Doctor of Medicine Program
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, dis-
ease, 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 stu-
dents to take the lead addressing national health needs. Duke University School of Med-
icine 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 lev-
els 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. The complete Self Study Review and LCME database is available for inspection to anyone upon request to the Registrar’s Office, 125 Davison Building, phone 919/684-2304.

**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, students are required to participate in a year-long course, Introduction to Clinical Care. This course, which also is offered throughout the second year as Ambulatory Care Clerkship, is designed to expand ambulatory, primary, and continuity care experience for Duke medical students. The course is a combined clinical curricular experience which emphasizes progressive knowledge and competencies. The course meets one afternoon per week with students beginning a supervised clinic assignment in January. Thereafter, students are in the clinic every other week and in small and large group instruction in the alternating weeks.

The first year consists of instruction in the following:

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAA 200 - Gross Human Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BCH 200 - Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>CBI 200 - Cell Biology</td>
<td>2</td>
</tr>
<tr>
<td>CBI 201 - Microanatomy</td>
<td>2</td>
</tr>
<tr>
<td>CBI 202 - Medical Physiology</td>
<td>4</td>
</tr>
<tr>
<td>GEN 200 - Genetics</td>
<td>2</td>
</tr>
<tr>
<td>IND 201 - Intro to Clinical Care</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 2</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMM 201 - Immunology</td>
<td>2</td>
</tr>
<tr>
<td>IND 201 - Intro to Clinical Care</td>
<td>2</td>
</tr>
<tr>
<td>MIC 200 - Microbiology</td>
<td>5</td>
</tr>
<tr>
<td>NBI 202 - Basic Neurobiology</td>
<td>4</td>
</tr>
<tr>
<td>PHR 200 - Pharmacology</td>
<td>4</td>
</tr>
<tr>
<td>PTH 200 - Pathology</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>22</td>
</tr>
</tbody>
</table>

A vacation takes place after the conclusion of the first year. In addition, every class has 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.

In addition, students are required to participate in a year-long course, Introduction to Clinical Care. This course, which also is offered throughout the second year as Ambulatory Care Clerkship, is designed to expand ambulatory, primary, and continuity care experience for Duke medical students. The core clinical rotations follow with 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 core clinical rotation in medical practice and health systems lasting two weeks follows the psychiatry rotation.

The clinical performance examination (CPX) is a standardized test of clinical performance that all students must take and pass after completing second-year clerkships. It 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. Each student determines 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. With rare exception, the elective experience should be taken as a block. During the eight months that comprise the third year, students are required to complete thirty-two basic science credits.

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

**Academic Standards.** The faculty of the Duke University School of Medicine has the responsibility to define minimum acceptable standards for academic performance. In all cours-
es, 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 mid-term 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 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.

A grade of Incomplete (I) 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 dean of 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 dean of medical education within two weeks of notification. The dean of medical education, with the advice of the Medical Center Policy Advisory Committee, 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 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 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 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, with the advice and consent of the Medical Center Policy Advisory Committee (MEDPAC), 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 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. 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.

**Audit and No Credit Courses.** 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 third and 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 register on a “no-credit” basis only for clinical courses whose total, combined weight does not exceed four. Such courses are not considered to be “audits.” Students are expected to participate fully in these courses and are graded upon the quality of their work, but do not earn credit toward degree requirement.

**Leave of Absence.** A student, after presenting a written request to the dean of medical education, 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 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 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 re-admission to the School of Medicine. When a leave of absence is taken, the dean may require the student upon return to repeat some or all of her or his previously completed academic program. To be eligible for a voluntary leave of absence, a student must have met all financial obligations to the university.

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

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

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

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

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

**Medical Licensure.** “The Federation of State Medical Boards (F.S.M.B.) and the National Board of Medical Examiners (N.B.M.E.) have established a single, three-step examination for medical licensure in the United States. The United States Medical Licensing Examination (U.S.M.L.E.) provides a common evaluation system for applicants for medical licensure.” (U.S.M.L.E. 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. In 1999, the March Step 2 Exam and the May Step 3 Exam will be paper and pencil. Computer-based exams begin in April, 1999. Call the Central Teaching Lab Office, 684-5967, for more information. The CTL website, http://som.mc.duke.edu will have 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 registered for courses in the School of Medicine to be eligible to take the U.S.M.L.E. and should speak with affected course directors at least two weeks prior to the test dates to make arrangements for the 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 (sometimes called externships or clerkships) 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.

Education Records. In accordance with the Family Education Rights and Privacy Act (F.E.R.P.A.), students are granted certain rights with respect to their education records. They are:

1. The right to inspect her or his education records:
   • Education records include those records which contain information directly related to a student and are maintained as official working files by the university. They do not include records made by faculty and administrators for their own use and not shown to others; campus police records; employment records; records of physicians, psychologists, etc., made or used only for treatment purposes; and records containing information relating to a person’s activities after she or he graduates or withdraws from the university.
   • Although F.E.R.P.A. regulations do not require institutions to provide copies of the education records unless to do so would affectively prohibit an individual from viewing her or his records, it is the policy of Duke University Medical School to make such copies available. However, the Medical School may deny requests to release copies of the transcripts of those students in financial default. The Medical School also does not release copies of other schools’ transcripts unless mandated by F.E.R.P.A.

2. The right to amend the contents of the education record to ensure that they are not inaccurate, misleading, or otherwise in violation of the student’s privacy or other rights.

3. The right to file a complaint with the U.S. Department of Education concerning perceived failure on the part of the school to satisfy the requirements of F.E.R.P.A.

F.E.R.P.A. also limits the disclosure of personally identifiable information to others without the student’s prior consent with the following exceptions:

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

The following have been designated as directory information by the University and/or the Medical School: name, addresses—including email addresses, telephone listing, date and place of birth, photograph, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and most recent previous educational institution attended. In addition, class rosters are considered to be as directory information in the School of Medicine.

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

The complete university policy regarding F.E.R.P.A. is located in the Medical School Registrar’s Office.

**Combined Degree Programs**

**Medical Scientist Training Program.** The Medical Scientist Training Program is designed for highly qualified students strongly motivated toward a career in medical sciences and academic medicine. It provides an opportunity to integrate graduate education in one of the sciences basic to medicine with the full clinical curriculum of the School of Medicine. The program requires, on average, six to seven years of study and leads to both the M.D. and Ph.D. degrees. Although the special emphasis of this program is on basic medical science, the trainees, because of their education in clinical medicine, have a remarkable range of career opportunities open to them. Graduates of this program follow one of two broad paths. Some embark directly on careers in teaching and research in one of the basic medical sciences while maintaining strong ties with clinical science as a result of their combined training. Others enter residency programs before pursuing investigative and teaching careers in clinical medicine, carrying with them strong academic backgrounds which allow them to conduct fundamental research with a foundation of superior training and experience in basic sciences.

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

**Financial Support.** Students admitted to the first year of the program receive a traineeship award (National Research Service Award) consisting of a stipend and full tuition allowance from the National Institutes of Health. Currently the annual stipend is $15,500. Financial support from that award can be furnished for up to six years assuming normal progress. These six years need not be consecutive; this permits flexibility in funding in case more than six years are required for completion of the curriculum. Funding by the NIH is limited to citizens or permanent residents of the United States.

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

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

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

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

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

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

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

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

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

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

2. The application form for the Medical Scientist Training Program should be completed and submitted no later than December 1.

3. To facilitate review of this application, the Medical College Admissions 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 required to complete an application form for the Graduate School. The Graduate Record Examination is not required for this purpose.

5. Applicants are notified about acceptance into the program on or about February 28.

Additional information may be obtained by writing Salvatore V. Pizzo, M.D., Ph.D., Director, Medical Scientist Training Program, Box 3712, Duke University Medical Center, Durham, North Carolina 27710 or emailing paoburks@acpub.duke.edu.

The Medicine and Clinical Research Program. The Clinical Research Training Program is offered by the faculty of the Division of Biometry in the Department of Community and Family Medicine at Duke with the participation of other members of the Medical Center faculty having expertise in relevant areas. The program provides academic instruction in the quantitative and methodological principles of clinical research. Formal courses in research design, statistical analysis, decision analysis, research ethics and research management are offered. 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 and thesis 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; the thesis serves to demonstrate the student's competence in the use of quantitative methods in medical research.

Application procedure. The CRT Program and the Clinical Research Study Program offered to third year students through the Medical School are two distinct programs; formal application to the Training Program must be made by students interested in pursuing the M.H.S. Medical students seeking admission to the Clinical Research Training degree program should contact William Wilkinson, Ph.D., Program Director, to discuss their interests and to obtain instructions as to how to apply.
**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 M.D./M.B.A., M.D./M.H.S., M.D./M.P.P., or M.D./M.P.H. During the fourth year of clinical electives, students are encouraged to take the basic neurology clerkship, a generalist subinternship, and at least one ambulatory care rotation in a generalist discipline such as community medicine or geriatric medicine. Throughout the four years, students are assigned a primary care mentor as well as an advisory dean. Students may join the program at any time during the first three years and may withdraw from the program at any time. Participation also does not necessitate a primary care career choice. The program is jointly sponsored by the Departments of Community and Family Medicine, Medicine, Obstetrics/Gynecology, and Pediatrics. Additional information may be obtained by contacting Barbara Sheline, M.D., M.P.H., Box 3886, Duke University Medical Center, Durham, NC 27710, sheli002@mc.duke.edu.

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

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

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

Further information may be obtained by contacting Margaret Humphreys, M.D., Ph.D., Box 3675, Duke Children's Primary Care, Duke University, Durham, NC 27708, meh@acpub.duke.edu.

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

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

Eligibility. Applicants for the M.D.-M.B.A. program must qualify for admission to both the School of Medicine and the Fuqua School of Business. The usual approach is to apply to the Fuqua School of Business during the second year of Medical School. It is helpful, however, for a student to indicate upon admission to the School of Medicine that he/she has an interest in the joint degree program of the School of Medicine and the Fuqua School of Business. Neither school gives preference to joint degree candidates in the admission process. Application Procedures. Application forms for the Fuqua School of Business may be obtained by writing to the Office of Admissions, Duke University Fuqua School of Business, Box 90104, Duke University, Durham, NC 27706. Applications for the School of Medicine should be made by utilizing the M.C.A.T.S. procedure described in this bulletin.

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

For additional information, contact the M.D.-M.B.A. advisor Steven J. Bredehoeft, M.D., Box 2928, Duke University School of Medicine, Durham, NC 27710, brede001@mc.duke.edu and Sim B. Sitkin, Ph.D., 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 M.D. and the J.D. degrees.

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

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

Application Procedure. Application forms for the School of Law may be obtained by writing to the Office of Admissions, Duke University School of Law, Durham, North Carolina 27706. Applications for the School of Medicine shall be made by utilizing the A.M.C.A.S. 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 (M.C.A.T.) and the Law School Aptitude Test (L.S.A.T.). For admission to the Medical School, the A.M.C.A.S. application procedures should be completed. Upon receipt of the supplemental application form from Duke, the box indicating M.D.-J.D. Program should be checked. The deadline for the A.M.C.A.S. procedure is November 1. There is no deadline for the Law School but January 15 or earlier submission is suggested.

For additional information contact the M.D.-J.D. Advisor, Paul Lee, M.D., J.D., Box 3802, Duke University Medical Center, Durham, North Carolina 27710, lee00106@mc.duke.edu, (919) 681-2793.

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

For additional information contact the M.D.-M.P.H. Advisor, Laurence G. Branch, Ph.D., Box 3003, Duke University Medical Center, Durham, North Carolina 27710, (919) 416-5880 ext. 223, 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 M.D. and Master of Public Policy (M.P.P.) degrees are awarded.

Admissions. Students may apply for admission to the program when they make application to the School of Medicine or 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 Dan G. Blazer, M.D., Ph.D., Box 3005, Duke University Medical Center, Durham, North Carolina 27710, blaze001@mc.duke.edu.
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 residential apartment facilities in which graduate and professional students live. These apartments are available for continuous occupancy throughout the calendar year. All the apartments are completely furnished by the university. An itemization of furnishings is included with the floor plans sent out in the application packet.

Spaces in apartments for single students are provided on an individual basis with each student paying rent per academic term to the university. This method permits students to share apartments with others of their choice. When this is impractical, the Department of Housing Management strives to place persons with similar interests together.

Town House Apartments. Town House Apartments, located about three blocks from the main East-West Campus bus line, is a thirty-two-unit complex. These apartments are more spacious than most apartments found on campus or in Durham. Because of its location away from the academic facilities, students find that these apartments offer a change from normal campus life and activities.
Each air-conditioned apartment includes a living room, a master bedroom, a smaller bedroom, a bath and a half, and an all-electric kitchen with a dining area. Spacious closets and storage spaces 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, and electricity—are provided. Telephone jacks are provided in each apartment. Duke University’s Tel-Com supplies telephone service. Residents are responsible for providing their own phones and having them connected.

Central Campus Apartments. Duke University also operates a 500-unit apartment complex.

A swimming pool, located in the center of the complex, is open during the late spring and throughout the summer months. Additional facilities include a pub, convenience store, tennis courts, and basketball courts.

All utilities—water, heat, air-conditioning, and electricity—are provided. Telephone jacks are provided in each apartment. Duke University’s Tel-Com supplies telephone service. Residents are responsible for providing their own phones and having them connected.

Efficiency, two-bedroom, and three-bedroom apartments are rented to graduate students. Efficiency units are very limited in number and are not generally available to new students.

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 online 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.
Services Available

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

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., Saturdays and Sundays from 11:00 a.m.-2:00 p.m. A wide variety of services are available: general medical care, health education, laboratory, pharmacy, travel and immunization, x-rays, cold/flu self-help table, allergy clinic, and nutrition counseling.

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

For problems arising after hours, 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 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 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://h-devil-www.mc.duke.edu/h-devil.

Student Health Physical Therapy. The Student Health Physical Therapy Clinic is located 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
- 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 services at D.F.M.C. and other locations:
- health education and health promotion, including nutrition consultation
- infirmary service, not including meals and not including diagnostic testing ordered by specialist consultants
- mental health and career counseling at C.A.P.S.

**Services not Covered by the Health Fee.** If you are unsure whether a service is covered, please ask the 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, 353 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 regarding a wide range of concerns. These include issues of 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 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 A.O.A. was founded in 1931 and has since played an important role in the medical center. For the past thirty years, A.O.A. 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. A.O.A. 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: Patrick J. Lager

**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.


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 by creating and strengthening life-long relationships between classmates, colleagues, faculty, and future physicians. The association is comprised of more than 4,500 Duke School of Medicine graduates and 5,500 former house staff members representing every state in the nation as well as forty-six countries worldwide. Each year the association sponsors events and activities including Medical Parents Weekend; the Davison Club/Medical Alumni Association Student-House Staff-Faculty Tennis Tournament, the Alumni Host Program; 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 school yearbook; student orientation activities, including a welcome event and a copy of Davison of Duke, the memoirs of the medical school’s first dean; and distribution of the publications Prespec-101ves and Medical Alumni News.

President: L. Scott Levin, M.D., H.S. 1982-91, 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. Se-
lection 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 diagnostian 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 chairman with whom their work has been done. The work must have been presented at the A.O.A. 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.
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 (A.M.C.A.S.). 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 A.M.C.A.S., if credentials indicate, a supplemental application and other information are mailed which serve as notification of receipt of the application from A.M.C.A.S. Applications are received by A.M.C.A.S. any time after June 15 until November 1, which is the deadline for all material to be received by A.M.C.A.S. 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 15. 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 September 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. M.C.A.T. scores dated earlier than four years prior to the year applied for 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 coursework.

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. Students must complete all Ph.D. requirements prior to matriculation if application is made while still in graduate school.
Reapplication

Students who wish to apply for a second time should write A.M.C.A.S. 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 1999-2000 is 100.
## Roster of Regional Representatives of Admissions Committee

**Alabama:** Birmingham, Margaret M. Tarpey  
Arizona: Phoenix, Beth Ann Banks; Scottsdale, Andrew S. Jacob  
Arkansas: Little Rock, Karl Staub  
California: Carlsbad, Mark Landon; Carmichael, John R. Dein; Hillsborough, Jerome M. Javer; Irvine, A. Brian Davis; La Jolla, Herman F. Froeb; Los Angeles, Kenneth P. Ramming, Douglas F. Smiley; Orange, Timothy R. S. Harward; Redwood City, John B. Simpson; Sacramento, Sidney M. Gospe, Jr.; San Diego, Stuart B. Kincaid, Karen Van Hoesen; San Francisco, Robert Kahn, R. Gray Patton, Henry Safrit; Santa Fe, Richard A. Schatz; Walnut Creek, David S. Forth  
Colorado: Denver, Frederick L. Grover, Michael J. Jobin, Alan Klein, York E. Miller; Englewood, Bertram Goldberg; Littleton, David S. Shimm  
District of Columbia: Jonca C. Bull, Linda D. Green, Kurt D. Newman  
Florida: Gainesville, Jerry Berger; Hollywood, Norman Moskowitz; Miami, Leonard A. Kalman; Miami Beach, Stephen W. Unger; Naples, James Halika; Tampa, America A. Gonzalvo, Douglas Reintgen  
Georgia: Atlanta, Crawford F. Barnett, Jr.  
Hawaii: Honolulu, Garrett F. Saikley; Kealakekua, Thomas E. Austin; Wahiawa, Ned Stoughton  
Idaho: Barrington, George Pepper  
Iowa: Iowa City, Febel, Wallace  
Kansas: Hopkinsville, Robert B. Bressler; Lexington, Julia L. Stevens  
Louisiana: Baton Rouge, Karen H. Miller; New Orleans, Nancy Haslett  
Maryland: Annapolis, Robin E. Rutherford; Chevy Chase, James R. Gavin, III; Olney, Joseph Buffington  
Michigan: Detroit, John J. Fath; Flint, Melissa Hamp; Grosse Pointe, John M. Lesesne  
Minnesota: Minneapolis, James A. Halikas  
Missouri: Fair Grove, C. Norman Shealy; Kansas City, David L. Smith, Gerald Wood; St. Louis, Scott J. Anderson, W. Edwin Dodson
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<thead>
<tr>
<th>State</th>
<th>Location</th>
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<tbody>
<tr>
<td>Montana</td>
<td>Dillon</td>
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<td>Nebraska</td>
<td>Omaha</td>
<td>Linda K. Matson</td>
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<td>Nevada</td>
<td>Las Vegas, Reno</td>
<td>Thomas L. Lambert, Thomas Fyda</td>
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<td>New Hampshire</td>
<td>Concord</td>
<td>Joseph R. Snow</td>
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<td>New York, Portland, Rhinebeck</td>
<td>J. Paul Lunas, Catherine Toye</td>
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<td>Portland</td>
<td>Marcia Freed</td>
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<td>Lincoln</td>
<td>Henry G. Magendantz, Providence, Benjamin T. Jackson</td>
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<td>South Carolina</td>
<td>Greenville</td>
<td>Will Flanagan</td>
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<td>South Dakota</td>
<td>Sioux Falls</td>
<td>Samir Abu-Ghazaleh</td>
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<tr>
<td>Tennessee</td>
<td>Chattanooga, Memphis, Nashville, Alexander C. McLeod</td>
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<td>Texas</td>
<td>Dallas, Galveston, Houston, Madeleine Duvic, Kenneth Gould, Jr., Barry N. Hyman, Eugenia Kleinerman, Leonard A. Zwelling, Plano, Alan D. Davis</td>
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<tr>
<td>Utah</td>
<td>Provo</td>
<td>Clark T. Bishop</td>
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<td>John Modlin</td>
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<td>Virginia</td>
<td>Alexandria, Falls Church, Thom A. Mayer</td>
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<td>Auburn, Renton, Seattle, Gregory J. Raugi, Woodinville, Alice M. Ormsby</td>
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<td>West Virginia</td>
<td>Morgantown</td>
<td>Lisa Gangarose</td>
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<tr>
<td>Wyoming</td>
<td>Laramie</td>
<td>Elizabeth Schreiner</td>
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</table>
Financial Information
Fees and Expenses

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.

1998-1999 Cost of Education

<table>
<thead>
<tr>
<th>Item</th>
<th>Year 1, 2, and 3</th>
<th>Year 4</th>
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<tr>
<td>Tuition</td>
<td>26,700</td>
<td>25,450</td>
</tr>
<tr>
<td>Accident and Sickness Insurance* (subject to change)</td>
<td>685</td>
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</tr>
<tr>
<td>Laptop computer rental fee</td>
<td>1,620</td>
<td></td>
</tr>
<tr>
<td>First Year Fee* (includes microscope rental, first year only)*</td>
<td>275</td>
<td></td>
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<tr>
<td>Annual Cost of Books and Supplies: first year</td>
<td>1,610</td>
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</tr>
<tr>
<td>Annual Cost of Books and Supplies: second year</td>
<td>1,434</td>
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<tr>
<td>Annual Cost of Books and Supplies: third and fourth years</td>
<td>679</td>
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<tr>
<td>Lodging: first year</td>
<td>4,800</td>
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<tr>
<td>Lodging: second year</td>
<td>5,200</td>
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<tr>
<td>Lodging: third and fourth years</td>
<td>3,200</td>
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<tr>
<td>Board: first year</td>
<td>3,810</td>
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<tr>
<td>Board: second year</td>
<td>4,130</td>
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<tr>
<td>Board: third and fourth years</td>
<td>2,540</td>
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<td>Student Health Service* $215 per semester</td>
<td>430</td>
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<tr>
<td>Student Government* (Davison Society)</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Continuation of Enrollment Fee* (per semester)</td>
<td>3,535</td>
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<td>Graduate Student Fee*</td>
<td>19</td>
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<tr>
<td>Motor Vehicle Registration: car</td>
<td>120</td>
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</tr>
<tr>
<td>Motor Vehicle Registration: motorcycle</td>
<td>31</td>
<td></td>
</tr>
</tbody>
</table>

*Sphygmomanometer, ophthalmoscope, otoscope, and other equipment required of each student must conform to rigid standards.
*Mandatory fees.
†The School of Medicine encourages students to interrupt their studies to pursue approved research that is complementary to the medical curriculum at Duke or elsewhere for no credit. To retain full-time student status for loan deferment purposes, students may seek approval to enroll in the Continuation of Enrollment option. Only students eligible to be enrolled at Duke during the applicable time period may participate.
Tuition and fees are payable on a semester basis, and students are required to pay full tuition for four years as a requirement for graduation. For the freshman year, one-half of the annual tuition and fees is billed in July and the other one-half in December. Students who must repeat 60 percent or more of the required first year courses pay full tuition while prorated tuition is paid by those repeating less than 60 percent of those courses. Second year students are billed a per credit rate for a total of 54 credits. Juniors and seniors are billed for a total of sixty-four credits during the elective years. Distribution of tuition charges depends upon the number of credits for which a student is registered each term. Annual cost per credit is obtained by dividing the tuition by thirty-two, half the number of elective credits required for graduation. No tuition is charged for elective credit taken in excess of the sixty-four required to obtain the M.D. degree provided the credit is taken within the same semester in which the student completes graduation requirements. Please note, however, that the student is no longer eligible to receive financial aid funding after he or she has completed the sixty-four elective credits.

Payment of Accounts for Fall and Spring. 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 late payment 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 late payment date, a late payment charge as described below is assessed on the next invoice and certain restrictions as stated below are 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 are 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 late payment 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.

Fall and Spring Refunds. Tuition and fees refunds are governed by the following policy:

1. In the event of death a full tuition and fees refund are granted.
2. In all other cases of withdrawal or leave of absence, students or their parents would need to follow the guidelines provided by the university.
may elect to have tuition refunded or carried forward as a credit for later study according to the following schedule:

a. withdrawal before the beginning of classes—full refund;
b. withdrawal during the first or second week—80 percent;
c. withdrawal during the third through fifth week—60 percent;
d. withdrawal during the sixth week—20 percent;
e. withdrawal after the sixth week—no refund;
f. tuition charges paid from grants or loans are restored to those funds on the same pro rata basis and are not refunded or carried forward.

3. In the case of changing enrollment category from full-time to part-time, dropping special fee courses (music, art, golf, etc.), or dropping audit courses, a full refund is granted during the drop/add period. Subsequent to the drop/add period, changes of category are not allowed. Students may, however, withdraw from courses after the drop/add period with no refund or add new courses if the proper tuition is paid.

Because Duke University participates in Title IV federal aid programs, it follows federal guidelines with respect to the refund and repayment of these funds. All first time students who have their charges and 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 dean's 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 1999-2000 academic year, rental rates for the first-year medical student are projected to be $4,972 for the Town House apartments. Utility charges, except telephone, are included in these rates. Rates are per person per academic year.

Rental rates in Central Campus Apartments for the 1999-2000 academic year are projected to range from $4,224 to $6,516 for first-year medical students. Utility charges, except telephone, are included in the Central Campus Apartment 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.
Financial Information

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.

Motor Vehicle Registration

Each motor vehicle operated on Duke University campuses by students enrolled in the School of Medicine must be registered at the Medical Center Traffic Office, PRT Level, Parking Deck II, within five days after operation on the campus begins, and thereafter must display the proper registration decal.

All students must pay an annual fee of $120 for each four-wheeled motor vehicle and $31 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.


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, and are not in addition to any other tuition award.

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 freshmen 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 Office. 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. A full twelve months is required for the research experience. Selection for the following awards is made by the Student Research Scholarship Committee.

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.

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 a primary appointment in medicine or in a basic science department. (contact Dr. Rosse at 919-684-3724 or by e-mail 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, we have 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. 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.

Merit Awards for Medical Students 55
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.

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 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. Awards are conditional until all required documents are received.

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 Medical Center Endowed Funds.


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.

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

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

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

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.


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.


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 Scholarship, established in 1975, by gift from C. G. McGehee, Jr.

Medical Alumni/Alumni Fund Scholarship Fund Quasi Endowment, 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.


Physical Medicine Scholarship, established in 1963, by gift from Central Carolina Con-
quences Hospital, Inc., Greensboro, North Carolina.
Queen Effat Muhhammed Al Thenayan Medical Scholarship Endowment, established 1993, by gift from Her Royal Highness Queen Effat Muhhammed 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.
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.
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.

Scholarships for Students of Exceptional Financial Need (E.F.N.). This federally funded program provides grant assistance to schools for students who qualify on the basis of federal criteria. Recipients, who are selected by the school, must meet the federal criteria for the grants. The selected student receives tuition and all other reasonable educational expenses (minus living expenses). Recipients must enter and complete a residency training program in a primary health care specialty not later than four years after completing the undergraduate medical education program and must practice in the primary health care specialty for five years after completing the residency program. Students who fail to maintain an acceptable level of academic standing and graduates who fail to comply with the primary care requirements are liable to the federal government for the amount of the E.F.N. award and for interest on such amount at the maximum legal prevailing rate not later than three years after the date on which the individual breaches the agreement.

Financial Aid for Disadvantaged Health Professions Students (F.A.D.H.P.S.). Recipients of this federally funded grant program are selected by the school on the basis of federal criteria. The selected student must be from a disadvantaged environment or
Scholarships for Disadvantaged Students (S.D.S.) and Loans for Disadvantaged Students (L.D.S.). Duke University School of Medicine does not participate in these two programs.

Primary Care Loan (P.C.L.) was formerly known as U. S. Health Professions Student Loan (H.P.S.L.). 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. Students who received their first H.P.S.L. funds before July 1, 1993, are exempt from this requirement.

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 (B.G.M.S.) 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. B.G.M.S. 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 B.G.M.S. 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, graduate and professional students are financially independent of parents. The annual maximums for medical students are $8,500 subsidized and $30,000 unsubsidized. For current medical students, the total maximum unsubsidized loan is $8,500. 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.
Courses of Instruction
Anesthesiology


Clinical Professor: Norbertus P. de Brujin, M.D. (Groningen, 1976).

Professor of the Practice of Experimental Anesthesiology: David W. Amory, M.D., (British Columbia 1967), Ph.D., (Washington, 1961).


Clinical Associate Randall F. Cooob, M.D. (Southern California, 1972).

Basic Science Electives

ANE-243B. Research Methodology and Experimental Design I

ANE-244B. Research Methodology and Experimental Design II. This two-semester sequence of courses (Research Methodology and Experimental Design I and II) is intended to provide a framework about research design for third year medical students currently engaged in bench top research and to give the participants broad exposure to techniques used in a variety of research settings. This breadth of exposure enables each student to understand research technologies of the future as well as what is currently available. Formal seminars and informal discussions during laboratory sessions are used to present didactic information, while observational and hands-on work demonstrate laboratory methodology. The evaluation is based on two submitted papers. The fall paper is 5-10 pages in length and is in the format of a grant, based on the student’s proposed research. This “grant” serves to focus the student’s research along with familiarizing them with the current state of knowledge in their area of interest. The spring paper is a Scientific American Style manuscript (5-10 pages) presenting the student’s results and conclusions from their research year. Credit: 1 per semester. Enrollment: min 1, max 15. King, Mwon, Reynolds, Stolp, and Warner

Clinical Science Electives

ANE-215C. Advanced Cardiac Life Support (ACLS). The ACLS Provider course follows the American Heart Association (AHA) guidelines. This course consists of twelve hours of lecture skill stations, case-based teaching, and evaluation. The course will be offered once in spring 2000. (Contact the Registrar’s Office for the date.) Prerequisite: Current Basic Life Support Certification (CPR). Credit: 1. Enrollment: min 10, max: 50. King and staff

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 su-
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. In addition to this clinical work, students are given the opportunity to 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 and February. Credit: 4. Enrollment: max 6, min 2.

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. 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: SUR 241C. Credit: 5. Enrollment: max 8.

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
Biochemistry

Associate Professors: Michael D. Been, Ph.D. (Washington, 1982); Patrick Casey, Ph.D. (Brandeis, 1986); Ronald C. Greene, Ph.D. (California Inst. Tech., 1954); Russel E. Kaufman, M.D. (Ohio State, 1973); Terrence Oas, Ph.D. (Oregon, 1986); Eric Toone, Ph.D. (Toronto, 1989).
Assistant Research Professor: Jean L. Johnson, Ph.D. (Duke, 1974).

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.

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.
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); Theresa R. Pope, Ph.D. (Florida, 1989); Daniel Schmitt, Ph.D. (SUNY-Stony Brook, 1995).
Associate Research Professors: Diane K. Brockman, Ph.D. (Yale, 1994); Leslie J. Digby, Ph.D. (California at Davis, 1994); Mark Spencer, Ph.D. (SUNY-Stony Brook, 1995); 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).
Research Associates: Friderun Ankel-Simons, Ph.D. (Copenhagen, 1963); Pierre Lemelin, Ph.D. (SUNY-Stony Brook, 1996); Rick Madden, Ph.D. (Duke, 1990); Christine Wall, Ph.D. (SUNY-Stony Brook, 1995).
Research Scientists: Susan Crissy, Ph.D. (Maryland, 1985); Lillian Spencer, Ph.D. (SUNY-Stony Brook, 1995); Thomas Struhsaker, Ph.D. (California-Berkeley, 1965).

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.

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. Hylander and 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


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); George M. Padilla, Ph.D. (California at Los Angeles, 1960); Michael K. Reedy, M.D. (Washington, 1962); George G. Somjen, M.D. (New Zealand, 1961).

Associate Professors: Onyekwere E. Akwari, M.D. (Southern California, 1970); Nels C. Anderson, Ph.D. (Purdue, 1964); Frederick R. Cobb, M.D. (Mississippi, 1961); Jonathan Cohn, M.D. (Rockefeller, 1978); Joseph M. Corless, M.D., Ph.D. (Duke, 1972); Joseph C. Greenfield, M.D. (Emory, 1956); Tobias Meyer, Ph.D. (Basel, 1966); Elliott Mills, Ph.D. (Columbia, 1964); Frederick H. Schachat, Ph.D. (Stanford, 1974); David W. Schomberg, Ph.D. (Purdue, 1965); Steven R. Vigna, Ph.D. (Washington, 1978).


Adjunct Professor: Martin Rodbell, Ph.D. (Washington, 1954).


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


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. M. 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. M. McIntosh and staff


Electives

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

CBI-219B. Preceptorship in Cell Biology/Physiology. Guided independent study of original literature and/or research experience in cell biology and/or physiology. Pre-requisites: 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. C-L: Graduate School. 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. Pre-requisites: permission of faculty preceptor. C-L: Graduate School. Credit: 1-3. Enrollment: max 8. Staff


Community and Family Medicine

Clinical Professor James L. Michener, M.D. (Harvard, 1978), Chairman.
Professor: Barbara K. Rimer, Dr. P.H. (Johns Hopkins, 1981).
Associate Professors: Colleen McBride, Ph.D. (Minnesota, 1990); Joellen Schildkraut, Ph.D. (Yale, 1987).
Associate Clinical Professor: Jean G. Spaulding, M.D. (Duke, 1972).
Assistant Research Professor: Kathryn I. Pollack, Ph.D. (Houston, 1996).

DIVISION OF BIOMETRY

Associate Professor William E. Wilkinson, Ph.D. (North Carolina, 1968), Chief.
Research Professor: Kenneth G. Manton, Ph.D. (Duke, 1974).

Assistant Professors: 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,

DIVISION OF MEDICAL INFORMATION SCIENCES


FAMILY MEDICINE PROGRAM

Assistant Clinical Professor Hershey S. Bell, M.D. (Toronto, 1982), Vice Chair.
Clinical Professor: Kathryn A. Andolsek, M.D. (Northwestern, 1984); Lawrence R. Wu, M.D. (Duke, 1982).
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.
Associate Professor: John Dement, Ph.D. (North Carolina, 1980).
Assistant Clinical Professors: George W. Jackson, M.D. (Western Reserve, 1968); Jerry J. Tulin, Ph.D. (Catholic Univ., 1965).
Assistant Research Professor: Hester J. Lipscomb, Ph.D. (North Carolina, 1995).
Associate: Thomas O. Brock, III, Ph.D. (Wake Forest, 1980).

DIVISION OF PHYSICIAN ASSISTANT EDUCATION

Assistant Clinical Professor Reginald D. Carter, Ph.D. (Bowman Gray, 1970), Division Chief.
Assistant Clinical Professor Joyce A. Copeland, M.D. (North Carolina, 1975), Medical Director.

DUKE DIET AND FITNESS CENTER
Assistant Clinical Professor: Ronette L. Kolotkin, Ph.D. (Minnesota, 1978).
Clinical Associate: Lisa Giannetto, M.D. (Loyola, 1986).

ADJUNCT FACULTY
Adjunct Associate Susan Lieff, Ph.D. (North Carolina, 1996).

COMMUNITY FACULTY
Associate Clinical Professor: Charles Ellenbogen, M.D. (Chicago-Pritzker, 1964), Fayetteville, NC.
Assistant Clinical Professors: L. Allen Dobson, Jr., M.D. (Bowman Gray, 1980), Mt. Pleasant, NC; Lauracinnie Jenkins, M.D. (SUNY at Buffalo, 1982), Harare, Zimbabwe; Oliver N. Oyama, Ph.D. (Indiana, 1985), Fayetteville, NC; James M. Wetter, M.D. (SUNY at Buffalo, 1974), Fayetteville, NC.

Assistant Consultant Professors: John B. Anderson, M.D. (Cincinnati, 1980); Philip Singer, M.D.
Community and Family Medicine  73


Emeriti: Arthur C. Christakos, M.D.; E. Harvey Estes, Jr., M.D.; Siegfried H. Heyden, M.D.; Dorothy E. Naumann, M.D.; Max Woodbury, Ph.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 sixteen 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 timelimitations, 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.

**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 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 upon the 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 upon 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-247B. Medicine in America.** The historical development of the medical profession in the United States with attention to such topics as the changing basis of authority for medical practice, the education of physicians, the impact of science and technology on health care, physician-patient relations, the organization of the profession as a whole and by specialty, the emergence of the hospital, the role of government in health care delivery and contemporary criticisms of the health care system. The history of the Duke University Medical Center provides a recapitulation of course themes. Additional units of credit may be earned through independent study. Credit: 1.

**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.
CFM-251C. Complementary Medicine: Academic and Community Perspectives. The purpose of the course is to familiarize Duke students with the large variety of complementary 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. They will be instructed to be prepared to field questions of a critical nature, and they will be expected to sign a release stating they will not use participation in the course for marketing purposes in the community. 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.

CFM-254C. Community Medicine Elective. 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 is held in Madison County in western North Carolina. 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 quality 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. 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. Sugarman

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-258C. Legal Issues in Medicine. A seminar which introduces participants to the basic approach of law and legal process to contemporary issues in medical care including malpractice, hospital privileges, confidentiality, natural death, abortion, consent/authorization for treatment, human experimentation, and peer review. Topics may be chosen by individual students. Common misconceptions about malpractice law and the rights of physicians and patients as well as the legal mechanisms for resolving disputes are examined including the role of expert witnesses. If permitted by the instructor, this clinical science course can be audited. Credit: 2. Enrollment: min 5, max 20. Warren

CFM-259C. Advanced Clerkship in Family Medicine. This course provides inten-
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 in 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. 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). No drops are permitted within sixty days of the first day of the rotation. 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.
ment: min 3, max 8. Puckett and staff

**CFM-299C. Community and Family Medicine Preceptorship.** An individually tailored preceptorship may be arranged for students to work with a family physician in a community practice site almost anywhere. The rotation allows students to observe and participate in the delivery of health care to individual patients and their families within the context of the community in which they live. The rotation is intended to supplement and complement the second year core clerkship. A wide variety of geographic locations and practice types are available; students may choose from an extensive list or nominate a new site. Because of the necessity for site approval and prior arrangements with preceptors, it is essential that interested students contact the Department as soon as possible and at least four months prior to the desired rotation. Drops are not accepted. Prerequisites: permission of instructor. Credit: 4. Kaprielian and staff

**DIVISION OF BIOMETRY**

**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: BM E-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 cognitive models. Specific applications examined in detail include MYCIN, ONCOCIN, PIP, CASNET, ILIAD, QMR, and DXPLAIN and selected EXPERT systems. Approval of the instructor required. C-L: BME-241 (Graduate School). Credit: 3. Staff

**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, reli-
ability, 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-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 Percak-Vance, Ph.D. (Indiana, 1978).** 
**Associate Professors: Joseph Heitman, Ph.D. (Rockefeller, 1989), M.D. (Cornell, 1992); Jeffery Vance, Ph.D. (Indiana, 1979), M.D. (Duke, 1984).** 
**Assistant Professors: F. Andrew Futreal, Ph.D. (North Carolina, 1993); Joseph Heitman, Ph.D. (Rockefeller, 1989), M.D. (Duke, 1990); 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-210B. 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.** 
**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); Dhavalkumar D. Patel, M.D., Ph.D. (Duke, 1989); Clay Smith, M.D. (Texas-Southwestern, 1984); J. Brice Weinberg, M.D. (Arkansas, 1969); Yuan Zhang, Ph.D. (Yale, 1989).** 
**Assistant Research Professor: Donna D. Kostyu, Ph.D. (Duke, 1979); Marcelia Sarzotti-Kelsoe, Ph.D. (Duke, 1980); Joel R. Ross, Ph.D. (Texas-Southwestern, 1991); Douglas A. Steeber, Ph.D. (North Carolina, 1975).**
Required Course

**IM M-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

**IM M-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

**IM M-259B. Molecular Biology I: Proteins And Enzymes.** Detailed concepts of the structure and function of proteins as enzymes and as structural elements of cellular substructures including: protein primary structure and its determination, patterns of protein folding, mechanisms of enzyme catalysis and regulation, function and formation of multimeric protein assemblies, proteins and other constituents of biological membranes. C-L: BCH 259B; CBI 259B; MIC 259B; Graduate School. Credit: 3. Fierke and staff

**IM M-268B. Molecular Biology II: Nucleic Acids.** Biochemistry of nucleic acids, with emphasis on their chemistry, structure, metabolism, and biological function in information transfer. Prerequisites: introductory biochemistry and Biochemistry 259. C-L: BCH 268B; MIC 268B; Graduate School. Credit: 4. Steege and staff

**IM M-269B. Advanced Cell Biology.** An advanced course in cell biology with emphasis on current research literature and featuring in-depth discussion of selected areas by staff engaged in research in these areas. The course covers membrane structure and physiology, the cytoskeleton, cell motility systems, chromosome mechanics, chromosome structure and function, and eukaryotic gene structure, control, and replication. C-L: CBI 269B; MIC 269B; Graduate School. Credit: 3. Siedow and staff

**IM M-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 biological 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

**IM M-330B. Medical Immunology.** A brief review of basic concepts of immunology followed by in-depth discussions of the role of immune mechanisms in the pathogenesis and treatment of human diseases. Principle emphasis is placed on immune deficien-
IM M - 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/CEC. This two-week required clerkship uses lectures, small group discussions, practical projects, and readings to improve students' awareness and understanding of the complexity of the physician's role in rapidly changing systems of healthcare delivery. The course emphasizes the professional and ethical tensions that emerge while striving to optimize care for individuals and the populations of individuals. Consideration of cost focuses on the nature and behavior of costs relevant to healthcare and explores the ambiguities inherent in assessing cost-effectiveness of interventions from the divergent viewpoints of payors, managed care organizations, physicians and individual patients. Interdepartmental faculty additionally provide perspective on past and present patterns of medical practice and offer possible models of future physician practices. Credit: 2. Bredehoeft, L. Branch, and staff

Electives

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 Gary L. Stiles, M.D. (Vanderbilt, 1975), Chief


Associate Professors: Christopher B. Granger, M.D. (Connecticut, 1984); Augustus O. Grant, M.D. (Edinburgh, 1971); 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,

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


Assistant Research Professors: Patricia A. Cowper, Ph.D. (California at Davis, 1984); Eric L. Eisenstein, D.B.A. (Cleveland State, 1995); Mark E. Olah, Ph.D. (Ohio, 1988); Karsten Peppel, Ph.D. (SUNY at Albany, 1990); Julie A. Pitcher, Ph.D. (Univ. of Dundee, 1988); Richard T. Premont, Ph.D. (City University of New York, 1992); Doris A. Taylor, Ph.D. (Texas, Southwestern, 1987).


DIVISION OF CLINICAL PHARMACOLOGY


DIVISION OF DERMATOLOGY

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


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.


Associate Research Professor: Bruce Lobath, Ph.D. (Pittsburgh, 1978).


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


DIVISION OF GASTROENTEROLOGY

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


Assistant Clinical Professors: Frank Pancotto, M.D. (Chicago, 1975); James F. Trotter, M.D.
DIVISION OF GENERAL INTERNAL MEDICINE

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


Assistant Research Professor: Ronnie D. Horner, Ph.D. (Ohio State, 1984).


DIVISION OF GERIATRICS

Professor Harvey Jay Cohen, M.D. (SUNY, 1965), Chief.

Associate Professors: Kenneth W. Lyles, M.D. (Med. Coll. of Virginia, 1974);  Kenneth E. Schmader, M.D. (Bowman Gray, 1980).

Assistant Clinical Professor: Byron B. Hamilton, M.D. (SUNY, Syracuse, 1959).

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

Assistant Professors: Anthony H. Galanos, M.D. (South Alabama, 1986);  Helen Hoenig, M.D. (Arizona, 1983).

Assistant Clinical Professors: Byron B. Hamilton, M.D. (SUNY at Syracuse, 1959);  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);  Miriam Smyth, Ph.D. (Maryland, 1996).


DIVISION OF HEMATOLOGY

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


Assistant Professor: Scott D. Berkowitz, M.D. (Jefferson, 1979).


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);
Associate Professor: John A. Bartlett, M.D. (Virginia, 1981).
Assistant Professors: Gary M. Cox, M.D. (Virginia, 1989); Richard Frothingham, M.D. (Duke, 1981); Carol Dukes Hamilton, M.D. (Utah, 1985); Allison E. Heald, M.D. (Pennsylvania, 1986); Charles B. Hicks, M.D. (George Washington, 1979); Kathryn B. Kirkland, M.D. (Dartmouth, 1986).

DIVISION OF MEDICAL ONCOLOGY
Professor Keith M. Sullivan, M.D. (Indiana, 1971), Chief.
Associate Professors: Gerold Bepler, M.D. (Philipps, 1983); Nelson J. Chao, M.D. (Yale, 1981); James J. Vredenburgh, M.D. (Vermont, 1983).
Associate Clinical Professor: Gwynn D. Long, M.D. (Bowman Gray, 1983).
Assistant 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. (Medical Coll. of Georgia, 1990); James J. Vredenburgh, M.D. (Vermont, 1983); Jennifer L. Garst, M.D. (Med. Coll. of Georgia, 1990); Marc Gautier, M.D. (Dartmouth, 1986); Herbert I. Hurwitz, M.D. (Jefferson, 1988); Michael Kelley, M.D. (Michigan, 1985); David Rizzieri, M.D. (Rochester, 1991); Clayton A. Smith, M.D. (Southwestern, 1984); Linda M. Sutton, M.D. (Massachusetts, 1987).
Assistant Research Professor: Michael P. Gamcsik, Ph.D. (Edinburgh, 1983); Ying-Fu Su, Ph.D. (Colorado, 1979).
Instructor Temporary: Michael R. Cooper, M.D. (Duke, 1983).

DIVISION OF NEPHROLOGY
Professor Thomas M. Coffman, M.D. (Ohio, 1980), Chief.
Associate Clinical Professor: Krairerk Athirakul, M.D. (Prince of Sojgkla, 1986); Russ P. Carstens, M.D. (Yale, 1990); Olafur S. Indridason, M.D. (Iceland, 1987).
Visiting Instructor: Matthew J. Oliver, M.D. (Western Ontario, 1993).

DIVISION OF NEUROLOGY
Professors: James O. McNamara, M.D., Carl R. Deane Professor of Neuroscience, (Michigan, 1968); Margaret Percik-Vance, Ph.D. (Indiana, 1978); Donald B. Sanders, M.D. (Harvard, 1964).
Assistant Research Professors: Elizabeth Hauser, Ph.D. (Michigan, 1998); Michael A. Hauser.
Courses of Instruction

Ph.D. (Johns Hopkins, 1990); Xiao-Ping He, Ph.D. (Shanghai, 1987); Ram S. Puranam, Ph.D. (Indian Institute, 1980); 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).


Visitng Associate: Ilkcan Cokgor, M.D. (Hacettepe, 1989).

DIVISION OF PULMONARY AND CRITICAL CARE MEDICINE

Professor William J. Fulkerson, M.D. (North Carolina, 1977); Chief.


Visiting Professor of Medicine: Werner Hofmann, Ph.D. (Vienna, 1973).

Associate Professors: Peter S. Kussin, M.D. (Mount Sinai, 1985); Victor F. Tapson, M.D. (Hahnemann, 1982).


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).

Associate in Medicine: Martha S. Carraway, M.D. (Bowman Gray, 1988); John P. Connolly, M.D. (Rochester, 1982); Joseph A. Goveit, M.D. (California, Irvine, 1989); Harvey E. Marshall, M.D. (Bowman Gray, 1991); Loretta G. Que, M.D. (Chicago - Pritzker, 1989).

Visiting Associate in Medicine: 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: Michael S. Hershfield, M.D. (Pennsylvania, 1967); Barton F. Haynes, M.D., Frederic M. Hanes Professor (Baylor, 1973); Nicholas M. Kredit, M.D. (Michigan, 1962); Ralph Snyderman, M.D., James B. Duke Professor of Medicine, New York, Downstate, 1965.


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


Assistant Professor: Virginia B. Kraus, M.D. (Duke, 1982).


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

ADJUNCT FACULTY


Adjunct Associate Professor of Medicine: John S. Penta, Ph.D. (Purdue, 1967); Walter J. Rogan, M.D. (California, 1975); Sandra L. White, Ph.D. (Michigan, 1974).

Adjunct Assistant Professor of Medicine: Edward Breitschwerdt, D.V.M. (Georgia, 1974); Linda A. Charles, M.D. (North Carolina, 1991); Richard Kent, M.D. (California at San Diego, 1975); 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


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: (1) Students 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) After the resident has also assessed the patient, students discuss their plans(s) for the evaluation and care of the patient. Students and residents return to the bedside to resolve any discrepant historical or physical examination findings. (3) The student's complete work-up (including analysis of primary data such as the peripheral blood smear, urinalysis, sputum gram stain, ECG, etc. where appropriate) is 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) Students take primary responsibility for the care of their patients, following them daily and writing progress notes in the chart. Students are responsible for knowing what has happened to their patients since last rounded on including the rationale for all diagnostic tests and therapeutic interventions as well as their outcomes. (5) Students participate in various diagnostic/therapeutic procedures (e.g., lumbar punctures, thoracentesis, paracentesis, arterial blood gases, placement of intravenous lines) and, where appropriate, perform these procedures under the supervision of the house staff. (6) Students see each of their patients on a daily basis before morning work rounds, review what has happened since last seen, and formulate a preliminary plan of care and treatment for each patient.
Students then present these formulations to their ward teams during morning work rounds. (7) Students prepare for their bedside case presentations by reading, at a minimum, relevant sections in a standard textbook of medicine. (8) Students 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) Students do not miss any attending rounds without prior permission from their attending physician. (10) Students attend all the Chairs 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

**MED-207C. Neurology.** The second year course in neurology 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. 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. Morgenlander

**Electives**

**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 straight grade of 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
MED-211C. Internal Medicine Subinternship (Duke/Durham-VA). (1) Course Goals: To provide an internal medicine inpatient care experience 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 an informal evaluation at two weeks and a formal 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.

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-specialties. (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). W augh 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. Staff

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. Fulkerson, 681-5850. (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. Fulkerson 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
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 pulmonary embolus, acute respiratory failure, hypersensitivity, interstitial and immunologic lung diseases and pulmonary manifestations of systemic illnesses, i.e., sarcoid, scleroderma, cystic fibrosis, etc. Secondary - To provide experience with pulmonary laboratory techniques including pulmonary function testing, cardio-pulmonary exercise testing, chest radiology, and bronchoscopy. (2) How Goals Are Achieved: Students assigned to the Pulmonary Consult Services at either the VA or at Duke Hospital. They have primary responsibility for workup and presentation of selected patients on these services. All patients are presented and followed at daily rounds with fellows and faculty. Students also participate in a half-day outpatient clinic each week. Joint seminars and conferences involving both the Duke and VA Consult Services are held each week to provide instruction in pulmonary function evaluation, pulmonary physiology, chest radiology, pulmonary pathology and clinical pulmonary medicine. (3) Methods of Evaluation: Student evaluations are done by fellows and faculty assigned to the Consult Services during the period of the course and are based on observed performance. Credit: 4. Enrollment: max: 1, max 4. Fulkerson 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 electrophysiological 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, Pritchett, 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. Ramesh 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 requiring hospitalization. Secondary - To refine student understanding of the cardiovascular history, physical examination and non-invasive and invasive laboratory testing in evaluating and managing patients with known or suspected cardiovascular disease. (2) How Goals Are Achieved: Students are assigned to the Duke CCU, the VA CCU, or to the private cardiology in-patient service at Duke. They, in concert with the housestaff, cardiology fellows, and senior staff attending, 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. Because of the considerable logistics involved in scheduling and coordinating the various cardiology electives, students who wish to drop must do so at least one week before the scheduled starting date. After that time, drops are allowed only if a replacement student can be provided. (3) Methods of Evaluation: Students are evaluated by all resident, fellow, and senior staff with whom they work. The evaluation questionnaire 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: min 1, 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 SAR, fellow and senior staff attending, they evaluate the operative risk for non-cardiac surgery as well as make decisions concerning cardiac surgery in patients with ischemic and other types of heart disease. Students participate extensively in reading ECGs. 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 the resident, fellow, and senior staff with whom they work. The evaluation questionnaire 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: 4. Enrollment: min 1, 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

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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. Mariencheck

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. Sugarman

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 and endoscopic papillotomy of the ampulla of Vater. Data derived from these and other laboratory studies are discussed in the context of specific patient problems in weekly conference settings. Students have an opportunity to interact with all the faculty of the Division at morning rounds and other conferences where patients from all of the services (Duke and VA) are discussed. (3) Methods of Evaluation: Student evaluation forms are completed by the resident, fellows, and faculty working with the student on individual patient care services. Final evaluation represents a composite of these forms that chiefly identifies clinical skills, fund of basic information, organizational ability, and degree of interest and participation. Credit: 4. Enrollment: max 4. Liddle and gastroenterology staff

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. Students may opt to pursue a broad experience in hematologic and oncologic problems or may choose to focus on a particular area, e.g., coagulation and transfusion, experimental therapeutics of malignancy, bone marrow transplant, hemoglobinopathies. Students choosing the broad experience may elect to spend one week on the coagulation/transfusion consult service. 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 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.

**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.

**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, Dreznier, 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 inpa-
tient 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 presenta-
tions. Division conferences include Grand Rounds, Research Seminar, Inpatient Attend-
ing 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 experi-
ence 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 partici-
pate 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 se-
nior 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 histopa-
thology, 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 com-
ments from the faculty. Credit: 4. Enrollment: max 4. Coffman and nephrology staff

MED-301C. Fluids And Electrolytes. (1) Course Goals: Primary - To provide an ap-
plied approach to the management of fluid and electrolyte problems encountered in
clinical medicine. To do this, cases are presented as problem-solving examples. The goal
is to develop a systematic approach to the analysis of specific electrolyte derangements
and to the correct selection of appropriate intravenous replacement therapy. These case
studies are interwoven with a series of lectures designed to review specific areas such as
compartmentalization of body fluids, derangements in acid-base balance, diuretic selec-
tion and use, analysis and approach to the treatment of potassium problems, etc. Sec-
condary - To integrate basic renal physiology with clinical problems of fluid and
electrolytes metabolism. (2) How Goals Are Achieved: Classroom experience. Does not
involve patient exposure. (3) Methods of Evaluation: Final exam. If permitted by the in-
structor, this clinical science course can be audited. Credit: 2. Enrollment: min 6.
Berkoben 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 neurologi-
cal problems, and practice with written and oral communications in a hospital setting.
The student has the opportunity to apply the neuroanatomy, neurophysiology, neuro-
chemistry, 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 ex-
amination. The student records the findings in the hospital charts and presents the find-
ings 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 proce-
dures forming part of evaluation and treatment. The specific expectations for the stu-
da show: (a) to perform and record a competent neurological and history examination
on each admitted patient; (b) to be competent in the hospital management of neurologi-
cal 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. Morgenlander 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 Neurovascular 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) Morgenlander 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 Neurologic 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. Morgenlander and neurology staff

**MED-310C. Neurology Subinternship.** (1) Course Goals: To provide a neurologic 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). Morgenlander and neurology staff

**MED-320C. Rheumatic and Immunologic Diseases.** (1) Course Goals: To provide experience in the recognition and care of patients with rheumatic, chronic in-
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flammatory, 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 be 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. 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 house staff 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 in-patient 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.

**Microbiology**

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


Adjunct Professors: H. Mario Goyen, Ph.D. (Melbourne, 1976); William Phelps, Ph.D. (Minnesota, 1965); Norman F. Weatherly, Ph.D. (Kansas, 1962).


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


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

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


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 microbiologic concepts. Medical case histories are presented by the clinical staff to correlate this course with patient care. Credit: 5.

**Electives**

**MIC-252B. General Virology and Viral Oncology.** The course is devoted to the

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

**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


Assistant Professors: Helene Benveniste, M.D., Ph.D. (Copenhagen, 1991); Michael D. Ehlers, M.D., Ph.D. (Johns Hopkins, 1988); Robert T. Fremeau, Jr., Ph.D. (George Washington, 1985); Timothy M. George, M.D. (New York, 1986); David A. Hosford, M.D. (Emory, 1983); Ph.D., (Emory, 1981); Erich Jarvis, Ph.D. (Rockefeller, 1995); Julie A. Kauer, Ph.D. (Yale, 1986); Ronald C. Lo, Ph.D. (Yale, 1989); Richard D. Mooney, Ph.D. (California Inst. Tech., 1991); Miguel A. L. Nicolelis, M.D. (Sao Paulo, 1984); Ph.D. (Sao Paulo, 1988); Andrew S. Peterson, Ph.D. (Harvard, 1988); Peter H. Reinhart, Ph.D. (Australian Natl. Univ., 1985).
Assistant Research Professor: Gillian Einstein, Ph.D. (Pennsylvania, 1984).
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. Chikaraishi, Skene, and Reinhart


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. Moneys, 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. Hammon, M.D., E. C. Hamblen Chair of Reproductive Biology and Family Planning, (Duke, 1961), Chairman.


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


Associate Clinical Professor: 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).


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

Professor Emeriti: Arthur C. Christakos, 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. 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, Rodriguez, 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 clinical opportunities. Three senior residents from Duke rotate through Cape Fear Valley Hospital. The students are directly supervised by three full-time Duke faculty. 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, Killam, Livingston, Murtha, Boggess, and maternal-fetal medicine fellows

**OBG-245C. Office Gynecology.** For students preparing for non-ob-gyn careers. Outpatient clinic diagnosis and patient care are taught. 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, Killam, Livingston, Murtha, Boggess, and fellows on obstetrical service

**O.B.G.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, Livengood, A mundsen, and urogynecology fellows

**O.B.G.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.


Electives

**OPH-210C. Medical Ophthalmology.** The ophthalmic signs and symptoms of systemic disease are presented in a lecture series. Oriented for those students interested primarily in pediatrics, internal medicine, or ophthalmology. If permitted by the instructor, this clinical science course can be audited. Credit: 1. Enrollment: min 8, max 20. Allingham 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, Delapaz, 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 Friedman

**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


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. Stenbergen

**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, Olatidoge, 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 serves as an apprenticeship in which the student works closely with residents in the actual preparation and diagnosis of tissue changes. Microscope required (limited number available on loan). Prerequisites: permission of Dr. Bradford. Preference given to Pathology Study Program students. Credit: 4 or 8. Enrollment: max 2. Gottfried 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. Reeler, Harrell, Henshaw, Madden, and staff.
**PTH-353B. Neuropathology.** A view of neuropathology that emphasizes clinico-pathologic 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. Harr son

**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: 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, genetherapy, 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.


Associate Clinical Professors: Laura T. Gutman, M.D. (Stanford, 1962); Ronald J. Kanter, M.D.
Courses of Instruction

Associate Research Professor: William D. Matthew, Ph.D. (California, San Francisco, 1981); David S. Millington, Ph.D. (Liverpool, 1969).


Assistant Research Professors: Michael D. Feezor, Ph.D. (North Carolina, 1969); Donald E. Fleener, Ph.D. (Emory University, 1987); I. Francis Heidlage, Ph.D. (Missouri, 1978); H. Toxicjiang, M.D., Ph.D. (Shanghai Medical University, China, 1975, 1991); Stewart P. Johnson, Ph.D. (Case Western Reserve, 1963); Rashid N. Nassar, Ph.D. (Duke, 1974); Karen J. O'Donnell, Ph.D. (North Carolina, 1983).


**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

**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.

<table>
<thead>
<tr>
<th>Division</th>
<th>Faculty</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergy/Immunology</td>
<td>Rebecca H. Buckley, M.D.</td>
<td>684-2922</td>
</tr>
<tr>
<td>Cardiology</td>
<td>Stephen P. Sanders, M.D.</td>
<td>681-2916</td>
</tr>
<tr>
<td>Critical Care Medicine</td>
<td>Ira Cheifetz, M.D.</td>
<td>681-5872</td>
</tr>
<tr>
<td>Emergency Department</td>
<td>Karen Frush, M.D.*</td>
<td>684-2246</td>
</tr>
<tr>
<td>Endocrinology</td>
<td>Michael S. Freemark, M.D.</td>
<td>684-3772</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>William R. Treem, M.D.</td>
<td>681-4841</td>
</tr>
<tr>
<td>Hematology/Oncology</td>
<td>Philip Rosoff, M.D.</td>
<td>684-3401</td>
</tr>
<tr>
<td>Infectious Diseases</td>
<td>Ross McKinney, M.D.</td>
<td>684-6335</td>
</tr>
<tr>
<td>Medical Genetics</td>
<td>Y. T. Chen, M.D., Ph.D.</td>
<td>684-2036</td>
</tr>
<tr>
<td>Nephrology</td>
<td>John W. Foreman, M.D.</td>
<td>684-4246</td>
</tr>
<tr>
<td>Neurology</td>
<td>Darrell Lewis, M.D.</td>
<td>684-3219</td>
</tr>
<tr>
<td>Perinatal Medicine</td>
<td>Ronald N Goldberg, M.D.</td>
<td>681-6024</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>J. Marc Majure, M.D.</td>
<td>684-2289</td>
</tr>
<tr>
<td>Rheumatology</td>
<td>Deborah Kredich, M.D.</td>
<td>684-6575</td>
</tr>
<tr>
<td>Rural Health Clinics</td>
<td>Joanne Barton, Dr.P.H.+</td>
<td>684-3172</td>
</tr>
<tr>
<td>Sports Medicine</td>
<td>Deborah Squire, M.D.</td>
<td>477-4297</td>
</tr>
</tbody>
</table>

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

+ The Rural Health Clinics rotation provides a broad exposure to general pediatric problems in a medically indigent community. Four days a week (Monday through Thursday) the student travels with a senior pediatric resident to each of four rural county health departments to provide pediatric care in collaboration with public health nurses and child health clinicians. There is approximately two hours a day driving time, which allows for a one-on-one tutorial with the senior resident. The Special Topics course may vary from two to four weeks in length. Student may not drop within sixty days of the starting date without finding a replacement. Student must contact Dr. Barton three weeks before the course starting date.

**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. Stu-
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Pediatric residents will accompany the inpatient team on ward rounds for one to two weeks of the rotation with the remaining time spent in the clinic evaluating new patients and seeing established patients. Students also expected to attend Divisional teaching conferences. Students may be asked to research a specific topic and present a short presentation at the end of their rotation. Prerequisites: contact instructor. Credit: 4 or 8. Enrollment: max 2.

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.

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 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.

PED-233C. Allergy and Clinical Immunology. Clinical evaluation and practice in the 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.

PED-234C. Clinical Genetics and Metabolism. The student becomes familiar with the 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.

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.

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.
PED-250C. Advanced General Pediatrics, 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: min 1, 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 a subintern 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. Credit: 5. Enrollment: max: 2. Drucker, Kredich, and faculty

PED-281C. Pediatric Neurology. Students examine both hospitalized and ambulatory pediatric patients with neurological disorders. Emphasis is placed on the neurological history, examination, investigation, and management techniques of nervous system disorders of infancy, childhood, and adolescence. 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.
Associate Professors: Joseph Heitman, M.D. (Cornell, 1992); Ph.D. (Rockefeller, 1989); Homme W. Heilinga, 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, 1988); 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).
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 Ottoleghi, 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 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, April-June. Credit: 4. Nadler and staff

Electives


PHR-234B. Interdisciplinary Approach to Pharmacology. Several model systems (cardiovascular, reproductive, neural, and cell cycle) are 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 Allen Frances, M.D. (SUNY at Downstate, 1967), 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).
Research Associates: John Feaganes, Ph.D.; Michael J. Helms.

DIVISION OF BIOLOGICAL PSYCHIATRY
Adjunct Professors: Jau-Shyon Hong, Ph.D. (Kansas, 1973); Jeffrey Lieberman, M.D. (George Washington, 1975).
Assistant Professors: Lawrence A. Dunn, M.D. (Michigan, 1984); Veeraindor Goli, M.D. (Osmania Medical College, 1978); Scott D. Moore, M.D. (Virginia, 1986); Rochelle Schwartz-Bloom, Ph.D. (George-town, 1983); David Steffen, M.D. (Texas, 1988).

Psychiatry 113
Associate: Leann Nelson, M.D. (Texas, 1986).

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).
Associate Clinical Professors: Christopher Byrum, M.D. (Virginia, 1988); Byron Cole, M.D. (Cincinnati, 1960); Ugo Goetzl, M.D. (New York Medical College, 1968).

DIVISION OF GENERAL PSYCHIATRY
Clinical Professor: Steven Lipper, M.D. (Boston, 1972).
Associate Professor: Jean Hamilton, M.D. (Texas Health Science Center, 1977).
Clinical Professor: Steven Lipper, M.D. (Boston, 1972).
Associate Professor: Jean Hamilton, M.D. (Texas Health Science Center, 1977).
Research Associate: Rosa F. Merino, M.D. (Case Western Reserve, 1985).
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. Giant-
urco, M.D. (Buffalo, 1960).


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


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


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 at 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. (American University, 1980).


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 Clinical Professors: James R. Clack, Ph.D. (Purdue, 1970); Jack D. Edinger, Ph.D. (Virginia Commonwealth, 1971); Rolffs S. Pinkerton, Ph.D. (Georgia, 1967); Clive J. Robins, Ph.D. (SUNY, 1982); Anna L. Stout, Ph.D. (South Carolina, 1980); Joseph E. Taile, Ph.D. (Virginia, 1977).

Associate Consulting Professor: Lenore Behar, Ph.D. (Duke, 1973); Paul Brinich, Ph.D. (Chicago, 1974).

Associate Research Professors: James Lane, Ph.D. (UCLA, 1979); William C. Wetzel, Ph.D. (Massachusetts Inst. Technology, 1983).

Assistant Professors: John Beckham, Ph.D. (Florida State, 1980); Kathryn Gustafson, Ph.D. (Ohio, 1988); Barbara R. Keath, 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); Randy Borum, Ph.D. (Melbourne Florida, 1992); Robin A. Buhrke, Ph.D. (Southern Illinois, 1982); Tracey Potts Carson, Ph.D. (Georgia, 1982); Jeanne 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); Marlene R. Jacobs-Sandstrom, Ph.D. (Duke, 1995); Ronette L. Kolotkin, 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, 1990); Jerri M. Oehler, Ph.D. (Duke, 1984); Oliver Oyama, Ph.D. (Indiana, 1985); Rebecca Shein, 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).


Adjunct Assistant Professors: Ralph Cooper, Ph.D. (Rutgers, 1973); William E. Schienger, Ph.D. (North Carolina State, 1974).

Adjunct Assistant Research Professor: Maya McNeilley, Ph.D. (Georgia, 1987).

Assistant Consulting Professors: William D. Barley, M.D. (Texas Tech., 1980); William V. Burlin-
Courses of Instruction

DIVISION OF OUTPATIENT SERVICES


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

Adjunct Assistant Professor: Tana A. Grady, M.D. (Duke, 1986); Rajinder Judge, M.D. (Birmingham, 1984).

Assistant Clinical Professors: Leslie Forman, M.D. (Tufts, 1972); Kishore Gadde, M.D. (Guntur Medical College, India, 1978); Leonard Handelsman, M.D. (Albert Einstein College Medicine, 1980); Caroline Haynes, M.D., Ph.D. (Duke, 1983); David Naftolowitz, M.D. (Albany Medical Ctr., 1986); Suzanne Sutherland, M.D. (Michigan State, 1988); Patricia A. Ziel, M.D. (Michigan, 1968).


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

Clinical Professor: Eileen P. Ahearn, M.D. (Duke, 1990); Melinda L. Brown, M.D. (South Carolina, 1988); Barbara A. Crockett, M.D. (Hahnemann Medical College, 1968); Manish A. Fozdar, M.D. (MBBS, NHL Municipal Medical College, 1988); Marlene I. Robles, M.D. (Arizona, 1994); Neriene E. Tatham, M.D. (Howard, 1992); Grace Thrall, M.D. (Connecticut, 1991); Susan Wicke, M.D. (Ohio State, 1999).


DIVISION OF PSYCHIATRIC SOCIAL WORK

Associate Muki Fairchild, M.S.W. (North Carolina, 1976), Division Head.


DIVISION OF SOCIAL AND COMMUNITY PSYCHIATRY

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


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 Professor: Jeffrey W. Swanson, Ph.D. (Yale, 1983).

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


Consulting Associates: B. Steven Bentsen, M.D. (Cincinnati, 1983); Bruce A. Berger, M.D. (Univ. Minnesota, 1977); Jeffrey Brantley, M.D. (North Carolina, 1977); Wiley Dickerson, M.D. (Medical

Adjunct Associate: Mary Lou Melville, M.D. (Texas, 1971).
Instructor: Joanne B. Dellaero, M.Ed. (Houston, 1991).

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.

Haynes

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

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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**

General questions regarding any of the clinical rotations should be referred to Caroline Haynes, M.D., Ph.D., director of medical student education (684-6406).

**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: psychodynamically 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.
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. (SUNY at Buffalo, 1975).

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 damage in vitro and in vivo; tumor and normal tissue models for radiation studies; solid tumor metabolism, microenvironment, and physiology; radiation sensitizers and
protectors; effects at the tissue and whole organ and whole organism level; time, dose, and fractionation; low dose rate radiotherapy, including use of radio labelled monoclonal antibodies; hyperthermia; radiation/drug and heat/drug interactions. Credit: 2.

Enrollment: max 10. DeWhirst

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 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. Marks and staff

Radiology

Professor Carl E. Ravin, M.D. (Cornell, 1968), Chairman.


Associate Clinical Professor: Robert Vandemark, M.D. (Upstate Medical Center, 1980).

Associate Research Professors: Laurence Hedlund, Ph.D. (Pittsburgh, 1968); Ganesan Vaidy-
Assistant Professors: Daniel P. Barboriak, M.D. (Harvard, 1986); Salvador Borges-Neto, M.D. (Federal Fluminense University, 1981); Sunny Chung, M.D. (Northeastern Ohio Universities College of Medicine, 1992); Lane F. Donnelly, M.D. (Cincinnati, 1990); James D. Eastwood, M.D. (SUNY at Buffalo, 1992); David Enterline, M.D. (Califomia, 1982); Jeremy Erasmus, M.B., Ch.B. (Witwatersrand, 1982); Kelly Freed, M.D. (Jefferson, 1991); Donald P. Frush, M.D. (Duke, 1985); Rosalie J. Hagge, M.D. (Washington University, 1988); Michael W. Hanson, M.D. (West Virginia, 1974); Joan P. Heneghan, M.B., B.Ch., B.A.O. (Dublin, 1988); Michael J. Campa, Ph.D. (Florida, 1989); Timothy DeGrado, Ph.D. (Wisconsin at Madison, 1988); David Gilland, Ph.D. (North Carolina, 1989); Edward Hsu, Ph.D. (Johns Hopkins, 1996); Joseph Lo, Ph.D. (Duke, 1993); Bradley Smith, Ph.D. (Duke, 1998); Martin P. Tornai, Ph.D. (California, Los Angeles, 1997); Georgia Tourassi, Ph.D. (Duke, 1993); Timothy Turckington, Ph.D. (Duke, 1989).


Basic Science Electives

**RAD-2508. 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 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 of 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. Chung 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 electives 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, vascular/interventional, pediatric, CT/abdominal imaging, ultrasound, nuclear medicine, gastrointestinal, and VA Hospital services. Credit: 4. Enrollment: min 4, max 9. Chung and staff

Surgery


DIVISION OF GENERAL 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).


DIVISION OF THORACIC SURGERY
Professor Peter K. Smith, M.D. (Duke, 1977), Chief.
Associate Professors: Donald D. Glower, Jr., M.D. (Johns Hopkins, 1980); David H. Harpole, M.D. (Virginia, 1984).
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 Jaggers, M.D. (Nebraska, 1988); Kevin P. Landolfo, M.D. (Manitoba, 1985).
Assistant Consulting Professors: Calvin C. Claxton, M.D. (Virginia, 1961); Robert Fiedtsam, M.D. (Wayne State, 1966); Charles A. Keller, Jr. (Louisiana State, 1959); John C. Lucke, M.D. (St. Louis, 1995); Bruno J. Urban, M.D. (Germany, 1960).
(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).


DIVISION OF ORAL SURGERY


DIVISION OF ORTHOPAEDIC SURGERY


Assistant Professors: Carl J. Basamania, M.D. (George Washington, 1984); Lloyd A. Hey, M.D. (Harvard, 1988); Laurence D. Higgins, M.D. (SUNY, 1992); Salutario Martinez, M.D. (Havana, 1961); Barry S. Myers, M.D., Ph.D. (Duke, 1991); Kevin P. Speer, M.D. (Johns Hopkins, 1985); T. Parker Vail, M.D. (Loyola, 1985).


Assistant Clinical Professors: George S. E. Aitken, M.D. (Case Western Reserve, 1962); Donald T. Kirkendall, Ph.D. (Ohio, 1975); Stephen N. Lang, M.D. (Illinois, 1965); Richard S. Moore, M.D. (North Carolina, 1991); Christopher Talley, M.D. (Virginia, 1991).


DIVISION OF OTOLARYNGOLOGY


Associate Research Professor: David W. Smith, Ph.D. (Michigan, 1996).


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


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).

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, 1962), Chief.
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).

DIVISION OF UROLOGIC SURGERY
Professor David F. Paulson, M.D. (Duke, 1964), Chief.
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: Craig F. Donnatucci, M.D. (Temple, 1979); John S. Wiener, M.D. (Tulane, 1988).
Assistant Research Professors: John W. Day, Ph.D. (Iowa, 1972); Wendy Demark-Wahnefried, Ph.D. (Syracuse, 1988).
Clinical Associate Steven H. Herman, Ph.D. (Duke, 1977).

DIVISION OF SPEECH PATHOLOGY AND AUDIOLOGY
Associate Clinical Professor Frank DeRuyter, Ph.D. (Washington, 1978), Chief.

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

126 Courses of Instruction
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-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-230C. Seminar in Urologic Diseases and Techniques. Lecture/seminar course by members of the staff in Urology and Radiology providing an introduction to the spectrum of urologic diseases amplified by demonstration of urologic and radiologic diagnostic methodology. Clinical problems to be stressed include pediatric urology, obstructive uropathies, urinary calculi, male infertility, impotence, trauma, urodynamics, reconstructive urology, and urologic malignancies. Informal seminars given weekly. If permitted by the instructor, this clinical science course can be audited. Credit: 2. Enrollment: min 6, max 8. Paulson, Anderson, Donnucci, Webster, Leder, Walther, Robertson, and Wiener

SUR-233C. Basic Neurosurgery Course. Disease conditions commonly encountered by neurosurgeons are presented. Clinical presentation of a disorder such as brain tumor or head injury is made by a member of the staff. Clinical features and plan of diagnostic investigation are stressed. The clinical disorder is used as a focal point from which to carry the presentation into the basic sciences that are related to the clinical problem. Prerequisites: student must have the approval of Dr. Cook to register for this course. Credit: 1. Enrollment: min 3, max 20. Cook, Friedman, Fuchs, Turner, and Wilkins

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.
SUR-240C. Otolaryngology Seminar. This conference and demonstration course provides an introduction to a variety of clinical problems in otolaryngology. Lectures are supplemented with case presentations illustrating problems encountered in this field. If permitted by the instructor, this clinical science course can be audited. Credit: 1. Enrollment: min 4, max 6. Richtsmeier

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. Serafin, G. Georgiade, Ruff, Levin, and Lettieri

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, Serafin, Ruff, Georgiade, and Lettieri

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, Serafin, Levin, and Ruff

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. DeBruyter and Weber

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, Hardaker, Nunley, Goldner, Fitch, Lang, Richardson, Speer, Vail, Levin, Scully, Hey, Moore,
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 multidisciplined group approach to the whole patient with complex orthopaedic and neurologic conditions as they affect growth, development, and rehabilitation. Credit: 2 or 4. Enrollment: max 2. 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.

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.

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.

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 expected to evaluate surgical patients in an outpatient setting as well as participating in inpatient and operative patient care. This course is designed for students who have an interest in the basic sciences in relation to surgical oncology. Attendance at research conferences involved in the molecular and cellular biology of human cancers is also expected. Permission of instructor is required. Credit: 4. Enrollment: min 1, max 2.

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 and Duke 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.

Higgins, and Basamania
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, G. Georgiade, Glower, Grant, Iglehart, Jones, Leight, Lowe, Lyerly, McCann, Sabiston, Sebastian, Segler, 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.

SUR-302C. Emergency Department Surgical Care. 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.

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 protein, 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 AND ENVIRONMENTAL PHYSIOLOGY STUDY PROGRAM (AEP)

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 weekly "work in progress" seminars, also attended by members of the program faculty, that focus on the development of scientific information using the students' projects as examples. Emphasis is placed on experimental design and statistical analysis. At the end of the year, each student is expected to have completed a project of sufficient merit to warrant presentation and publication. Further, the Department offers a unique opportunity for the students to present their projects in a formal setting moderated by an external reviewer of national stature.

All students are required to take ANE 243B/ANE 244B, Research Methodology/Experimental Design I (fall) and II (spring). Additional courses in Advanced Diving Physiology and Medicine are available for interested students.

Students meet with the coordinating director weekly to monitor progress in the laboratory. The course directors meet on a monthly basis regarding course direction and the individual progress of students in the laboratories. The department chairman meets with the coordinating director and co-directors annually to discuss objective data such as publications, examinations and unpublished papers, and subjective data obtained in exit interviews.


BEHAVIORAL NEUROSCIENCES STUDY PROGRAM (BSP)

PROGRAM DIRECTOR: Andrew D. Krystal, M.D., M.S.

This study program is designed to help third year medical students obtain an integrative understanding of the basic processes underlying normal and pathological human and laboratory animal behavior. The course and preceptorship offerings familiarize students with significant developments in the behavioral neurosciences, investigative methodology used to examine human behavior and its neurobiological underpinnings, and the application of these findings to medicine. As an example, they are provided with the neuroanatomical, histochemical, neuroimmunological, neuropharmacological, and neurobehavioral basis of prescribing anxiolytics, antidepressants, and other neurotropic drugs.

Students are encouraged to select an area of research concentration and then arrange to match their interests with a faculty member as a research preceptor by discussing the array of options with the study program director. They are given the opportunity to focus on some determinant of human behavior which may include neurobiological, developmental, or psychosocial factors. Students may choose to spend a significant portion of their time in a closely supervised laboratory with associated library research in an area of the student's interest resulting in a published report of the work. Specific science interests can be augmented through seminars, guided readings, and appropriate courses providing a greater familiarity with current issues in the biobehavioral sciences. The following coursework is required of all students: PSC 223B, Neurobehavioral Basis of Behavior.

The courses listed below, although not required, are recommended for consider-
Courses of Instruction

United States:

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.


BIOMEDICAL ENGINEERING STUDY PROGRAM (BES)

PROGRAM DIRECTORS: Donald D. Glower, M.D. and James H. McElhaney, 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.


BIOPHYSICS STUDY PROGRAM (BBP)

PROGRAM DIRECTOR: G. Allan Johnson, 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.).


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.


CARDIOVASCULAR STUDY PROGRAM (CVS)

PROGRAM DIRECTOR: Samuel E. George, 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.


CELL AND REGULATORY BIOLOGY STUDY PROGRAM (CRB)
PROGRAM DIRECTOR: George M. Padilla, Ph.D.

The CRB program is based on the application of contemporary experimental approaches of cell biology and genetics to the study of regulatory mechanisms in health and disease. It seeks to bridge the gap between research at the cellular/molecular and the tissue/organ level of organization.

Research areas represented in the CRB program fall into four broad categories:

• Molecular properties and actions of peptide hormones, growth factors and their receptors: Studies on membrane biology, ligand-receptor interactions, and signal transduction; molecular mechanisms of insulin action and related growth factors (EGF and PDGF); and mechanisms of action of regulatory peptides on gastrointestinal target organs.

• Genetic and biochemical regulation of membrane function, cytoskeletal elements, intracellular motility, and macromolecular trafficking: Studies on the motor complexes which drive organelle movements within cells during endocytosis, exocytosis, and axonal transport; intracellular function of unconventional myosins encoded by abm genes; and regulation of nucleocytoplasmic trafficking.

• Genetic regulation of cell proliferation, growth, and development: The biochemical and functional properties of the recessive retinoblastoma oncogene; hormonal regulation of malignant cell growth; the molecular basis of cytokinesis; the role of fetal and placental hormones in the regulation of fetal growth and oogenesis; molecular basis of morphogenetic changes using genetic and transgenic methods; and the role of cyclins in mitotic and meiotic events in relation to cell cycle-specific kinases.

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

The major emphasis of the CRB program is on student-generated, independent study/research projects conducted in a close association with a faculty preceptor. Students are encouraged to enroll in basic science courses or relevant clinical offerings which contribute to their research projects or their future career goals. The research colloquia and self-learning course offerings, as described below, are equally important components of the CRB program.

For all students, the program consists of the following:

Individual Tutorial (CBI 219). This is carried out under the supervision of a faculty preceptor selected by each student with the approval of the program director. Students are expected to complete their tutorial arrangements before entering the program. The program director directs the students to appropriate faculty preceptors and evaluates the proposed research projects.

Research Presentations. At the beginning of the fall semester, students give a brief presentation on their proposed research to the CRB participants. This presentation and a short research report is a formal requirement of all participants. Toward the end of spring semester, students present their research results before the group in the form of a platform presentation.

Research Reports. Coincident with the research presentations, students submit two written reports to the program director on their research projects. The preliminary report is submitted before the end of the fall semester. It consists of a brief review of the literature, a discussion of the hypothesis to be tested, specific aims of the proposed research, and a brief assessment and justification of the methodologies that are to be employed. The final report, submitted towards the end of the spring semester, is written in
the form of a research paper being submitted for publication. It should include a more extensive review of the literature and an evaluation and discussion of the results obtained. The colloquia and research reports provide an opportunity for medical students to develop communication and presentation skills for their biomedical careers.


CLINICAL RESEARCH STUDY PROGRAM (CRP)
PROGRAM DIRECTOR: William E. Wilkinson, Ph.D.

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

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


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 knowledge regarding research tools to design prospective clinical trials and to analyze the resultant health services research data. Participants also learn the essentials of research design, statistical analyses, health policy, and comparative health systems so that they can be contributors to the improvement of the system of health care, beginning with the improved health of the patient but extending to local, state, and national issues. Each student selects a 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 causology 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 usually occupies more depending on the election of courses.

Required Research. In conjunction with the practicum, each student is required to produce an in depth research paper analyzing an area of epidemiology, health service research, finance, health systems, or health policy, most probably related to the student’s practicum experience. He or she works with an advisor to determine and investigate the topic. This research activity extends throughout the nine months, accumulating with the acceptance of the completed paper.

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), and the Duke Master's in Business Administration from the Fuqua School of Business (M.D./M.B.A. program). Dr. Broedeheoft is the director of the latter program. Some of these other programs may take more time, thereby necessitating an extension of the time required for completing the third year requirement. In addition, students may propose an individually-tailored Study Away option. Study away proposals are reviewed and approved individually by the Third Year 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.


**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.

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 merely be 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. (4 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.


INFECTIOUS DISEASES STUDY PROGRAM (IDP)

PROGRAM DIRECTOR: Thomas G. Mitchell, Ph.D.

Knowledge of infectious diseases is relevant to care of patients of all ages and in each clinical specialty from surgery, pediatrics, and medicine to obstetrics-gynecology and family medicine. This study program provides students with the opportunity to directly explore infectious diseases in a laboratory setting coupled with lecture and 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 mi-
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.


**NEUROBIOLOGY STUDY PROGRAM (NBP)**

**PROGRAM DIRECTORS:** Dennis A. Turner, M.D. and Miquel Nicolelis, 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 fo-
cus 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.


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.


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 participa-
tion 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 required
- 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 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.

Courses of Instruction

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 required
- **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 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

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- **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
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**Advisory Plan for Pathology Study Program**

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**FACULTY:**
CLASS ROSTER*

Class of 1999

Allen, Leigh M. (Vanderbilt), Lexington, Kentucky
Bethel, Mary A. (Duke), Kennesaw, Georgia
Binder, Devin K. (Harvard), Berkeley, California
Blazer, Dan G. (Duke), Cary, North Carolina
Bleich, Karen B. (Westneyan), Flushing, New York
Boozer, Margaret M. (Duke), Atlanta, Georgia
Bryce, Todd C. (Dartmouth), Winston-Salem, North Carolina
Breen, Catherine M. (William and Mary), Green Bay, Wisconsin
Brodsky, Michael C. (Massachusetts Institute of Technology), Melville, New York
Bronner, Leslie L. (Duke), Columbia, Maryland
Brooks, Kelli R. (Virginia), Falls Mill, Virginia
Bruce, Stephanie R. (Georgetown), Leicester, North Carolina
Camacho, Daniel L. (Stanford), Gretna, Louisiana
Castellino, Robert C. (Duke), Durham, North Carolina
Chang, Daniel H. (California Institute of Technology), Knoxville, Tennessee
Charles, Kirk L. (Harvard), Brooklyn, New York
Chen, Elsbeth (Harvard), Pine Brook, New Jersey
Chen, Hsiupi (Princeton), Florham Park, New Jersey
Chen, Joyce C. (Stanford), Lubbock, Texas
Cotik, William B. (North Carolina State), Raleigh, North Carolina
Cote, Nicole L. (Virginia), Wilmington, North Carolina
Crichlow, Brian R. (Carleton), Miami, Florida
Datto, Michael B. (Johns Hopkins), Cherry Hill, New Jersey
Dawes, Donald M. (Cornell), Alexandria, Virginia
De, Jitakshi (North Carolina at Chapel Hill), Cary, North Carolina
Delia Rocca, Gregory J. (Cornell), Castleton, New York
Dezfalian, Cameron (Florida), Plantation, Florida
Dike, Nwamara C. (Maryland-College Park), Hyattsville, Maryland
Dong, Xiang D. (Massachusetts Institute of Technology), Brooklyn, New York
Dooley, Kelly E. (Northwestern), Durham, North Carolina
Engler, Susanne M. (Cornell), East Meadow, New York
Ennis, Francis A. (Yale), Wellesley, Massachusetts
Foster, William T. (California Institute of Technology), Annandale, Virginia
Garg, Rahul (Massachusetts Institute of Technology), Miami, Florida
Gartner, Anne E. (Stanford), Edina, Minnesota
Gilliam, Lisa K. (Amherst), Durham, North Carolina
Glasgow, Sean C. (Duke), Colorado Springs, Colorado
Greenman, Herb E. (Pennsylvania), Charlotte, North Carolina
Grubbs, Elizabeth G. (Duke), Greensboro, North Carolina
Handy, Michael H. (North Carolina at Chapel Hill), Winston-Salem, North Carolina
Harris, Geoffrey R. (Ohio), Bexley, Ohio
Hata, Jonathan A. (Wheaton), Portland, Oregon
Hattangadi, Shilpa M. (Massachusetts Institute of Technology), Richboro, Pennsylvania
Healey, Michael J. (Pennsylvania), Clifton Park, New York
Henry, Craig S. (Duke), Durham, North Carolina
Heron, Kerrieanne A. (Emory), Orlando, Florida
Hewitt, John D. (North Carolina State), Durham, North Carolina
Hickey, Jason D. (Colgate), Norcross, Georgia
Huang, Benjamin Y. (North Carolina at Chapel Hill), Chapel Hill, North Carolina
Hughes, Solomon G. (North Carolina at Chapel Hill), Durham, North Carolina
Jaquette, Brian A. (Duke), Scotia, New York
Kane, Henry S., IV (Swarthmore), Chevy Chase, Maryland
Kaz, Andrew M. (Duke), Durham, North Carolina
Kherani, Aftab R. (Duke), Grafton, Ohio

*Hometown does not denote legal residence
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<tr>
<th>Name</th>
<th>Institution</th>
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<tr>
<td>King, Aliceon Y.</td>
<td>(Maryland Baltimore County)</td>
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<td>Koshy, Anita A.</td>
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<td>(Georgia Institute of Technology)</td>
<td>Atlanta, Georgia</td>
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<td>(Peking University of China)</td>
<td>Malden, Massachusetts</td>
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Class of 2000

Adlakha, Charu L. (Massachusetts Institute of Technology), Columbia, Maryland
Agarwal, Swati (Duke), Hollidaysburg, Pennsylvania
Alan, Rodney K. (Morehouse), Tallahassee, Florida
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Yi, Sang P. (Stanford), Potomac, Maryland
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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, Jessicca E. (Massachusetts Institute of Technology), North Miami, Florida
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<td>(Washington) Florissant, Missouri</td>
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<td>(Williams) Scranton, Pennsylvania</td>
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<td>(Stanford) Monte Sereno, California</td>
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<td>(Duke) St. Louis, Missouri</td>
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<td>(Virginia) Great Falls, Virginia</td>
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<td>(Brown) Durham, North Carolina</td>
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<td>(North Carolina at Chapel Hill) Burlington, North Carolina</td>
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<td>(Harvard) Yucaipa, California</td>
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<td>(Massachusetts Institute of Technology) Rockville, Maryland</td>
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<td>(Cornell) Kearny, New Jersey</td>
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<td>Linden, Diane C.</td>
<td>(Middlebury) Los Angeles, California</td>
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<td>Lo, Wayne R.</td>
<td>(Yale) Tucker, Georgia</td>
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<td>Lynn, Stephanie D.</td>
<td>(Princeton) Boston, Massachusetts</td>
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<td>Maercks, Rian A.</td>
<td>(Florida) Miami, Florida</td>
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<td>Mavropoulos, John C.</td>
<td>(Chicago) Atlantic City, New Jersey</td>
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<td>McCoy, Allison N.</td>
<td>(Duke) Durham, North Carolina</td>
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<td>Miksdal, Rachel E.</td>
<td>(Duke) Charlottesville, Virginia</td>
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<td>Morgan, Katherine S.</td>
<td>(Yale) Maysville, North Carolina</td>
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<td>Mummery, Heather J.</td>
<td>(Rochester) Alden, New York</td>
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<td>Nimjee, Shahid M.</td>
<td>(Yale) Brampton, Ontario, Canada</td>
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<td>Norris, Regina D.</td>
<td>(Duke) Gaffney, South Carolina</td>
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<td>O’Halloran, Elizabeth K.</td>
<td>(Chicago) Spokane, Washington</td>
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<td>Oduzze, Millicent J.</td>
<td>(Harvard) Orem, Utah</td>
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<td>Parker, Rodney D.</td>
<td>(Harvard) Durham, North Carolina</td>
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<td>Pasquali, Sara K.</td>
<td>(Michigan) Ann Arbor, Michigan</td>
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<td>Pickering, Trevor R.</td>
<td>(California at Berkeley) Durham, North Carolina</td>
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<td>Rohatgi, Anand D.</td>
<td>(Duke) Durham, North Carolina</td>
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<td>Rovak, Jason M.</td>
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<tr>
<td>Sabo, Gregory J.</td>
<td>(Notre Dame) Colorado Springs, Colorado</td>
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</table>
Sanchez, Carlos D. (Dartmouth), Highland Park, New Jersey
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Class of 1998 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

Ahuja, Vinita (Raleigh, North Carolina) Robert Wood Johnson Medical Center, New Brunswick, New Jersey - Internal Medicine

Allen, Jayme D. (Salem, Indiana) University of North Carolina - North Carolina Memorial Hospital, Chapel Hill, North Carolina - Pediatrics

Anderson, Scott Robert (Reston, Virginia) St. John's Mercy Medical Center (St. Louis, Missouri) - Transitional, Washington University - Mallinckrodt Institute of Radiology (St. Louis, Missouri) - Radiology, Interventional Neuroradiology

Baek, Peter S. (James Island, South Carolina) Duke University Medical Center - Anesthesiology, Durham, North Carolina

Bartholomew, Marnie Beth (Shillington, Pennsylvania) Stanford University Hospital - General Surgery, Palo Alto, California, Stanford University Hospital - Otolaryngology - Head and Neck Surgery, Otolaryngology, Neurotology and Skull Base Surgery

Batten, Dean (Selma, North Carolina) Crozer-Chester Medical Center - Transitional, Philadelphia, Pennsylvania, Hospital of the University of Pennsylvania - Diagnostic Radiology, Philadelphia, Pennsylvania

Berry, Garland Keith (Lebanon, Tennessee) Wilford Hall United States Air Force Base Medical Center - Transitional, San Antonio, Texas - Aerospace Medicine

Beutler, Anthony Ivan (Orem, Utah) David Grant Air Force Base Medical Center - Family Practice, Fairfield, California - Family Practice - Sports Medicine

Bienstock, Alan Marc (East Windsor, New Jersey) Baylor College of Medicine - Plastic Surgery, Houston, Texas

Blatt, Ellen R. (Scarsdale, New York) Residency Deferred

Bloom, Matthew B. (Chappaqua, New York) Duke University Medical Center - Surgery, Durham, North Carolina - Surgery

Bolden, Jason E. (Bismarck, North Dakota) Morris Mount Sinai Medical Center - Internal Medicine, New York, New York, Mount Sinai Medical Center - Emergency Medicine, New York, New York

Bolognesi, Michael P. (Durham, North Carolina) Duke University Medical Center - Surgery, Durham, North Carolina, Duke University Medical Center - Orthopaedic Surgery, Durham, North Carolina - Academic Orthopaedic Surgery

Bowman, Brian P. (St. Louis, Missouri) Duke University Medical Center - Pediatrics, Durham, North Carolina

Brown, Franchesca D. (Myrtle Beach, South Carolina) Wilford Hall Air Force Base - Pediatrics, San Antonio, Texas

Bryce, Thomas J. (Belle Harbor, New York) St. Vincent's Hospital - Transitional, New York, New York, University of California Medical Center - Radiology, San Francisco, California - Diagnostic Radiology

Byerley, Julie S. (Spartanburg, South Carolina) University of North Carolina - North Carolina Memorial Hospital - Pediatrics, Chapel Hill, North Carolina - General and Public Health Pediatrics

Camacho, Daniel L. (Gretna, Louisiana) Residency Deferred

Chandler, Damon B. (New Hyde Park, New York) Massachusetts General Hospital - Surgery, Boston, Massachusetts - Surgery

Cooper, Leslie (Durham, North Carolina) Northwestern University - McGaw Medical Center - General Surgery, Chicago, Illinois

Criscone, Lisa G. (Durham, North Carolina) Duke University Medical Center - Internal Medicine, Durham, North Carolina - Rheumatology

Drayer, Jeffrey (East Brunswick, New Jersey) Mercy Hospital - Transitional, San Diego, California, Boston University Medical Center - Dermatology, Boston, Massachusetts - Dermatologic Surgery

Durgin, Kristi (Garner, North Carolina) University of Michigan Hospitals - Internal Medicine, Ann Arbor, Michigan - Internal Medicine

Farooqi, Aamer Z. (Demarest, New Jersey) St. Barnabas Medical Center - Transitional, Livingston, New Jersey, Washington University - Barnes Jewish Hospital - Radiology, St. Louis, Missouri

*Hometown does not denote legal residence*
Fields, Michael J. (Silver Spring, Maryland) The Johns Hopkins University Medical Center - Pediatrics, Baltimore, Maryland - Pediatric Cardiology
Gagliardi, Jane P. (Athol, Massachusetts) Duke University Medical Center - Medicine/ Psychiatry, Durham, North Carolina - Medicine/ Psychiatry
Garg, Seema (Durham, North Carolina) University of North Carolina - North Carolina Memorial Hospital - Pediatrics, Chapel Hill, North Carolina, Duke University Medical Center - Ophthalmology, Durham, North Carolina - Ophthalmology
Gratz, Brett I. (Miami Beach, Florida) Carilion Health System - Transitional, Roanoke, Virginia, Washington University - Mallinckrodt Institute of Radiology - Radiology, St. Louis, Missouri - Radiology
Green, Johnathan (Burnsville, North Carolina) Duke University Medical Center - Internal Medicine, Durham, North Carolina
Gullotto, Carmelo (Homestead, Florida) Duke University Medical Center - Internal Medicine, Durham, North Carolina - Cardiology - Internal Medicine
Halvorson, Eric G. (Maplewood, New Jersey) Brown University - Rhode Island Hospital - General Surgery, Providence, Rhode Island - Academic General Surgery
Hanft, Valerie N. (Miami, Florida) Carilion Health System - Transitional, Roanoke, Virginia
Hanley, Matthew L. (Dhahran, Saudi Arabia) Carolinas Medical Center - Emergency Medicine, Charlotte, North Carolina - Emergency Medicine
Harris, Jason B. (Northampton, Massachusetts) Massachusetts General Hospital - Pediatrics, Boston, Massachusetts - Pediatric Infectious Disease
Higgins, Peter D. (Fairfield, Connecticut) Duke University Medical Center - Internal Medicine, Durham, North Carolina
Horton, Clarie K. (Springfield, Missouri) University of California Medical Center - Internal Medicine, San Francisco, California - Internal Medicine
Hsia, Amie (Potomac, Maryland) California Pacific Medical Center - Internal Medicine, San Francisco, California, Stanford University Medical Center - Neurology, Stanford, California - Neurology
Hu, Gang (Durham, North Carolina) University of California Medical Center - Transitional, Fresno, California, Duke University Medical Center - Ophthalmology, Durham, North Carolina - Ophthalmology
Huffman, George R., III (Orlando, Florida) University of California Medical Center - Surgery, San Francisco, California - Surgery, San Francisco, California - Orthopaedic Surgery
James, Martha L. (Winston Salem, North Carolina) University of California Neuropsychiatric Institute - Psychiatry, Los Angeles, California
Kalady, Matthew F. (Allentown, Pennsylvania) Duke University Medical Center - General Surgery, Durham, North Carolina - General Surgery
Kaminetzky, Catherine P. (Columbia, Missouri) Duke University Medical Center - Internal Medicine, Durham, North Carolina - Internal Medicine
Kihlstrom, Laura J. (Chapel Hill, North Carolina) Duke University Medical Center - Anesthesiology, Durham, North Carolina - General Anesthesiology
King, Wendalyn (Peachtree City, Georgia) Emory University Medical Center - Pediatrics, Atlanta, Georgia
Knize, Lehsa (Englewood, Colorado) Washington University Medical Center/ St. Louis Children's Hospital - Pediatrics, St. Louis, Missouri - Pediatrics
Kong, James A. (Dayton, Ohio) Duke University Medical Center - Internal Medicine, Durham, North Carolina
Lager, Joanne J. (Westford, Massachusetts) University of North Carolina - North Carolina Memorial Hospital - Anesthesiology, Chapel Hill, North Carolina
Lahey, Timothy P. (Salt Lake City, Utah) Duke University Medical Center - Internal Medicine, Durham, North Carolina - Academic Primary Care Medicine
LaRoque, Regina C. (Merritt Island, Florida) Brigham and Women's Hospital - Internal Medicine, Boston, Massachusetts - Infectious Disease
Lee, Linda H. (Glendale, Wisconsin) University of Washington Affiliated Hospitals - Internal Medicine, Seattle, Washington, Duke University Medical Center - Dermatology, Durham, North Carolina - Dermatology
Levinson, Bari E. (Sacramento, California) Mercy Hospital of Pittsburgh - Internal Medicine, Pittsburgh, Pennsylvania - Private Practice Internal Medicine

150 Internship Appointments
Locklear, Robert (Red Springs, North Carolina) East Carolina University Medical Center - Internal Medicine, Greenville, North Carolina
Lovdal, Jamie A. (Raleigh, North Carolina) Residency Deferred
Luo Xurong (Shanghai, China) Cornell Medical Center - The New York Hospital - Internal Medicine, New York, New York
Lyons, Michael S. (Libertyville, Illinois) University of Cincinnati Hospitals - Emergency Medicine, Cincinnati, Ohio - Emergency Medicine
Massenburg, Donald (Durham, North Carolina) Lutheran General Hospital - Internal Medicine, Park Ridge, Illinois - Clinical Research
McClure, Matthew W. (Las Vegas, Nevada) Duke University Medical Center - Internal Medicine, Durham, North Carolina
McFadden, Dwight J., III (New Holland, Pennsylvania) St. Joseph Hospital - Family Medicine, Denver, Colorado
Meine, Elizabeth K. (Shrewsbury, New Jersey) University of North Carolina - North Carolina Memorial Hospital - Pediatrics, Chapel Hill, North Carolina - General Pediatrics
Meine, Frederick J. (Columbus, Georgia) Duke University Medical Center - Internal Medicine, Durham, North Carolina - Academic Cardiology
Merchant, Audrea K. (Tampa, Florida) East Carolina University Medical Center - Medicine/ Psychiatry, Greenville, North Carolina
Michelson, Kelly N. (St. Louis, Missouri) University of Chicago Hospitals - Pediatrics, Chicago, Illinois
Morgan, Nancy S. (Clemson, South Carolina) Duke University Medical Center - Pediatrics, Durham, North Carolina - Pediatric Genetics
Morowitz, Michael J. (Cherry Hill, New Jersey) Hospital of the University of Pennsylvania - General Surgery, Philadelphia, Pennsylvania
Neimat, Joseph S. (Potomac, Maryland) Massachusetts General Hospital - Surgery, Boston, Massachusetts - General Surgery
Nettles, Richard (Wadsworth, Ohio) Duke University Medical Center - Internal Medicine, Durham, North Carolina - Infectious Diseases
Park, Eun-Ha (Pebble Beach, California) Santa Clara Valley Hospital - Transitional, Santa Clara, California, University of California Medical Center - Ophthalmology, San Diego, California - Pediatric Ophthalmology and Oculoplastics
Patil, Chandrashekhar Y. East Carolina University Medical Center - Family Practice, Greenville, North Carolina - Family Physician
Peterson, Cathleen L. (Phoenix, Arizona) Duke University Medical Center - Internal Medicine, Durham, North Carolina, Duke University Medical Center - Anesthesiology, Durham, North Carolina - Anesthesiology
Price, Nicole (Houston, Texas) Tulane University Hospital - General Surgery, New Orleans, Louisiana - General Surgery
Reeck, Jay B. (Mercer Island, Washington) University of California Medical Center - General Surgery, San Francisco, California - University of California Medical Center - Otolaryngology - Head and Neck Surgery, San Francisco, California
Reuter, Nancy (Vero Beach, Florida) University of Massachusetts Medical Center - General Surgery, Worcester, Massachusetts - General Surgery
Rougier-Chapman, Duncan P., (East Grand Rapids, Michigan) Duke University Medical Center - Radiology, Durham, North Carolina - Radiology
Samuelson, David W. (Birmingham, Alabama) Virginia Mason Hospital - Transitional, Seattle, Washington, Emory University Hospital - Radiology, Atlanta, Georgia - Interventional Radiology
Scarborough, John E. (Raleigh, North Carolina) Duke University Medical Center - Surgery, Durham, North Carolina - Cardiothoracic Surgery
Schreiber, Jonathan L. (Dix Hills, New York) Boston University Medical Center - Internal Medicine, Boston, Massachusetts, Boston University - Tufts Medical Center - Dermatology, Boston, Massachusetts - Dermatology
Snoak, Charles K. (Charlotte, North Carolina) University Hospital of Cincinnati - Cincinnati Children's Hospital - Pediatrics, Cincinnati, Ohio - Pediatrics
Soltani, Lisa F. (Seattle, Washington) Duke University Medical Center - Medicine/ Pediatrics, Durham, North Carolina
Song, Alice (Oak Brook, Illinois) MacNeal Hospital - Transitional, Berwyn, Illinois, University of Miami - Bascom Palmer Eye Institute - Ophthalmology, Miami, Florida
Sorenson, Carsten M. (Greensboro, North Carolina) University of Colorado Health Science Center - Surgery, Denver, Colorado, University of Colorado - Urology, Denver, Colorado - Urology
Stolker, Joshua M. (Gaithersburg, Maryland) Hospital of the University of Pennsylvania - Internal Medicine, Philadelphia, Pennsylvania - Cardiology
Taylor, Jennifer L. (Aurora, Colorado) Duke University Medical Center - Medicine/Pediatrics, Durham, North Carolina - Academic Medicine/Pediatrics
Thornburg, Courtney D. (Okemos, Michigan) Duke University Medical Center - Pediatrics, Durham, North Carolina - Academic Pediatrics
Vanscoy, Lori L. (French Creek, West Virginia) San Diego Naval Hospital - Pediatrics, San Diego, California
Wadleigh, Martha (Manchester, New Hampshire) Duke University Medical Center - Internal Medicine, Durham, North Carolina - Internal Medicine
Walker, David H. (Lee's Summit, Missouri) Barnes Hospital - Washington University - General Surgery, St. Louis, Missouri, Barnes Hospital - Washington University - Neurosurgery, St. Louis, Missouri - Neurosurgery
Weaver, Carolyn J. (Linden, New Jersey) Duke University Medical Center - Internal Medicine, Durham, North Carolina
Weiser, Lori G. (New York, New York) Columbia University - Presbyterian Hospital - Orthopaedics, New York, New York
Wheeler, Kevin G. (Fort Myers, Florida) Boston University Medical Center - Internal Medicine, Boston, Massachusetts, Boston University Medical Center - Emergency Medicine, Boston, Massachusetts - Emergency Medicine
White, Wendy M. (Cleveland, Ohio) Residency Deferred - Obstetrics and Gynecology
Whitener, Tracy R. (Lenoir, North Carolina) Brigham and Women's Hospital - Obstetrics and Gynecology, Boston, Massachusetts - Primary Care Women's Health
Williamson, John A. (Austin, Texas) San Diego Naval Hospital - Surgery, San Diego, California
Wilson, Russell C. (Irving, Texas) Crozer-Chester Hospital - Internal Medicine, Philadelphia, Pennsylvania, Brigham and Women's Hospital - Radiology, Boston, Massachusetts - Musculoskeletal Radiology
Wong, David (York, Pennsylvania) Philadelphia Children's Hospital - Pediatrics, Philadelphia, Pennsylvania
Wood, Carrie E. (Memphis, Tennessee) University of Tennessee - Pediatrics, Memphis, Tennessee - Pediatrics
Zidar, David A. (Pittsburgh, Pennsylvania) The Johns Hopkins Hospital - Internal Medicine, Baltimore, Maryland - Academic Medicine