nadine D. Tanenbaum, M.D. (Miami, 1998); Gina M. Vaccaro, M.D. (Louisiana State, 1998); Martha Wadleigh, (Duke, 1998); Amy C. Weintrob, M.D. (Virginia, 1998).

Junior Assistant Residents-Medicine/Pediatrics: Adam Bressler, M.D. (Med Col of Georgia, 1998); Cynthia W. Brown, M.D. (Med. Coll. of Georgia, 1997); Alexander W. Chen, M.D. (SUNY-Buffalo, 1997); Edward Evans, M.D. (UMDNJ-New Jersey, 1998); Wayne J. Franklin, M.D. (California-Los Angeles, 1997); Karen Kiang, M.D. (Yale, 1998); Keri L. Livingstone, M.D. (Miami, 1997); Michael G. Mallowney, M.D. (Georgetown, 1997); Danielle Scheurer, M.D. (Tennessee, 1998); Mark Scheurer, M.D. (Tennessee, 1998); Jennifer Taylor, M.D. (Duke, 1998); Lisa R. Young, M.D. (Duke, 1997).

Junior Assistant Residents-Medicine/Psychiatry: Jude R. Alexander, M.D. (Miami, 1996); Eric J. Christopher, M.D. (Med. Coll. of Wisconsin, 1996); M. Ojinga Harrison, M.D. (Tennessee, 1997); Wei Jiang, M.D. (Binzhou, 1982); Gregory C. Luncford, M.D. (Chicago, 1990); Henry Radziewicz, M.D. (SUNY-Brooklyn, 1996); Pritham M. Raj, M.D. (Maryland, 1997).

Interns: Waleed Ahmed, M.D. (Aga Khan, 1999); Mary A. Bethel, M.D. (Duke, 1999); Daniel L. Camacho, M.D. (Duke, 1998); Gregory A. Clines, M.D. (Texas-Dallas, 1999); Davey B. Daniel, M.D. (Johns Hopkins, 1999); Katja L. Elbert, M.D. (Michigan, 1999); Steven G. Fein, M.D. (Johns Hopkins, 1999); Terry A. Fortin, M.D. (Massachusetts, 1999); Camille G. Frazier, M.D. (Case Western, 1999); Radha Goel, M.D. (Baylor, 1999); Joseph Gottfried, M.D. (Pittsburgh, 1999); David Gregg, M.D. (Columbia, 1999); Christian N. Gring, M.D. (Virginia, 1999); Margaret M. Guo, M.D. (SUNY-Stony Brook, 1999); Donald D. Hegland, M.D. (Florida, 1999); Keith G. Hickey, M.D. (Louisiana State, 1997); Ernest G. Hope, M.D. (Stanford, 1999); Edward P. Hu, M.D. (Washington, 1999); Mark A. Iler, M.D. (Ohio State, 1999); David C. Isbell, M.D. (Virginia, 1999); M. Luke James, M.D. (Louisiana State, 1999);

Peter N. Kamilakis, M.D. (Med. Coll. of Virginia, 1999); Stephen D. Kendall, M.D. (Albany, 1999); Richard P. Konstance, M.D. (Hahnemann, 1999); Wissam M. Kourany, M.D. (Beirut, 1998); Jacob P. Laubach, M.D. (Duke, 1999); Peter F. Lebowitz, M.D. (Pennsylvania, 1999); Lillian Lien, M.D. (Duke, 1999); Sauyu Lin, M.D. (Vanderbilt, 1999); June-Chih Liu, M.D. (China Med. Coll., 1985); Jill M. Mhyre, M.D. (Michigan, 1999); Hemalatha Naganna, M.D. (Tulane, 1999); Quynh A-T. Nguyen, M.D. (Minnesota, 1999); India F. Reid, M.D. (UMDNJ, 1999); Naomi G. Romano, M.D. (Maryland, 1999); Daniel M. Sauri, M.D. (Northwestern, 1999); Daniel R. Scanga, M.D. (Duke, 1999); Teresa K. Tarrant, M.D. (Florida, 1999); Melissa G. Teitelman, M.D. (Temple, 1999); Kevin L. Thomas, M.D. (North Carolina, 1999); Carol L. Venable, M.D. (Duke, 1999); Aaron Walton, M.D. (Duke, 1999); Sean M. Wu, M.D. (Duke, 1999); Monica M. Ziebert, M.D. (Med. Coll. of Wisconsin, 1999).

Interns-Medicine/Pediatrics: James W. Fox, M.D. (Cincinnati, 1999); Kristin E. Ito, M.D. (Harvard, 1999); Cynthia L. Johnson, M.D. (Rochester, 1999); Jason E. Lang, M.D. (Duke, 1999); Scott M. Robert, M.D. (Pennsylvania, 1999); Anita K. Ying, M.D. (Duke, 1999).

Interns-Medicine/Psychiatry: Jane P. Gagliardi, M.D. (Duke, 1998); Charles W. Hargett, M.D. (Virginia, 1999); Jonathan E. Leinbach, M.D. (Louisiana State, 1998); Anne G. Lin, M.D. (Utah, 1999); Susan L. Padrino, M.D. (Maryland, 1999); Eric J. Park, M.D. (Maryland, 1998); Erin Silvertooth, M.D. (Texas-Galveston, 1998); Wei Zhang, M.D. (Shanghai, 1990).

Fellows: Amy Abernethy, M.D. (Duke 1991); Anjali S Advani, M.D. (Duke, 1996); Gregory Ahearn, M.D. (Hahnemann, 1995); Intekab Ahmed, M.D. (Punjab Univ., Pakistan, 1987); Mark D. Aldous, M.D. (Duke, 1995); John H. Alexander, M.D. (Pennsylvania, 1993); Saleh Al-Ghamdi, M.D. (King Abdulaziz, 1989); Sana M. Al-Khatib, M.D. (Beirut, 1993); Luis Amador, M.D. (Central del Caribe, Puerto Rico, 1995); Kashif H. Ansari, M.D. (Dow Medical, 1992); Manish D. Assar, M.D. (California-San Francisco, 1992); Maria C. Bahit, M.D. (Buenos Aires, 1992); Michael P. Battaglini, M.D. (New York Med., 1994); Judy K. Battle, M.D. (Louisiana State, 1993); Richard S. Bedlack, M.D. (Connecticut, 1995); Crystal Bernstein, M.D. (Duke, 1996); Rajesh Bhagat, M.D. (Univ. College, 1983); Kimberly L. Blackwell, M.D. (Mayo, 1994); Richard Blair, M.D. (Harvard, 1994); Richard S. Bloomfeld, M.D. (Washington, 1994); Paul R. Bohjanen, M.D. (Michigan, 1993); Jeffrey D. Bornstein, M.D. (McGill, 1994); Kristina E. Bowen, M.D. (Duke, 1996); Patrick H. Bowen, M.D. (Duke, 1995); Cynthia D. Brown, M.D. (SUNY-Brooklyn, 1994); Cheryl D. Bushnell, M.D. (Med. Coll. Of Wisconsin, 1995); Susan Byrne-O'Shea, M.D. (University College Cork, 1993); Christopher H. Cabell, M.D. (Duke, 1994); Jane Zhan Cai, M.D. (Shanghai Second Medical, 1988); Kevin Campbell, M.D. (Bowman Gray, 1996); Warren J. Cantor, M.D. (Western Ontario, 1991); Hector Castro, M.D. (National Autonomous Univ. of Mexico, 1991); Emma Cialfoni, M.D. (Milan, 1989); Mauricio G. Cohen, M.D. (Tucuman, Argentina, 1991); Joseph Coladonato, M.D. (Jefferson, 1995); Cathleen Colon-Emeric, M.D. (Johns Hopkins, 1994); Jeanine Connolly, M.D. (Florida, 1995); Steven D. Crowley, M.D. (Duke, 1996); Fernando de la Serna, M.D. (Tucuman, Argentina, 1983); Mark Donohue, M.D. (Cincinnati, 1996); Christopher K. Dyke, M.D. (Texas-Southwestern, 1995); Mark A. East, M.D. (North Carolina, 1995); Thomas Fanning, M.D. (Ohio State, 1993); G. Michael Felker, M.D. (Duke, 1993); Deborah Fisher, M.D. (Vanderbilt, 1996); Nora Franceschini, M.D. (de Federal Do Rio, 1996); Nadia Deborah Friedman, M.D. (Monash, 1992); Peter L. Gallagher, M.D. (Nebraska, 1994); Starvos Garantziotis, M.D. (Albert-WDWigs, 1994); Thomas R. Gehrig, M.D. (Florida, 1994); Hakan Goker, M.D. (EGE, Turkey, 1986); Michael J. Goloto, M.D. (UMDNJ, 1995); Denis Hadjiliadis, M.D. (Toronto, 1995); Kimberly J. Hamilton, M.D. (Vanderbilt, 1996); Nancy M. Hardy, M.D. (Washington, 1995); Eric B. Haura, M.D. (Duke, 1994); Aroti Hegde, M.D. (Bangalore, 1992); Mitchell T. Heflin, M.D. (Virginia, 1993); Aaron B. Hesselton, M.D. (Robert Wood Johnson, 1994); Mohammed Hijazi, M.D. (King Abdulaziz, 1991); Timothy Hong, M.D. (Yale, 1995); Philip Huang, M.D. (Vanderbilt, 1996); Michael P. Hudson, M.D. (Illinois, 1991); Charles Ivester, M.D. (Med. Univ. of South Carolina, 1996); Kandaswamy Jayaraj, M.D. (Stanley, 1992); Dean C. Johnson, M.D. (Univ. of British Columbia, 1992); Christopher Jordan, M.D. (East Carolina, 1995); David E. Kandzari, M.D. (Duke, 1995); Joseph Kay, M.D. (SUNY-Buffalo, 1994); Khuda-Dad Khan, M.D. (Nishtar Med. Coll., 1984); J. Benjamin Khoury, M.D. (Virginia, 1994); Preston S. Klassen, M.D. (Nebraska, 1994); Andreas Klein, M.D. (Yale, 1996); David F. Kong, M.D. (Johns Hopkins, 1993); Richard A. Krasuski, M.D. (Harvard, 1994); Thu H. Le, M.D. (George Washington, 1993); Lawrence Liao, M.D. (Duke, 1996); A. Craig Lockhart, M.D. (Texas-Dallas, 1993); Yuan Lu, M.D. (Shanghai, 1987); John R. Lynch, M.D. (Duke, 1994); Mel Mabugat Magboo, M.D. (Santo Thomas, 1993); William I. Mariencheck, M.D. (Washington, 1994); David O. Martin, M.D. (Alabama, 1992); Steven T. Mast, M.D. (California-San Francisco, 1993); Charles E. Mayes, M.D. (Vanderbilt, 1995); Steven L. McCune, M.D. (Alabama, 1996); Dean S. McGaughey, M.D. (Chicago, 1994); Darren K. McGuire, M.D. (Johns Hopkins, 1993); Melissa Mendez, M.D. (Puerto Rico, 1995); Debra L. Miller, M.D. (Albert Einstein, 1994); Andrew Muir, M.D. (Duke, 1993); Nirjaleshwar K. Nikhar, M.D. (Armed Forces Med. Coll., 1987); J. Conor O'Shea, M.D. (University Cork College, 1989); Thomas Owens, M.D. (SUNY-Buffalo, 1995); Augusto Parra, M.D. (Escuela Colombiana, 1988); John R. Pawloski, M.D. (St. Louis, 1994); Thomas J. Povsic, M.D. (Harvard, 1995); Sunil V. Rao, M.D. (Ohio State, 1996); Abdallah G. Rebeiz, M.D. (Amerian University, 1996); Donal Reddan, M.D. (Univ. College, Dublin, 1992); Michael F. Reidy,



M.D. (George Washington, 1990); Paula Ryan, M.D. (Rochester, 1994); Nathan Schmulewitz, M.D. (Columbia, 1996); Monica R. Shah, M.D. (Brown, 1989); William T. Smith, M.D. (North Carolina, 1996); Susan E. Spratt, M.D. (Harvard, 1995); Amy Stone, M.D. (Florida, 1995); Jason Stout, M.D. (SUNY-Syracuse, 1996); Thaddeus R. Tolleson, M.D. (Texas-Houston, 1993); Jitendra Vasadani, M.D. (SUNY-Syracuse, 1995); Eric J. Velazquez, M.D. (Albert Einstein, 1994); Momen N. Wahidi, M.D. (Damascus, 1992); John J. Warner, M.D. (Vanderbilt, 1992); Alvin F. Wells, M.D. (South Florida, 1996); David J. Whellan, M.D. (Washington, 1994); Jeffrey Whitehill, M.D. (Baylor, 1996); Craig J. Wilson, M.D. (Queensland, 1993); Stephen Wilson, M.D. (Duke, 1992); Terry L. Wimpey, M.D. (Emory, 1995); Kelly Wood, M.D. (SUNY-Buffalo, 1993); Christopher Woods, M.D. (Duke, 1994); Dannah W. Wray, M.D. (Duke, 1993); William S. Yancy, M.D. (East Carolina, 199); Sally York, M.D. (Washington, 1996).

#### **DIVISION OF DERMATOLOGY**

Julie E. Allee, M.D. (Emory, 1996); Erin S. Gardner, M.D. (Vanderbilt, 1996); Camille Haisley-Royster, M.D. (Duke, 1996); Caroline Hebert, M.D. (Ohio State, 1996); ; Mary Helen Allen Jordan M.D. (East Carolina, 1997); Linda H. Lee, M.D. (Duke, 1998); Sylvia Owen, M.D. (Duke, 1997); Susan H. Psaila, M.D. (Rochester, 1993); Shikha Sethi, M.D. (SUNY-Brooklyn, 1998); William T. Sumner, M.D. (Duke, 1996).

#### **DIVISION OF NEUROLOGY**

Mohammed Aldosai, M.D. (King Saud Univ. Med. Sch., 1993); Beth A. Belluscio, M.D. (Columbia, 1997); Rhonda Gabr, M.D. (West Virginia, 1998); Ganesh T. Ghooray, M.D. (Med. Coll. of Ohio, 1996); John W. Gibbs, M.D. (Med. Coll. Of Virginia, 1998); Aneeta Gupta, M.D. (MGM Medical College, India, 1982); Jonathan J. Halford, M.D. (South Carolina, 1996); Hassan Kassem-Moussa, M.D. (Beirut, 1995); Gandis G. Mazeika, M.D. (California-Davis, 1993); David L. McDonagh, M.D. (Georgetown, 1998); Bennett Myers, M.D. (SUNY-Buffalo, 1998); Arman Sabet, M.D. (New Mexico, 1996); Zaeem A. Siddiqi, M.D. (Army Med. Coll., Pakistan, 1987); Connie Tsang, M.D. (McGill, 1994).

### **Obstetrics and Gynecology**

Chief Residents: Linda Fetko (Duke, 1999); Jennifer Kalich (Michigan, 1999); Johnathan Lancaster (Wales, 1992); Jennifer Occhipinti (Massachusetts, 1996); Timothy Olson (Minnesota, 1991); Katharine Taber (Virginia, 1996); Gerald Welch (Ohio State, 1995).

Senior Assistant Residents: Carol Brown (Johns Hopkins, 1997); William Catherino (Wisconsin, 1997); Damla Dryden (Washington, 1997); Marc Gustilo-Ashby (Mayo, 1996); Tina Jackson (Harvard, 1997); Nimesh Nagarsheth (Mount Sinai, 1997); Ted Roth (Rochester, 1996).

Assistant Residents: Matthew Alvarez (Ohio State, 1998); Katherine Kent (Virginia, 1998); Karen Lee (Harvard, 1998); Eva Littman (Duke, 1998); Michael Paglia (Pennsylvania, 1998); Eleanor Rhee (Yale, 1998); Mildred Ridgway (Tulane, 1998).

Junior 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, 1998).

### **Ophthalmology**

Chief Resident: Thomas Stone, M.D. (SUNY-Buffalo, 1995).

Residents: Sameer Ahmad, M.D. (Tufts, 1994); Sanjay Asrani, M.D. (India, 1987); Amy Fowler, M.D. (North Carolina, 1998); Jerry Hu, M.D. (Duke, 1998); Seena Garg, M.D. (Duke, 1997); Jin Jing, M.D. (China, 1983), Ph.D. (Boston, 1993); Bobbie Kholsa, M.D. (North Carolina, 1997); Johannes Kristinsson, M.D. (Iceland, 1992); Prithvi Mruthyunjaya, M.D. (New York, 1996); Kevin D. O'Neal, M.D., Ph.D. (Baylor, 1997); Eric Poulsen, M.D. (California, 1996); John Rose, M.D. (Duke, 1997).

### **Pathology**

Chief Resident: Robert C. Stern, M.D. (Texas-Galveston, 1981).

Residents: Catherine M. Breen, M.D. (Duke, 1999); Kelly J. Butnor, M.D. (Duke, 1997); Henry R. Carag, M.D. (Chicago, 1995); Thomas J. Cummings, M.D. (UMDNJ, 1991); Rajesh C. Dash, M.D. (Champaign, 1995); Louis R. DiBernardo, M.D. (Duke, 1991); Christopher R. Eedes, M.B.Ch.B. (Cape Town, S. Africa, 1985); Timothy A. Fields, M.D., Ph.D. (Duke, 1997); John B. Holt, M.D. (Iowa, 1999); Emilie Morphew, M.D. (Michigan State, 1992); Paul R. Morris, M.D. (Boston, 1997); Ruth Y. Peng, M.D. (Albert Einstein, 1999); Mark J. Routbort, M.D., Ph.D. (Duke, 1999); Filiz Sen, M.D. (Maramara, Turkey, 1995); Matthew J. Snyder, M.D. (Med. Coll. of Virginia, 1999); Jean E. Thomas, M.D. (Med. Coll. of Ohio, 1996); David C. Williams, M.D., Ph.D. (Virginia, 1998).

Fellows: John A. Crump, M.B.Ch.B. (Otago, New Zealand, 1993); Mai P. Hoang, M.D. (Southwestern, 1994); David R. Murdoch, M.B.Ch.B. (Otago, New Zealand, 1985); Sharon A. Szukala, M.D. (Buffalo, 1994).



## Pediatrics

Chief Resident: Elizabeth A. Hunt, M.D. (Albany Medical College, 1995).

Third Year Residents: Jennifer Austin, M.D. (Tulane, 1997); Tabitha Bauer, M.D. (SUNY-Stonybrook, 1997); Karen Belsito, M.D. (Connecticut, 1996); Jill Bernstein, M.D. (Virginia, 1997); Lisa Bourque, M.D. (George Washington, 1997); Hyeon Choi, M.D. (Virginia, 1997); Karrie Dyer, M.D. (Virginia, 1997); Donald Kulas, M.D. (Rochester, 1997); Faith Lawrence, M.D. (Johns Hopkins, 1997); Leona Matl, M.D. (Houston, 1997); Jessica McAdoo, M.D. (North Carolina, 1997); Stephen Miller, M.D. (Illinois, 1997); Aveline Quinlan, M.D. (Howard, 1996); Alice Rothman, M.D. (Duke, 1997).

Second Year Residents: Brian Bowman, M.D., Ph.D. (Duke, 1998); Brooke Britton, M.D. (Pittsburgh, 1998); Harmony P. Garges, M.D. (Duke, 1998); Sonja Haugeto, M.D. (SUNY-Syracuse, 1998); Tania Hurlbutt, M.D. (Uniformed Services, 1998); William Malcolm, M.D. (Minnesota, 1998); Vaishali Mankad, M.D. (Illinois, 1998); Lisa McGregor, M.D., Ph.D. (Johns Hopkins, 1998); Anne McLaughlin, M.D. (Dartmouth, 1998); Jonathan NedreLOW, M.D. (Minnesota, 1998); Ian Paul, M.D. (Pennsylvania State, 1998); Rachel Rose, M.D. (Dartmouth, 1998); Betty Cole Staples, M.D. (Maryland, 1998); Nancy Strom Morgan, M.D., (Yale, 1995) Ph.D. (Duke, 1998); Courtney Thornberg, M.D. (Duke, 1998).

First Year Residents: Russell Alexander, M.D. (Albert Einstein, 1999); Wendy Taylor Book, M.D. (Duke, 1999); Nicole Dupraw, M.D. (Northwestern, 1999); Walter Eppich, M.D. (Heidelberg, 1999); Jill Gronowski, M.D., (Med. Coll. of Wisconsin, 1999); Yolanda O. Johnson, M.D. (Emory, 1999); Matthias Karajannis, M.D. (Free Univ. of Berlin, 1997); Carrie Kitko, M.D. (Ohio State, 1999); James Lin, M.D. (Iowa, 1999); Susan Manning, M.D. (Dartmouth, 1999); Sandra Moreira, M.D. (Duke, 1999); Sara Page, M.D. (Loyola, 1999); Jennifer Peterson, M.D. (Iowa, 1999); Martha A. Snyder, M.D. (Med. Coll. of Virginia, 1999).

Fellows: Mohamed Ahmed, M.D. (Suez Canal, Ismailia, Egypt, 1987); Mohammed Aldosari, M.D. (King Faisal Hospital, Saudi Arabia, 1993); Sherri S. Baker, M.D. (Oklahoma Hlth. Sci. Ctr., 1995); Sherry L. Bayliff, M.D. (Med. Coll. Ohio, 1995); Danny Benjamin, M.D. (Virginia, 1995); Michael Camitta, M.D. (Texas Hlth. Sci. Ctr., San Antonio, 1996); Kenji M. Cunnion, M.D., M.P.H. (Duke, 1993; North Carolina, 1992); J. Chad Davis, M.D. (Texas Med. Branch-Galveston, 1994); Gerardo Enriquez, M.D. (Santo Thomas, Manila, Philippines, 1992); David Hugh Frazer, M.D. (Alabama-Birmingham, 1996); Peter Gaskin, M.D. (West Indies, 1998); Brenda Louise Giles, M.D. (Western Ontario-Canada, 1991); Annmarie Golio, M.D. (New Jersey Medical School, 1996); Sanjeev Grover, M.B., B.S. (Med. Coll., MS Univ. of Baroda, India, 1986); Scott Hagen, M.D. (Wisconsin, 1987); Matthew Heeney, M.D. (Calgary, 1995); Salim Idriss, M.D. (Duke, 1996); Alicia Johnston, M.D. (SUNY Hlth. Sci. Ctr., 1994); Majed Koleilat, M.D. (Charles-Prague, Czech, 1996); Mary Lacaze, M.D. (Mount Sinai, 1991); Stephen Leinenweber, M.D. (Rush Presbyterian-St. Lukes, Chicago, 1995); Corinne Linardic, M.D. (Duke, 1995); Maricarmen Lopez-Pena, M.D. (Universidad Dentrál Del Cariba, Bayamon, Bayamon, Puerto Rico, 1996); Kathleen McKenna, M.D. (Jefferson Med. Coll.-Philadelphia, 1995); Angelo Milazzo, M.D. (SUNY-Stony Brook, 1996); Michelle Miller, M.D. (Minnesota, 1994); Martin Moya, M.D. (National Univ. of Cordoba, Argentina, 1992); Jose Pineda, M.D. (Francisco Marroquin, 1993); Santi Punnahtananda, M.D. (Chulalongkorn Univ. Hosp. Bangkok, Thailand, 1988); Karen Richards, M.D. (Johns Hopkins School of Medicine, 1993); Robb Romp, M.D. (Duke, 1995); Rolla Shbaro, M.D. (Amer. Univ. of Beirut, Lebanon, 1994); Stephen Shaw, M.D. (Mississippi, Oxford, 1994); Wendy Smith, M.D. (Michigan, 1995); Jennifer Turi, M.D. (Massachusetts, 1995); Christopher Turner, M.D. (Rochester, 1994); Michael Vozzelli, M.D. (Temple, 1996); Mark Wainwright, M.D., Ph.D. (Chicago, 1995, 1994).

## Psychiatry

Chief Residents: Jude Alexander, M.D. (Miami-Florida, 1996); Eric Christopher, M.D. (Med. Coll. of WI, 1996); Jennifer Kern, M.D. (Ohio State, 1996); Ajay Makhija, M.D. (Alabama, 1996); Samantha Meltzer-Brody, M.D. (Northwestern, Chicago, IL, 1996); Hank Radziewicz, M.D. (SUNY-Brooklyn, 1996); Warren Taylor, M.D. (Florida, 1996).

Fourth Year Residents: Jude Alexander, M.D. (Miami-Florida, 1996); Roy D. Book, M.D. (MUSM Macon, Ga, 1996); Eric Christopher, M.D. (Med. Coll. of WI, 1996); Jennifer Kern, M.D. (Ohio State, 1996); Gregory Lunceford, M.D. (Chicago, 1996); Ajay Makhija, M.D. (Alabama, 1996); Samantha Meltzer-Brody, M.D. (Northwestern, Chicago, IL, 1996); Hank Radziewicz, M.D. (SUNY-Brooklyn, 1996); Ewa Sikora, M.D. (Pomeranian Med Academy Sjccew, Poland, 1992); Warren Taylor, M.D. (Florida, 1996).

Third Year Residents: Cherry Chevy, M.D. (West Virginia, 1997); Charles Cloutier, M.D. (Wayne State, 1997); Mary Edmondson, M.D. (North Carolina, 1985); Anna Gonzaga, M.D. (Med. Coll. of Ohio, 1997); Myleme Ojinga Harrison, M.D. (Tennessee, 1997); George Jackson, M.D. (Drew/UCLA Med. Edu. Program, 1995); Wei Jiang, M.D. (Oingdao Med. Coll., China, 1982); Omar Manejwala, M.D. (Maryland, 1997); Richard McColl, M.D. (Virginia, 1997); Robert Nelson, M.D. (Duke, 1997); Pritham Raj, M.D. (Maryland, 1997); Purvi Sangani, M.D. (SUNY-Syracuse, COM, 1997).

Second Year Residents: Drew Barzman, M.D. (SUNY-Buffalo, 1997); Jane Gagliardi, M.D. (Duke, 1998); John-Paul Gomez, M.D. (Temple, 1998); Kathleen Lapp, M.D. (Med. Univ. of South

Carolina, 1998); Jonathan Leinbach, M.D. (Louisiana State, 1998); Mehul Mankad, M.D. (Northwestern, 1998); Thomas Milam, M.D. (Virginia, 1998); Eric Park, M.D. (Maryland, 1998); Thomas Patamia, M.D. (Georgetown, 1998); Millie Paupst, M.D. (McMaster, Hamilton, Canada, 1990); Alexandra Powell, M.D. (Jefferson Med. Coll., 1998); Darren Rothschild, M.D. (South Florida, 1998); Erin Silvertooth, M.D. (Texas Medical Branch, 1998); Mugdha Thakur, M.D. (Seth G.S. Med. Coll., 1994).

First Year Residents: Charles Hargett, M.D. (Virginia, 1999); Jeffrey Jacobs, M.D. (New Mexico, 1999); Heidi Johnson, M.D. (Med. Coll. of Ohio, 1999); Patrick Keenan, M.D. (Kansas, 1995); Anne Lin, M.D. (Utah, 1999); Edward McGonigle, M.D. (Temple, 1998); Susan Padrino, M.D. (Maryland, 1999); Victoria Payne, M.D. (Wake Forest, 1999); Juandalyn Peters, M.D. (Miami, FL, 1999); Joseph Sharpe, M.D. (Tennessee, 1999); Michael Slifer, M.D. (UTHSCA, 1999); Lihui Tang, M.D., Ph.D. (Harbin Med., P.R. China, 1984); Wei Zhang, M.D., Ph.D., (Shanghai Med.).

Child Psychiatry Chief Residents: Trina Allen, M.D. (SUNY-Buffalo, 1995); Samina Aziz, M.D. (Aga Khan Univ of Karachi, Pakistan, 1994);

Geriatric Psychiatry Residents: Barbara Davenport, M.D. (Wayne State, 1980); Abayomi Jaji, M.D. (Coll. of Med. Univ. of Ibadan, Nigeria, 1986).

Substance Abuse Fellow: Lawrence M. Raines, III, M.D. (North Carolina, 1993).

Forensic Psychiatry Resident: Charles Vance, M.D. (Duke, 1993).

## **Radiation Oncology**

Chief Resident: Patrick Maguire, M.D. (Penn State, 1995).

Residents: Sylvia Bovio, M.D. (Texas, 1997); Joel Elconin, M.D. (Ohio State, 1995); Bobby Harrison, M.D. (East Carolina, 1997); Phillip Villiotte, M.D. (Dartmouth, 1995).

## **Radiology**

Residents: Andrew Adamson, M.D. (Medical College of Wisconsin, 1998); Todd Aho, M.D. (Wayne State, 1997); Matthew Banks, M.D. (Pennsylvania State, 1998); L. Neal Beard, M.D. (Virginia, 1997); Jeffrey Behar, M.D. (Tulane, 1996); S. Douglas Brown, M.D. (Utah, 1996); Taylor Chen, M.D. (Southern California, 1996); R. Lee Cothran, Jr., M.D. (Duke, 1995); Robert Cranley, M.D. (Boston, 1995); Steven Crawford, M.D. (Indiana, 1996); Stephen A. Fine, M.D. (Massachusetts, 1995); David J. Fiorella, M.D. (SUNY-Buffalo, 1996); Tasha Foushee, M.D. (Medical College of Georgia, 1998); Christopher Gaskin, M.D. (Florida-Gainesville, 1997); Carmelo Gullotto, M.D. (Duke, 1998); William Lee Hall, M.D. (Duke, 1995); Paul Haugan, M.D. (Minnesota-Minneapolis, 1998); J. Joseph Hewett, M.D. (California-San Francisco, 1996); Lynn Hurwitz, M.D. (Duke, 1997); John Jackson, M.D. (Utah, 1997); M. Todd Jacobs, M.D. (Duke, 1996); Christopher Lascola, M.D. (Chicago, 1998); H. Stanley Lambert, M.D. (North Carolina, 1997); Ellie Lee, M.D. (Emory, 1996); Lisa J. Lee, M.D. (Medical College of Ohio, 1995); Melissa Lipton, M.D. (Texas-Houston, 1997); Ryan Nielsen, M.D. (Creighton, 1995); John Pappas, M.D. (Albert Einstein, 1996); Thomas Presson, Jr., M.D. (Wake Forest, 1995); Ana Quinones, M.D. (Tufts, 1997); John Rampton, M.D. (Utah, 1998); Duncan Rougier-Chapman, M.D. (Duke, 1998); Eric Rohren, M.D. (Mayo, 1996); Brandt Schraner, M.D. (George Washington, 1995); Brooke Spencer, M.D. (Vermont, 1995); Bertram Stemmler, M.D. (Texas-Southwestern, 1997); Willaim Taylor, M.D. (New York Medical Center), 1998); Shannon Turner, M.D. (Arkansas, 1997); Matthew Wagner, M.D. (Ohio State, 1996); Carolyn Weaver, M.D. (Duke, 1998); Sybille Woel, M.D. (Pittsburgh, 1995); Zenon Zarewych, M.D. (Wayne State, 1996).

## **Surgery**

### **DIVISIONS OF GENERAL AND CARDIOTHORACIC SURGERY**

Instructors and Teaching Scholars: Paul M. Kirshbom, M.D. (Johns Hopkins, 1991); Scott C. Silvestry, M.D. (Pennsylvania, 1991).

Cardiothoracic Fellows: R. Eric Lilly, M.D. (Duke, 1992); Jeff L. Myers, M.D. (Oklahoma, 1991); John S. Sapirstein, M.D. (Boston, 1990); James D. St. Louis, M.D. (Georgetown, 1992).

Critical Care Fellow: Bryan Weidner, M.D. (Pennsylvania, 1992).

Transplant Fellow: Pedro W. Baron, M.D. (Antioquia Medical School, 1977).

Instructors and Chief Residents: Shahab A. Akhter, M.D. (Chicago-Pritzker, 1993); Larkin J. Daniels, M.D. (Alabama, 1992); Kimberly L. Gandy, M.D. (Northwestern, 1990); Alan P. Kypson, M.D. (Columbia, 1993); Cleveland W. Lewis, Jr., M.D. (Duke, 1993); Andrew J. Lodge, M.D. (Duke, 1993); Robert B. Noone, Jr., M.D. (Pennsylvania, 1993).

Research Fellows: Thomas A. Aloia, M.D. (California-Los Angeles, 1996); Rolf N. Barth, M.D. (Duke, 1997); Shankha Biswas, M.D. (Duke, 1996); Michael Davidson, M.D. (Yale, 1996); Patrick W. Domkowski, M.D. (Georgetown, 1997); Sitaram M. Emani, M.D. (Harvard, 1997); Paul Mosca, M.D. (Virginia, 1995); Mark W. Onaitis, M.D. (Duke, 1997); G. Robert Stephenson, M.D. (Johns Hopkins, 1996); David C. White, M.D. (Virginia, 1996); Rebekah R. White, M.D. (Duke, 1997).

Senior Assistant Residents: B. Zane Atkins, M.D. (Duke, 1995); William R. Burfeind, Jr., M.D. (Columbia, 1994); Paul Chai, M.D. (Duke, 1994); Lisa Clark, M.D. (Harvard, 1994); Piere DeMatos,

M.D. (Johns Hopkins, 1994); Michael R. Finch, M.D. (Duke, 1997); Thomas Z. Hayward, M.D. (Northwestern, 1994); G. Chad Hughes, M.D. (Duke, 1995); Christine Lau, M.D. (Dartmouth, 1995); Shu S. Lin, M.D. (Duke, 1992); John Maurice, M.D. (California-San Francisco, 1994); Kendra Merine, M.D. (Washington, 1993); Aurora D. Pryor, M.D. (Duke, 1995); Gretchen P. Purcell, M.D. (Stanford, 1997); Ashish S. Shah, M.D. (Pittsburgh, 1995); Burton M. Sundin, M.D. (Duke, 1997); Kirssten B. Wilkins, M.D. (Johns Hopkins, 1994).

Junior Assistant Residents: Cynthia Bowers, M.D. (Med. Coll. of Ohio, 1998); Heather Chulock-Sher, M.D. (Miami, 1998); Jeffrey G. Gaca, M.D. (Columbia, 1998); Denis L. Gonyon, M.D. (Michigan, 1998); Gonzalo Gonzalez-Stawinski, M.D. (Ponce School of Medicine, 1994); Matthew F. Kalady, M.D. (Duke, 1998); Costa D. Lallas, M.D. (Jefferson Medical College, 1998); Jaimie Nathan, M.D. (Yale, 1998); Ganesh Raj, M.D. (Thomas Jefferson, 1998); Robert W. Santa-Cruz, M.D. (Miami, 1998); Shawn D. Safford, M.D. (Duke, 1992); John E. Scarborough, M.D. (Duke, 1998); Patrick N. Weybright, M.D. (Harvard, 1998).

First Year Residents: David C. Adamson, M.D. (Johns Hopkins, 1999); Mark J. Albritton, M.D. (Chicago Medical School, 1999); James Bowers, M.D. (Wisconsin, 1999); Kelli R. Brooks, M.D. (Duke, 1999); Fernando C. Delvecchio, M.D. (Buenos Aires, 1990); William J. Foster, M.D. (Duke, 1999); Elizabeth S. Grubbs, M.D. (Duke, 1999); John D. Hewitt, M.D. (Duke, 1999); Michael M. Holloway, M.D. (Florida, 1999); Michael W. Kadrmas, M.D. (Washington, 1999); Aftab R. Kherani, M.D. (Duke, 1999); Christopher D. Landsford, M.D. (Michigan, 1999); Tamer H. Mahmoud, M.D. (Ain Shams, 1992); Robert A. Malinzak, M.D. (Duke, 1999); Ricardo A. Meade, M.D. (ITESM Medical School, 1997); Parag G. Patil, M.D. (Johns Hopkins, 1999); Jason A. Petrofski, M.D. (Johns Hopkins, 1999); Anthony S. Rhorer, M.D. (Duke, 1999); Shiva Sarraf-Yazdi, M.D. (Duke, 1999); John A. Seldomridge, M.D. (Columbia, 1999); Ari D. Silverstein, M.D. (Emory, 1999); Hardayal Singh, M.D., (Government Medical College, 1992); Tracey H. Stokes, M.D. (Cornell, 1999); Allston J. Stubbs, M.D. (Duke, 1999); Richard B. Thompson, M.D. (Columbia, 1999); Adrian Varela, M.D. (Florida, 1999); Alon Z. Weizer, M.D. (Baylor, 1999); Alan J. Ying, M.D. (Ohio, 1999).

#### **DIVISION OF NEUROSURGERY**

Chief Residents: Sohaib A. Kureshi, M.D. (South Carolina, 1994); John W. Kim, M.D. (Iowa, 1994). Residents: Ketan Bulsara, M.D. (Duke University, 1996); Dragan Dimitrov, M.D. (New York University School of Medicine, 1996); Amy B. Heimberger, M.D. (Tulane Washington, 1995); Kenneth M. Little, M.D. (Vanderbilt, 1998); Russell R. Margraf, M.D., Ph.D. (Albany, 1996); Kent C. New, M.D., Ph.D. (Georgetown, 1998); John B. Pracyk, M.D., Ph.D. (Duke, 1992); Alan T. Villavicencio, M.D. (Harvard, 1995); John C. Wellons, III, M.D. (Mississippi, 1995).

#### **DIVISION OF ORTHOPAEDIC SURGERY**

Chief Residents: J. Jay Crawford, M.D. (Vanderbilt, 1993); Mark A. Curzan, M.D. (California-Los Angeles, 1994); Aileen M. Danko, M.D. (Temple, 1994); E. Scott Frankel, M.D. (Rochester, 1994); Christopher K. Jones, M.D. (Emory, 1994); Martin J. Luber, M.D. (SUNY-Syracuse, 1994); J. Douglas Patterson, M.D. (Harvard, 1995); Jonathan R. Perryman, M.D. (Georgetown, 1994); Allison P. Toth, M.D. (Duke, 1994); Kurt L. Unverferth, M.D. (Ohio State, 1994).

Residents: Mark J. Albritton, M.D. (Finch, 1999); Julian "Mack" Aldridge, III, M.D. (Bowman Gray, 1998); Diane M. Allen, M.D. (Duke, 1995); Todd S. Atkinson, M.D. (Yale, 1998); Christopher J. Barnes, M.D. (Ohio State, 1997); Keith R. Berend, M.D. (Duke, 1997); Michael P. Bolognesi, M.D. (Duke, 1998); James R. Bowers, M.D. (Wisconsin, 1999); Hussein A. Elkousy, M.D. (Duke, 1995); Matthew J. Garberina, M.D. (Temple, 1997); Michelle A. Ghert, M.D. (Vanderbilt, 1996); Robert D. Graham, M.D. (Duke, 1997); Gregory V. Green, M.D. (Baylor, 1998); Forest T. Heis, M.D. (Cincinnati, 1995); Jon D. Hernandez, M.D., Ph.D. (UCLA, 1998); Michael M. Holloway, M.D. (Florida, 1999); Andrew S. Holmes, M.D. (Thomas Jefferson, 1997); Thomas F. Holovacs, M.D. (Columbia, 1995); Elizabeth S. Joneschild, M.D. (Duke, 1997); Michael W. Kadrmas, M.D. (Washington, 1994); Timothy J. Kinkad, M.D. (Yale, 1996); Daniel T. Kuesis, M.D. (Northwestern, 1996); Robert A. Malinzak, M.D. (Duke, 1999); Matthew D. Olin, M.D. (Bowman Gray, 1998); Anthony S. Rhorer, M.D. (Duke, 1999); Marco Rizzo, M.D. (Temple, 1996); James J. Rubano, M.D. (Hahnemann, 1998); Roy M. Rubin, M.D. (Temple, 1997); J. A. Alexander Seldomridge, III, M.D. (Columbia, 1999); William P. Silver, M.D. (Bowman Gray, 1997); Hardayal Singh, M.D. (Gov't Med. Coll., Patiala, 1992); Allston J. Stubbs, IV, M.D. (Duke, 1999); W. Christopher Urban, M.D. (Jefferson, 1998); Douglas J. Wyland, M.D. (North Carolina, 1995).

#### **DIVISION OF OTOLARYNGOLOGY**

Chief Residents: Daniel Lai, M.D. (Baylor, 1995); S. Andrew Harper, M.D. (North Carolina, 1995); Christopher T. Wenzel, M.D. (Duke, 1995).

Assistant Residents: Raymond Cook, M.D. (North Carolina, 1997); Brett E. Dorfman, M.D. (Emory, 1996); Morris Gottlieb, M.D. (Johns Hopkins, 1998); Thomas Y. L. Hung, M.D. (Massachusetts, 1996); Shannon E. Hunter, M.D. (North Carolina, 1998); Peter N. van der Riet (Leiden, 1992).

#### **DIVISION OF PLASTIC, RECONSTRUCTIVE, MAXILLOFACIAL AND ORAL SURGERY**

Instructors and Chief Residents: Laura A. Gunn, M.D. (Tennessee, 1991); Dimitrios Mastorakos, M.D. (Athens, Greece, 1987); Gregory M. Swank, M.D. (New Jersey, 1987).

Assistant Residents: Gunnar E.O. Bergqvist, M.D. (Pittsburgh, 1994); John A. Millard, M.D. (Georgetown, 1989); Gregory J. Moorman, M.D. (Texas Health Science Ctr., 1993); Kenneth O. Phillips, M.D. (Nebraska, 1995); Ramon A. Robles, M.D. (Arizona, 1993); Michael S. Wong, M.D. (Tufts, 1992).

#### **DIVISION OF UROLOGY**

Chief Residents: James V. Eaton, M.D. (Duke, 1994); Brian J. Malloy, M.D. (Southern California, 1994); Philip Newhall, M.D. (Boston, 1994); Frank H. Roland, Jr. (Duke, 1994).

Assistant Residents: Dieter P. Bruno, M.D. (Duke, 1995); Robert R. Byrne, M.D. (Baylor, 1996); Phillipp Dahm, M.D. (Heidelberg, Germany, 1994); Gerard D. Henry, M.D. (North Carolina, 1995); Ramsey L. Kuo, M.D. (Boston, 1994); Bertram A. Lewis, Jr. (Johns Hopkins, 1997); Mark J. Makhuli, M.D. (New York, 1995); Ravi Munver, M.D. (Cornell, 1996); Dinesh S. Rao, M.D. (Duke, 1997); Jeffrey J. Sekula, M.D. (UMDNJ, 1996); Chris B. Threath, M.D. (California-Irvine, 1996); Ning Z. Wu, M.D. (Duke, 1997).

# *Postgraduate Education*



## Postgraduate Education

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