Doctor of Medicine Program

Mission Statement and the Medical Curriculum

The mission of the Duke University School of Medicine is:

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

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

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

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

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

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

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

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

Features of the four-year curriculum include:

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

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

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

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

**Doctor of Medicine Degree**

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

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

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<thead>
<tr>
<th>Year 1</th>
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<td>Oct/Nov/Dec</td>
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| Jan | Jan/Feb | Jan/Feb | |}
| Feb/Mar/Apr | Mar/Apr | Mar/Apr | |}
| May/Jun/Jul | May | May | |}

**Block 1**: Biochemistry<br>**Cell Biology<br>Genetics**

**Block 2**: Gross Anatomy<br>**Micro Anatomy<br>Physiology**

**Block 3**: Neurobiology

**Block 4**: Microbiology<br>**Immunology<br>Pathology I**

**Block 5**: Pharmacology<br>**Pathology II**

**Vacation**

**Orientation**

**Clinical Electives**

**CPX**

**Elective Basic Sciences (Scholarly Research year; courses may also be taken if appropriate to program)**

**Optional Scholarship OR Clinical Electives**

**Elective Clinical Sciences (at least one four-week rotation must provide direct patient care experience)**

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*CPX = Clinical Performance Examination; 15 standardized patients with variety of clinical challenges*
**Course Requirements- First Year.** The student studies the principles of all the basic science disciplines. Rather than mastering an encyclopedic array of facts, the purpose is to acquire familiarity with the major principles of each subject. In addition, during the first two years students are required to participate in the Practice course which is designed to expand primary and continuity care experience for Duke medical students. The course is a combined clinical curricular experience which emphasizes progressive knowledge and competencies.

The first year consists of instruction in the following:

<table>
<thead>
<tr>
<th>Semester 1</th>
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<tr>
<td>BAA 200B - Gross Human Anatomy</td>
<td>4</td>
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<tr>
<td>BIOCHEM 200B - Biochemistry</td>
<td>4</td>
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<tr>
<td>CELLBIO 200B - Cell Biology</td>
<td>2</td>
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<tr>
<td>CELLBIO 201B - Microanatomy</td>
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<tr>
<td>CELLBIO 202B - Medical Physiology</td>
<td>4</td>
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<tr>
<td>GENETICS 200B - Genetics</td>
<td>2</td>
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<tr>
<td>INTERDIS 201B - Practice I</td>
<td>1</td>
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<td><strong>Total</strong></td>
<td><strong>19</strong></td>
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<th>Semester 2</th>
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<tr>
<td>IMMUNOL 201B - Immunology</td>
<td>2</td>
</tr>
<tr>
<td>INTERDIS 201B - Practice I</td>
<td>2</td>
</tr>
<tr>
<td>MICROBIO 200B - Microbiology</td>
<td>5</td>
</tr>
<tr>
<td>NEUROBIO 202B - Basic Neurobiology</td>
<td>4</td>
</tr>
<tr>
<td>PHARM 200B - Pharmacology</td>
<td>4</td>
</tr>
<tr>
<td>PATHOL 200B - Pathology</td>
<td>5</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>22</strong></td>
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A vacation takes place after the conclusion of the first year. In addition, every class has Labor Day, Thanksgiving and the day after, Christmas, New Year’s Day, Martin Luther King, Jr. holiday, and spring break with the exact dates depending upon rotation and class schedules. Approved calendars are included in this Bulletin as well as published on the [http://registrar.mc.duke.edu](http://registrar.mc.duke.edu) website.

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

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

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

**Course Requirements- Third and Fourth Years.** Satisfactory completion of the second year curriculum is a prerequisite to the elective curriculum. The third and fourth (elective) years of undergraduate medical education build upon the experiences in basic science and clinical medicine gained in the earlier years. The elective years consist of four semesters of 16 weeks each. In addition, the fourth year has an optional summer term, also of 16 weeks. Successful completion of 64 elective credits (typically 32 basic science credits during the third year and 32 clinical science credits during the fourth) is required for graduation. Course offerings are described in the different departmental sections in this bulletin. The wide selection affords an opportunity for the student, with guidance from advisers, to design a program that best satisfies her or his needs. During the third year, students are required to complete 32 basic science credits including the completion of a quantitative thesis. Specific requirements related to the thesis and other third year requisites can be found on the third year website: [http://thirdyear.mc.duke.edu](http://thirdyear.mc.duke.edu).

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

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

**Fourth Year.** The clinical elective experience, usually occurring in the fourth year, should be used to: (a) aid in decision-making about the area of choice of postgraduate training, (b) obtain experiences in areas that would not be included in that postgraduate training and, above all, (c) pursue active experiences in patient care sufficient to provide the basic skills necessary for doctor-patient interaction. To satisfy requirements for the M.D. degree, students must complete 32 clinical science credits during the fourth year. Four of these credits must be completed in an elective requiring direct patient care.

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

1. The right to inspect her or his education records.
   - Education records include those records which contain information directly related to a student and are maintained as official working files by the university. They do not include records made by faculty and administrators for their own use and not shown to others; campus police records; employment records; records of physicians, psychologists, etc.,
made or used only for treatment purposes; and records containing information relating to a person's activities after she or he graduates or withdraws from the university.

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

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

3. The right to file a complaint with the U.S. Department of Education concerning perceived failure on the part of the school to satisfy the requirements of FERPA. FERPA also limits the disclosure of personally identifiable information to others without the student's prior consent with the following exceptions:

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

   The following have been designated as directory information by the university: name, address, telephone listing, email address, date and place of birth, photograph, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and most recent previous educational institution attended. Class schedule is considered as directory information in the School of Medicine. Some of this information will be made available as a student directory for use by fellow students, faculty, and School of Medicine staff. In addition, match results for residency placement will also be made available on the web.

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

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

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

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

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

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

The students of the Duke University School of Medicine understand that it is a privilege to learn the practice of their chosen professions in a clinical setting. At the same time, they recognize the obligation that they have to the health and welfare of their patients and to their patients’ families. As they enter professions in which they will have an extraordinary responsibility for others’ lives and health, students will strive to hold themselves to the highest standards of academic integrity and conduct. As part of their education and training, students must begin to practice the ethic of service that they will uphold for the rest of their professional lives. Since training in ethical and professional behavior is integral to the education of the health professional, violations of this Honor Code will be considered as an academic issue and may jeopardize advancement and graduation in the same way as other academic matters.

The Honor Code is written to promote a sense of intellectual honesty, trust, responsibility, and professionalism among students, faculty and staff of the School of Medicine. It should be understood that these guidelines represent standards to strive for, and that not every infraction will necessitate investigation. It should also be recognized that this honor code can not anticipate every potential offense and that unethical behavior not specifically mentioned in this code can still be investigated. Specific incidents will be considered in the context in which they occur. In addition, the magnitude and chronicity of infractions will be taken into account.

To uphold the honor code, the student will:
- demonstrate intellectual integrity and honesty,
- show concern for the welfare of others and act responsibly,
- demonstrate respect for the rights of others, build trust in professional relationships, and demonstrate professional demeanor.

For specifics on the honor code, students may contact the office of student affairs.

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

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

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

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

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

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

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

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

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

- **First to Second Year.** Completion of core basic science courses in one calendar year.
- **Second to Third Year.** Completion of core clinical science courses within 14 months.
Third to Fourth Year. Completion of 32 basic science credits within nine months (12 months for master's or scholarship students).

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

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

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

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

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

Course Load. In the first year, students typically complete certain required courses whose total weight equals 19 credits in the fall and 22 credits in the spring.
semester. During the second year, the normal registration for each 16-week semester is two eight-week rotations or the equivalent, four credits for the OCY course, and a total of three credits for Practice. In the elective years, the normal registration for any term is 16 credits with a maximum registration of 18 credits; no more than five credits in any four-week period may be taken. Enrollment for credit above this limit must have the written approval of the advisory dean.

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

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

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

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

For purposes of deferring repayment of student loans during a school approved leave of absence, federal regulations limit the leave to six months.
In all cases of leave of absence, the student is required to complete the full curriculum to be eligible to earn the M.D. degree.

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

1. A statement detailing:
   • The reason(s) for withdrawing from the program, including relevant history leading up to the decision;
   • How the issues relating to those reasons have been addressed;
   • A discussion as to why the student is re-applying to the Medical School, including information concerning changes in situation, reasons for wishing to pursue a career in medicine, and an explanation as to the chosen time for return;
   • A chronological list and brief description of actions since withdrawing from the Medical School;

2. An updated curriculum vitae;

3. A transcript of any academic courses taken since the withdrawal;

4. Two letters of reference from people with whom the student worked during the withdrawal period.

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

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

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

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

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

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

Admission Procedures

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

Application for Admission. The Duke University School of Medicine participates in the American Medical College Application Service (AMCAS), and application to the School of Medicine must be initiated through the electronic AMCAS application. The application may be accessed at the following website: http://www.aamc.org/students/.

Upon receipt of the application from AMCAS, a preliminary screen of the AMCAS application materials at Duke selects competitive candidates to complete the Duke web-based supplemental application. Applications are received after June 1 until November 1, which is the deadline for all materials to be received by AMCAS. Applicants are urged to file their applications as early as possible. Supplemental applications should be completed and transmitted within two weeks of receipt of notification to complete the
supplemental application. The absolute deadline for the supplemental application is December 1. Upon receipt of the supplemental application, two members of the Admissions Committee review all application materials and determine whether or not to invite prospective applicants for interview.

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

Selection. The earliest date of notification of acceptance is in late February for students entering the following August. Data on each candidate are screened using a computer model of previously matriculated students. Those selected to complete supplemental applications are carefully evaluated by the Committee on Admissions. A personal interview is conducted at Duke for those students with competitive credentials. Candidates may have personal interviews with regional representatives of the Admissions Committee, who are Duke School of Medicine alumni. Those candidates who demonstrate the most promise for exceptional performance in their future practice of medicine are admitted on the basis of merit. In order to ensure enrollment, accepted candidates must return a signed agreement within three weeks after notification. Since admission is offered in advance of matriculation, it is provisional upon the successful completion of any incomplete premedical required subjects as well as the continued demonstration of scholarship in college 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. Applications to receive credit for the Ph.D. can be obtained at the Medical School admissions and registrar's offices, and must be submitted to the registrar's office by the end of the first year of enrollment.

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

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

Summary. Three years of college work, a $75 nonrefundable application fee, a
signed agreement within three weeks of notification of acceptance, and the Medical College Admission Test are required. The estimated, first year class size for 2002-2003 is 100.

**Combined Degree Programs**

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

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

**Financial Support.** Students admitted to the first year of the program receive a traineeship award (National Research Service Award) consisting of a stipend and full tuition allowance from the National Institutes of Health. Currently the annual stipend is $19,750 (including health insurance). Financial support from that award can be furnished for up to six years assuming normal progress. These six years need not be consecutive; this permits flexibility in funding in case more than six years are required for completion of the curriculum. Funding by the NIH is limited to citizens or permanent residents of the United States.

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

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

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

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

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

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

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

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

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

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

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

3. To facilitate review of this application, the Medical College Admission Test should be taken, if possible, in April of the year in which the application is submitted.

4. Only those applicants who are accepted for the program are requested to complete an application form for the Graduate School. The Graduate Record Examination is not required for this purpose.

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

Additional information may be obtained by writing Salvatore V. Pizzo, M.D., Ph.D., Director, Medical Scientist Training Program, Box 3712, Duke University Medical Center, Durham, North Carolina 27710 or checking our website at [http://pathology.mc.duke.edu/mstp/](http://pathology.mc.duke.edu/mstp/) or emailing paoburks@acpub.duke.edu.

**Primary Care Program.** In September 1994, Duke University School of Medicine instituted the Primary Care Program for medical students. The goal of the program is to develop leaders in primary care disciplines of medicine. Any student matriculating in the Medical School and expressing an interest in becoming a primary care physician can apply to join this program. The program functions much as an academic society, with periodic informal meetings of generalist faculty and program students. Students are encouraged to elect the eight-week family medicine clerkship during the second year. 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, shel002@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 is available there through the Department of History. Following the completion of the Ph.D. degree, the student resumes requirements for the M.D. degree.

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

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

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

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 in the Fuqua Health Care Management Program. 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 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 AMCAS procedure described in this bulletin.

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

For additional information, contact the M.D./M.B.A. Program advisor, Dr. Kevin Schulman, Director, Center for Clinical and Genetic Economics, Duke Clinical Research Institute, DUMC, Box 17969, Durham, NC 27715, schul012@mc.duke.edu and Eureka Daye, Fuqua School of Business, Health Sector Management Program, Box 90120, Duke University, Durham, NC 27706, daye@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 74 credits must be earned in the Law School. The final time is spent in the Medical School completing elective basic science and elective and required clinical science work that is tailored to the student’s specialized needs and interests.

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

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

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

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

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

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

For the class entering in 2002, M.P.H. tuition policy changed to reflect North Carolina in-state/out-of-state residency status. The M.P.H. student will pay tuition to Duke, and Duke will pay the in-state tuition rate to UNC for North Carolina residents; however, if the student is not a North Carolina resident, Duke will only pay the in-state rate, and the student will be responsible for the difference.

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

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

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

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

After the first two years in the School of Medicine at Duke, course work shifts to the Public Policy Institute in the third year. In addition to the normal public policy curriculum, combined degree students are required to complete an epidemiology course. Between the third and fourth years, students have a twelve-week policy internship. During the fourth year, students complete their requirements in the School of Medicine and write a quantitative master’s thesis 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 during their first or second years.

Applications. Requests for applications and specific questions about the program should be addressed to the Director of Graduate Studies, Terry Sanford Institute of Public Policy, Box 90243, Duke University, Durham, North Carolina 27708-0243, mpp@pps.duke.edu. Inquiries and Medical School approval can be obtained from the Director of the M.D./M.P.P. Program, Laurence G. Branch, Ph.D., Box 3003, Duke University Medical Center, Durham, North Carolina 27710, (919) 660-7554, email: lgbranch@geri.duke.edu.

Financial Information

TUITION AND FEES

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

Tuition. The following table represents an estimate of a student's necessary expenses in the School of Medicine. The total of these figures suggests a basic minimum budget of approximately $40,200 for a fourth year student to $48,500 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.

2001-2002 Cost of Education

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition</td>
<td>$28,566</td>
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<tr>
<td>Accident and sickness insurance* (subject to change)</td>
<td>814</td>
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<tr>
<td>Laptop computer rental fee</td>
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</tr>
<tr>
<td>First year fee† (includes microscope rental, first year only)</td>
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<tr>
<td>Annual cost of books and supplies: first year</td>
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<td>Annual cost of books and supplies: second year</td>
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<tr>
<td>Annual cost of books and supplies: third and fourth years</td>
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<tr>
<td>Rent: second year</td>
<td>5,780</td>
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<td>Rent: third and fourth years</td>
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<tr>
<td>Student Health Service† (per semester)</td>
<td>240</td>
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</tbody>
</table>

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Transcripts.** Requests for transcripts of academic records should be directed to the Office of the Medical Center Registrar, Box 3878, DUMC. After graduation from the School of Medicine, transcripts of dean’s letters may also be obtained from the Office of the Registrar. There is no charge for either service.

**MERIT AWARDS FOR MEDICAL STUDENTS**

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

Financial need is not a criteria for selection; however, applicants who feel their financial need is greater than the merit award may apply for financial aid.
The School of Medicine offers awards based on academic excellence to students from the following scholarship funds. These funds support the Senior Scholarship Program:

- **William G. Anlyan, M.D. Scholarship**, established 1988, by gifts from faculty, staff and friends.
- **Barham Endowed Merit Fund**, established November, 1984, by gift from Mr. and Mrs. Joseph Barham, Oak Ridge, Louisiana.
- **Family Dollar Scholarship**, established November, 1984, by gift from Mr. Leon Levine, Chairman of the Board, Family Dollar Stores, Inc., Charlotte, North Carolina; for minority students.
- **Dr. William Redin Kirk Memorial Trust for North Carolinians**, established March, 1984, by bequest of Mr. Frederick H. Pierce, Owensboro, Kentucky.
- **School of Medicine Merit Fund**, established 1984, by gifts from medical alumni, students, and American Medical Association-Education and Research Foundation.
- **The Dean’s Tuition Scholarships**. Seven Dean’s Tuition Scholarships in the amount of current tuition are given to academically excellent first year under-represented minority students each year. Preference is given to residents of North Carolina; students must be U.S. citizens. Selection is made by the dean based on recommendations from the Medical School Admissions Committee. Annual renewal is contingent upon satisfactory academic progress.
- **The Nanaline H. Duke Scholarships**. Eight Nanaline H. Duke Scholarships valued at the current amount of tuition are awarded to academically excellent first year students. Selection is made by the dean based on recommendations from the Medical School Admissions Committee. Students must be U.S. citizens. Annual renewal is contingent upon satisfactory academic progress.

**MEDICAL STUDENT RESEARCH SCHOLARSHIPS**

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

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

**Eugene A. Stead Student Research Scholarships**

The Eugene A. Stead Scholarship is sponsored by the Duke Department of Medicine in honor of Eugene A. Stead, Jr., M.D., chairman of the Department of Medicine from 1947 to 1967. Three to four students are selected each year as Stead Scholars. Two of the Stead Scholarships are supported by endowments from individual patients of Dr. James Clapp: Jay D. and Lorraine Nicewonder and the Loo Cheng Ghee family. The third scholarship is supported by an endowment comprising persons at Duke and elsewhere, who were trained by Dr. Stead in internal medicine. The Robert T. and Virginia McDaniel-Stead Scholarship is an endowed scholarship intended to support basic cardiovascular research.

**Sarnoff Society Endowment for Cardiovascular Science**

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

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

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

Hughes Medical Research Training Fellowships

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

Intramural Research Program at the National Institute of Environmental Health Sciences

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

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

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

NIH Clinical Research Training Program

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

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

FINANCIAL AID

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

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

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

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

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

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

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

Financial Assistance to Upperclassmen. Annual reapplication is required of all need based aid recipients. Upperclassmen seeking financial assistance for the first time may consult with the director of financial aid.
Federal Scholarships. Armed Forces (Army, Navy, and Air Force) Scholarship programs may be available for accepted or enrolled students. The recipient receives full tuition, fees, and a monthly stipend in return for a commitment of service as a physician for each year of funding. The special application is made directly to the program in which the student is interested.

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

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

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

Loans

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

There are a few loans available from external sources.

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

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

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

**Awards and Prizes**

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

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

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

**The Joseph Eldridge Markee Memorial Award in Anatomy.** This award, donated by the friends and family of the late Dr. J.E. Markee, James B. Duke Professor of Anatomy and chairman of the Department of Anatomy from 1943 to 1966, consists of a certificate, medallion, and cash award of $200. It is presented by the Department of Anatomy to the most outstanding student in anatomy during the first year in the Medical School.
C.V. Mosby Book Award. Three graduating senior students are selected by the Awards Committee for active participation in service to the students, community, and medical school. The award is a Mosby book of the student’s selection.

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

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

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

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

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

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

Student and Professional Organizations

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

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

Medical student groups affiliated with, and in the past funded by, the Davison Society include the American Medical Student Association, the North Carolina Student Rural Health Coalition, the North Carolina Medical Society Student Chapter, the Student National Medical Association, *Shifting Dullness* (the medical student newspaper), the Christian Medical and Dental Society, the Asian-American Medical Student Association, the Duke Jewish Medical Student Association, Student Curriculum Committee, Duke Comprehensive Cancer Center Volunteer Network, AIDS Education Roadshow, Lenox Baker Children's Hospital Program, Duke Medical Gleaning Program, Homeless Shelter Clinic, Children's Miracle Network Fair, Family Medicine Interest Group, the *Aesculapian* (yearbook), American Medical Women's Association, the Mind-Body Interest Group, OB-GYN Interest Group, Neurology Interest Group, Emergency Medicine Interest Group, and the N.C. Wilderness Club.

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

President: Ali Raja  
Social Chairman-Vice-President: Amita Kamath  
Service Chairman-Vice-President: Marie Clark  
Secretary: Julius Wilder  
Treasurer: Chuck Scales  
IM Chairman: TBA  

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

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

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

President: Sheila Moriber Katz, M.D. 1966, Gladwyn, Pennsylvania
President-Elect: Calvin R. Peters, M.D., H.S. 1972-75, Winter Park, Florida
Ellen R. Luken, Executive Director, Medical Alumni Affairs
Courses of Instruction

ANESTHESIOLOGY

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


Courses of Instruction


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


Clinical Science Electives

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

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

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

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

**BIOCHEMISTRY**

**Courses of Instruction**

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

Associate Professors: Lorena Beese, Ph.D. (Brandeis, 1984); Ronald Greene, Ph.D. (California Inst. Tech., 1986); Homme Hellinga, Ph.D. (Cambridge, 1986); Kenneth Kreuzer, Ph.D. (Chicago, 1978); Terrence Oas, Ph.D. (Oregon, 1986); Eric Toone, Ph.D. (Toronto, 1988).


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

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

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


**Required Course**

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

**Electives**

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

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

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

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

**Biological Anthropology and Anatomy**

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

Courses of Instruction


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

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

Associate Research Professor: Theresa R. Pope, Ph.D. (Florida, 1999).

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

Associate Research Professor: Theresa R. Pope, Ph.D. (Florida, 1999).

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

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

Adjunct Assistant Professor: Thomas Anderson, Ph.D. (Duke, 1971).

Research Associates: Friderun Ankel-Simons, Ph.D. (Copenhagen, 1963); Brigitte Holt, Ph.D. (Missouri-Columbia, 1999); Pierre Lemelin, Ph.D. (SUNY-Stony Brook, 1996); Richard Madden, Ph.D. (Duke, 1990); Christopher J. Vinyard, Ph.D. (Northwestern, 1999); Anne Weil, Ph.D. (California-Berkeley, 1999).


Required Course

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

Electives

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

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

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

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

BIOSTATISTICS AND BIOINFORMATICS

Professor: William E. Wilkinson, Ph.D. (North Carolina at Chapel Hill, 1968), Interim Chair.
Professor: Stephen L. George, Ph.D. (Southern Methodist, 1969).
Research Professor: Brent A. Blumenstein, Ph.D. (Emory, 1974).


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

Assistant Professors: Andrew S. Allen, Ph.D. (Emory, 2000); Daohai Yu, Ph.D. (Michigan, 2000).

Assistant Research Professors: Laura P. Coombs, Ph.D. (Oklahoma State, 1999); Habib El-Moalem, Ph.D. (North Carolina at Chapel Hill, 1995); Alastair Erkanli, Ph.D. (Carnegie Mellon, 1991); Steven C. Grambow, Ph.D. (Kentucky, 1998); Cynthia L. Green, Ph.D. (North Carolina State, 1999); Edwin S. Iversen, Ph.D. (Yale, 1995); Maragatha Kuchibhatla, Ph.D. (Texas A & M, 1992); Lawrence H. Muhlbaier, Ph.D. (North Carolina at Chapel Hill, 1981); Donna Niedzwiecki, Ph.D. (Yale, 1984); Maren K. Olsen, Ph.D. (North Carolina at Chapel Hill, 1985).
Courses of Instruction

Ph.D. (Pennsylvania State, 1999); Bercedis L. Peterson, Ph.D. (North Carolina at Chapel Hill, 1986); Carl F. Pieper, Dr.P.H. (Columbia, 1990); Jennifer S. Shoemaker, Ph.D. (North Carolina State, 1998); Sandra S. Stinnett, Dr.P.H. (North Carolina at Chapel Hill, 1993).

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

Adjunct Professors: Marie Davidian, Ph.D. (North Carolina at Chapel Hill, 1987); Anastasios A. Tsiatis, Ph.D. (California at Berkeley, 1974).


Adjunct Assistant Professor: Lauren M. McIntyre, Ph.D. (North Carolina State, 1995).

Electives

CRP-241B. Introduction to Statistical Methods. This course is an introduction to the fundamental concepts in biostatistics and their use in clinical research. Through directed readings and discussion of representative research reports from peer-reviewed journals, students will be introduced to the concepts of hypothesis formulation, descriptive statistics, commonly used research designs and statistical tests, statistical significance, confidence intervals, statistical power, and commonly used statistical models. In addition, the basic concepts of data collection and analysis are presented using Microsoft Access and SAS. Prerequisite: Permission of instructor. Credit: 4. Wilkinson and Staff

CRP-242B. Principles of Clinical Research. The emphasis is on general principles and issues in clinical research design. These are explored through the formulation of the research objective and the research hypothesis and the specification of the study population, the experimental unit and the response variable(s). In addition, the course content promotes an understanding that allows the student to classify studies as experimental or observational, prospective or retrospective, case-control, cross-sectional, or cohort; this includes the relative advantages and limitations and the statistical methods used in analysis of each type. Emphasis is placed on the traditional topics of clinical epidemiology such as disease etiology, causation, natural history, diagnostic testing, and the evaluation of treatment efficacy. In addition, an introduction to ethical issues in clinical research is included. Prerequisite: Permission of instructor. Corequisite: CRP-241B. Credit: 4. Wilkinson and Staff

CELL BIOLOGY

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

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); Sharyn Endow, Ph.D. (Yale, 1975); Pascal Goldschmidt, Ph.D. (Universite Libre de Bruxelles, 1980); Daniel P. Kiehart, Ph.D. (Pennsylvania, 1979); Thomas J. McIntosh, Ph.D. (Cambridge, 1973); R. Bruce Nicklas, Ph.D. (Columbia, 1958); Michael K. Reedy, M.D. (Washington, 1962); James Siedow, Ph.D. (Indiana, 1972).

Associate Professors: Onyekwene A. Akwari, M.D. (Southern California, 1970); Blanche Capel, Ph.D. (Pennsylvania, 1989); Jonathan Cohn, M.D. (Rockefeller, 1978); Joseph M. Corless, M.D., Ph.D. (Duke, 1972); Haifan Lin, Ph.D. (Cornell, 1990); Christopher C. Newblda, M.D. (Pennsylvania, 1987); Don Rockey, M.D. (Stanford, 1974); David W. Schomberg, Ph.D. (Purdue, 1965); Steven R. Vigna, Ph.D. (Washington, 1978).


Assistant Research Professors: Lawrence Barak, M.D., Ph.D. (Michigan, 1982); Rodney Folz, M.D. (Washington, 1989); Raul Gaido, M.D. (Moscow Medical, 1988), Ph.D. (Russian Academy of Medical Sciences, 1992); Bruce M. Kittleson, Ph.D. (Virginia, 1979); Bruce Lobaugh, Ph.D. (Pennsylvania State, 1981); Emmanuel Opara, Ph.D. (London, 1984); Howard Rockman, M.D., C.M. (McGill, 1983).

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Required Courses

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

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


Electives

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

CELLBIO-251B. Molecular Cell Biology. Current research topics in cell biology presented in a lecture and discussion format based on recent research papers. Topics include: protein secretion and trafficking, the nucleus; cytoskeleton and cell motility, extracellular matrix and cell adhesion, growth factors and signaling, cell cycle. Credit: 4. Fall. Enrollment: min 10, max 38. Erickson and staff

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

COMMUNITY AND FAMILY MEDICINE
Clinical Professor: Lloyd Michener, M.D. (Harvard, 1978), Chairman.

DIVISION OF COMMUNITY HEALTH
Clinical Professor: Kathryn Andolsek, M.D. (Northwestern, 1975).
Assistant Consulting Professor: Gwendolyn C. Murphy, Ph.D. (North Carolina at Chapel Hill, 1993).

DIVISION OF CLINICAL INFORMATICS
FAMILY MEDICINE PROGRAM

DIVISION OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE
Associate Professor: Hester J. Lippsom, Ph.D. (North Carolina at Chapel Hill, 1995).
Associate Clinical Professor: George W. Jackson, M.D. (Western Reserve, 1968).
Associate: Thomas O. Brock, III, Ph.D. (Wake Forest, 1960).
Clinical Associates: Judith Holder, Ph.D. (Southern Illinois, 1995); Tamara James, M.A. (Georgia Mason, 1990); Andrew S. Silverman, M.S.W. (North Carolina at Chapel Hill, 1982).

DIVISION OF PHYSICAL THERAPY
Professor of Practice: Jan K. Richardson, Ph.D. (Pittsburgh, 1983), Chief.

DIVISION OF PHYSICIAN ASSISTANT EDUCATION
FACULTY

Assistant Professor: Colleen McBride, Ph.D. (Minnesota, 1990), Division Chief.
Professor: Barbara K. Rimer, Dr. P.H. (Johns Hopkins, 1991).
Assistant Professor: Joellen Schildkraut, Ph.D. (Yale, 1987).
Assistant Professor: Patricia Moorman, Ph.D. (North Carolina at Chapel Hill, 1993).
Assistant Research Professor: Kathryn I. Pollack, Ph.D. (Houston, 1996).

DUKE DIET AND FITNESS CENTER

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

ADJUNCT FACULTY

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

COMMUNITY FACULTY

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

**Duke University Affiliated Physicians**

Assistant Clinical Professors: William S. Friedman, M.D. (Tulane, 1972); Elizabeth B. Nadler, M.D. (New York, 1983).


Consulting Associates: John B. Anderson, M.D. (Cincinnati 1980); Ginetta Archinal, M.D. (New South Wales, 1982); Gillian A. Aylward, M.D. (Canada, 1983); Katherine Bliss, M.D. (North Carolina at Chapel Hill, 1989); Anita Blosser, M.D. (Kentucky, 1991); Catherine Bostelman, M.D. (Ohio at Toledo, 1998); William Borgos, M.D. (Johns Hopkins, 1995); W. Kevin Broyles, M.D. (Florida, 1996); Isa Cheran, M.D. (Bowman Gray, 1988); Daniel Crummert, M.D. (Wayne State, 1982); Thomas Curtis, D.O. (Texas College of Osteopathic Med., 1993); Denise Detchow, M.D. (Virginia, 1996); Kathleen dela Cruz, M.D. (Johns Hopkins, 1996); Jenny Franzak, M.D. (West Virginia, 1988); Joanne Fruth, M.D. (Ohio, 1987); Michael Gagliardi, M.D. (Pittsburgh, 1992); Allison K. Gard, M.D. (Illinois-Chicago, 1990); Jon Paul Hadersheet, M.D. (North Carolina at Chapel Hill, 1995); Craig A. Hoffman, M.D. (Louisiana State, 1986); Kamila T. Jan, M.D. (Bowman Gray, 1994); V. Satterly, Jr., M.D. (Tennessee, 1979); Joel R. Kann, M.D. (Eastern Virginia, 1989); Patrick Kavaunagh, M.D. (East Carolina, 1995); Richard Kennedy, M.D. (Illinois, 1983); David Klein, M.D. (North Carolina at Chapel Hill, 1986); Thomas Koinis, M.D. (Case Western Reserve, 1980); Soon Kwark, M.D. (Louisiana State, 1984); Douglas B. McKee, M.D. (Indiana, 1993); Janet McFadden, M.D. (Washington, 1991); John M. Old, M.D. (Bowman Gray, 1984); John E. Schaff, M.D. (South Carolina, 1990); George H. Moore, M.D. (East Carolina, 1981); Mary Sherwyn Mow, M.D. (Michigan, 1996); Jane Murray, M.D. (North Carolina at Chapel Hill, 1984); Julia Nelson, M.D. (North Carolina at Chapel Hill, 1974); T. Andrew O'Donnell, M.D. (Med. Coll. of Ohio, 1993); Coin Page, M.D. (North Carolina, 1996); Eneas Pruitt, M.D. (Iowa, 1997); Sarah Cornwell Ringel, M.D. (Medicine-207, the four-week neurology clerkship. Primary care students may complete the neurology clerkship during their fourth year.

**COMFMAM-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 ap-
Courses of Instruction

The course emphasizes continuous and comprehensive health care for people of both sexes and all ages within the context of their social groups and communities. Particular attention is paid to the diagnosis and treatment of common medical problems and to health maintenance, ambulatory care, continuity of care, and the role of consultants in primary care. Other topics covered include social factors such as the doctor-patient relationship, the role of the physician in the community, and the economics of health care delivery.

Students are placed with community-based faculty who are practicing family physicians in communities outside of Durham, principally within North Carolina. Most of these preceptorship sites are in rural communities, providing students with exposure to many issues of rural health care such as farming and other occupational injuries, transportation difficulties, and local customs. The eight-week sites are scheduled based on the availability of the preceptors. These sites may not be available every rotation. Students gain extensive experience in diagnosing and managing patient problems in an ambulatory care setting under the guidance of the department’s faculty. In addition, the clerkship provides students with opportunities to see patients in a variety of other settings, including home, nursing home, and community hospital. There is also the opportunity for medical students to be paired with physician assistant students at a community practice site for the purpose of working with mid-level practitioners in a team practice setting. Note: COMMFAM-205C is strongly recommended for all students in the primary care program. Changes in the rotation are not made less than 12 weeks prior to the start of the rotation. Credit: 8. Copeland

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

Basic Science Electives

COMMFAM-238B. Tutorial in Community and Family Medicine. An individually arranged experience in which the student participates in the research program of a faculty member. The subject matter, course credit, and meeting time are arranged with the faculty member. Each student meets regularly with his faculty preceptor and carries out a project related to the preceptor’s work. Through these discussions and the project, the student is able to develop an understanding of the discipline involved. Possible areas include community health, health education, geriatrics, family dynamics, occupational health, functional health and quality of life assessment, severity of illness assessment, case-mix adjustment, medical education, management sciences, economic aspects of health care, computer technology, biostatistics and epidemiology, clinical decision-making, diagnosis and management of common problems, alcoholism and social support systems. Because of the variety of projects available and the necessity of prior arrangements, it is essential that interested students consult with the instructor and staff at least two months before the beginning of the term selected. Prerequisite: permission of instructor. Credit: 1-16. Parkerson and Ostbye

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

**COMM FAM-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**

**COMM FAM-243C. Occupational and Environmental Medicine.** This elective is designed to enhance the student’s basic science skills in three important areas related to occupational medicine: clinical toxicology, industrial hygiene, and epidemiology. During this four-week rotation, students will complete readings related to these three areas, participate in lectures and seminars, learn to conduct computerized database searches concerning industrial toxicology issues and cases, and visit industrial sites as part of the experience. Students will also be given at least one project which will involve evaluation of chemical, physical, or biologic exposures in the work environment and medical evaluation of suspected cases of occupational disease. Upon completion of the rotation, students can expect to have practical and useful skills in evaluating occupational and environmental exposures and making a reasonable risk assessment of those exposures. Credit: 4. Enrollment: max 2, min 1. *Epling, Darcey and staff*

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

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

**COMM FAM-255C. Health Promotion and Disease Prevention.** This elective is an intensive clinical experience in health promotion and disease prevention. Students see patients in the Duke Family Medicine Center and participate in a variety of activities designed to help them provide excellent health maintenance care. Specific content areas addressed include counseling skills in nutrition, safe sex practices, and smoking and al-
Courses of Instruction

Cohol cessation, as well as screening tests and immunizations. Prerequisites: permission of instructor. Credit: 4. Enrollment: min 2, max 6. Yarnall and staff

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

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

COMM Fam-259C. Advanced Clerkship in Family Medicine. This course provides intensive instruction and practice in the care of primary care patients in the community setting. Students may select from three sites: the Duke Family Medicine Center on the Duke campus, the Duke-SRAHEC Family Medicine Center in Fayetteville or the Duke-Cabarrus Family Medicine Residencies in Concord. This course has an outpatient focus and is recommended for students who would like to improve their skills in the care of ambulatory patients, especially those with common problems. Students are involved with day to day patient care under the supervision of family physician faculty and residents. Because of restrictions on the number of students allowed at each site, preference is given to those students entering Family Medicine Residencies. Students are advised to contact the department as early as possible for course approval (at least eight weeks in advance). No drops are permitted within 60 days of the first day of the rotation. Prerequisite: permission of instructor. Credit: 2-8. Enrollment: max 4. Gradison and staff

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

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

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weeks in advance). Priority will be given to primary care track students. Prerequisite: permission of instructor. Credit: 2-8. Copeland and staff

COMM FAM-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

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

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

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

- Occupational and Environmental Medicine
  - Sam Moon, M.D.
  - Carol Epling, M.D.
- Community Health
  - Barbara Sheline, M.D.
  - Victoria Kaprielian, M.D.
- Sports Medicine
  - Rich Ferro, M.D.
  - Andrew Bonin, M.D.
- Lifestyle Management
  - Howard Eisonson, M.D.
  - Kathryn Andolsek, M.D., M.P.H.
- Managed Care
  - Victoria Kaprielian, M.D.
  - Lloyd Michener, M.D.

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

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DIVISION OF CLINICAL INFORMATICS

Electives

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

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

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

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

MEDINFO-399B. Preceptorship in Medical Informatics. An individualized research program under the direction and supervision of a member of the faculty of the Clinical Informatics 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); Pascal Goldschmidt, M.D. (Univ. Libre de Bruxelles, 1980); Margaret Pericak-Vance, Ph.D. (Indiana, 1978); David Schwartz, M.D. (California-San Diego, 1979).
Associate Professors: Mariano Garcia-Blanco, M.D., Ph.D. (Yale, 1988); Joseph Heitman, Ph.D. (Rockefeller, 1989); Douglas A. Marchuk, Ph.D. (Chicago, 1985); Bruce Sullenger, Ph.D. (Cornell, 1990); Jeffrey Vance, Ph.D. (Indiana, 1979); M.D. (Duke, 1984); Robin P. Wharton, Ph.D. (Harvard, 1986).
Assistant Professors: Andrea Amalfitano, Ph.D. (Michigan State, 1989), M.D. (Michigan State, 1990); Hubert Amrein, Ph.D. (Zurich, 1988); Frederick Dietrich, Ph.D. (M.I.T., 1992); Daniel Lew, Ph.D. (Rockefeller, 1990); Hiroaki Matsunami, Ph.D. (Kyoto, 1996); John M. McCusker, Ph.D. (Brandeis, 1986); Gregory Riggins, Ph.D. (Emory, 1994); M.D. (Emory, 1984); Yuan Zhuang, Ph.D. (Yale, 1989).
Associate Research Professors: Maria Cardenas-Corona, Ph.D. (N. Texas State, 1988); M.D. (Tohoku, 1986).
Required Course

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

Elective

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

**IMMUNOLOGY**

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


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


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

Required Course

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

Electives

**IMMUNOL-252B. General Virology and Viral Oncology.** The first half of the course is devoted to a discussion of the structure and replication of mammalian and bacterial viruses. The second half deals specifically with tumor viruses which are discussed in terms of the virus-cell interaction, the relationship of virus infection to neoplasia, and the application of retroviruses in molecular and developmental biology. C-L: MICROBIO-252B; Graduate School. Credit: 3. Enrollment: min 5. Keene and staff
IMMUNOL-291B. Comprehensive Immunology. An intensive course in the biology of the immune system and the structure and function of its component parts. Major topics discussed are: properties of antigens; specificity of antibody molecules and their biologic functions; cells and organs of the lymphoid system; structure and function of complement; inflammation and non-specific effector mechanisms; cellular interactions and soluble mediators in lymphocyte activation, replication, and differentiation; regulation of immunoresponses, neoplasia and the immune system; molecular structure and genetic organization of immunoglobulins, histocompatibility antigens, and T cell receptor. C-L: MICROBIO-291B; Graduate School. Credit: 3. Enrollment: max 10. Krangel and staff

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

INTERDISCIPLINARY COURSES

Required Courses

INTERDIS-201B. Practice Year 1. The Practice courses are required in both years one and two. Practice emphasizes clinical skills development using lecture and small group teaching once a week.

In year one, Practice introduces students to interviewing and physical diagnosis skills with emphasis on the doctor/patient relationship. Practice uses a problem-based learning technique to expose students to life cycle, human development, and clinical reasoning. Students practice interviewing and counseling on the wards and with standardized patients. Students work with preceptors in outpatient clinics in spring of year one where they continue to practice their new skills. Fall, Credit: 1. Spring, Credit: 2. Sheline, Chatterjee, and Dell

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

INTERDIS-205C. Practice Year 2. During year two, students use the Practice course to reflect on their experiences on the clinical rotations. Discussion topics include ethics, suffering, spirituality, pain, and end of life issues. Students develop skills in giving bad news and counseling around advance directives. The course devotes an entire block to personal professional development. Fall, Credit: 1. Spring, Credit: 1. Sheline, Chatterjee, and Dell

MPS-206C. Medical Practice and Health Systems/MPS. This two-week required clerkship uses lectures, small group discussions, practical projects, and readings to improve students' awareness and understanding of the complexity of the physician's role in rapidly changing systems of health care delivery. The course emphasizes the professional and ethical tensions that emerge while striving to optimize care for individuals and the populations of individuals. Consideration of cost focuses on the nature and behavior of costs relevant to health care and explores the ambiguities inherent in assessing cost effectiveness of interventions from the divergent viewpoints of payors, managed care organizations, physicians and individual patients. Interdepartmental faculty additionally provide perspective on past and present patterns of medical practice and offer possible models of future physician practices. Credit 2. Bredehoeft, Branch, and staff
INTERDIS-305C. Practice Year 3. A continuity ambulatory (outpatient) care experience, the course is required of most third year students and is designed to teach students patient outcomes over time. Study away and scholarship students who may not be able to take the course in their third year must take its equivalent in their fourth year. The outpatient clinic experience is 34 weeks, one-half day a week. Twenty-two weeks are required in an approved continuity ambulatory site, primary care sites being the most likely to be approved. Specialty care sites (medicine or surgery) may be approved, if at least 50 percent of the patients are seen on a continuing basis with typical follow-up in 1-3 months. Approval for this is required by the Practice office. Students may arrange to use 12 of the 34 weeks to pursue non-continuity outpatient clinic experiences (e.g., specialty clinics that do not see patients back before three months, if at all). Notification of the Practice office is required prior to starting, and attendance must be documented by the preceptor. A student may choose to do all 34 weeks at the same approved site. Credit: 1.5. Enrollment: max 100. Sheline

Basic Science Electives

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

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

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

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

Clinical Science Electives

INTERDIS-302C. Exploring Medicine: Cross-Cultural Challenges to Medicine in the 21st Century. The purpose of this course is to promote understanding of the cultural background that frames how the practice of medicine can benefit the people of Latin America—particularly Honduras. The course content is designed to understand how art, political history, literature, music, and religion impact the lives of people in a foreign country. The seminar will facilitate understanding the meaning of medicine for the student in a different culture and then to modify what and how medical issues are treated. The classes will be given by a multidisciplinary faculty. A trip to Honduras is planned for the spring with a limited number of students invited. They will meet Honduran students and faculty as well as offer medical care to patients during the visit. Spanish is not required but recommended. The course will be held as ten (10) two hour
seminars with the trip to Honduras as an optional laboratory experience. There will be approximately 20 hours of instruction. The course can be found on the web at https://courses.duke.edu/courses/IND302C.01-S2001. Credit: 2. Enrollment: max 12. Clements

**INTERDIS-304C. Healing in the Developing World and Care of the Underprivileged.** This course is divided into a didactic period conducted between January and May followed by one week in Haiti during the Duke spring break. The didactic portion of the course meets on Monday evenings to discuss issues such as, when cultures collide, medical anthropology, research in developing countries, providing culturally relevant assistance, malnutrition, public policy regarding poverty, and theological considerations of intercultural ministries. In addition, some rudimentary knowledge of the Kreyol language is introduced. While in Haiti, the student will participate as a member of a mission team involving members of the medical and divinity schools. Goals of the course: (a) exposing students to health care in a developing country; (b) an appreciation for working in an intercultural environment. Credit: 2. Walmer and Meador

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

**DIVISION OF CARDIOLOGY**
Professor: Pascal J. Goldschmidt, M.D., Edward S. Organ Professor of Cardiology (Université Libre de Bruxelles, Belgium, 1980), Chief.

Professors: Thomas M. Bashore, M.D. (Ohio, 1972); Victor S. Behar, M.D. (Duke, 1961); Robert M. Califf, M.D., Donald F. Fortin, M.D. Professor of Cardiology, (Duke, 1978); Fred R. Cobb, M.D. (Mississippi, 1964); Augustus O. Grant, M.D. (Edinburgh, 1971); Joseph C. Greenfield, Jr., M.D., James B. Duke Professor of Medicine, (Emory, 1956); Joseph R. Kisslo, M.D. (Hahnemann, 1967); Robert J. Lefkowitz, M.D., James B. Duke Professor of Medicine, (Columbia, 1966); Daniel B. Mark, M.D. (Tufts, 1978); James H. Morris, M.D. (SUNY, 1959); Robert H. Peter, M.D. (Duke, 1961); Harry R. Phillips, M.D. (Duke, 1975); Thomas J. Ryan, M.D. (Indiana, 1981); Richard S. Stack, M.D (Wayne State, 1976); Gary L. Stiles, M.D., Ursula Geller Professor for Research in Cardiovascular Diseases, (Vanderbilt, 1975); R. Sanders Williams, M.D. (Duke, 1974).


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


**DIVISION OF CLINICAL PHARMACOLOGY**
Associate Professor: Christopher M. O’Connor, M.D. (Maryland, 1983), Chief.

**DIVISION OF DERMATOLOGY**
Professor: Russell P. Hall, M.D. (Missouri, 1975), Chief.
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Associate Clinical Professor: Jonathan L. Cook, M.D. (Med. Univ. of South Carolina, 1992).

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

Assistant Professor: Camille Haisley-Royster, M.D. (Duke, 1996).

DIVISION OF ENDOCRINOLOGY, METABOLISM, AND NUTRITION

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

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


DIVISION OF GASTROENTEROLOGY

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


DIVISION OF GENERAL INTERNAL MEDICINE

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

Professors: David B. Matchar, M.D. (Maryland, 1980); Kevin Schulman, M.D. (New York, 1988).


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


DIVISION OF GERIATRICS
Professor: Harvey Jay Cohen, M.D. (SUNY, 1965), Chief.
Professor: Kenneth W. Lyles, M.D. (Med. Coll. of Virginia, 1974).
Associate Professors: Anthony N. Galianos, M.D. (South Alabama, 1986); Kenneth E. Schmader, M.D. (Wake Forest, 1980).
Associate Research Professor: Connie Bales, Ph.D. (Tennessee, 1981).
Assistant Clinical Professor: Jack I. Twersky, M.D. (Hahnemann, 1982).

DIVISION OF HEMATOLOGY
Professor: Marilyn J. Telen, M.D., Wellcome Clinical Professor of Medicine in Honor of R. Wayne Rundles, M.D. (New York, 1977), Chief.
Assistant Professors: Murat O. Arcasoy, M.D. (Aegean, 1987); Gowthami Arepally, M.D. (Vanderbilt, 1989); John R. Pavlofski, M.D. (St. Louis, 1994).
Associate: Laura M. De Castro, M.D. (Autonoma de Santo Domingo, 1986).

DIVISION OF INFECTIOUS DISEASES
Professor: John D. Hamilton, M.D. (Colorado, 1964), Chief.
Associate Clinical Professor: Charles B. Hicks, M.D. (George Washington, 1979).

DIVISION OF MEDICAL ONCOLOGY
Professor: Keith M. Sullivan, M.D., James B. Wyngaarden Professor of Medicine, (Indiana, 1971), Chief.
Associate Professors: Frank R. Dunphy, II (Louisiana at Shreveport, 1979); Matthew J. C. Ellis, M.D. (Royal Postgraduate Med. School, 1991); Michael Kelley, M.D. (Michigan, 1985); Victoria L. Seewaldt, M.D. (California at Davis, 1989); James J. Vredenburgh, M.D. (Vermont, 1963).
Associate Clinical Professor: Gwynn D. Long, M.D. (Wake Forest, 1983).
Associate Research Professors: David Adams, Ph.D. (Nebraska, 1979); Susan M. Ludeman, Ph.D. (Catholic, 1979).
Assistant Clinical Professor: Steven M. Sorscher, M.D. (Michigan, 1985).
Assistant Research Professors: Adrianus G.W. Domen, Ph.D. (Amsterdam, 1993); Michael P. Gamcsik, Ph.D. (Edinburgh, 1983); Joel R. Ross, Ph.D. (Texas at Dallas, 1991); Robert W. Storms, Ph.D. (Texas, Austin, 1991); Ying-Fu Su, Ph.D. (Colorado, 1979).
DIVISION OF NEPHROLOGY

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


DIVISION OF NEUROLOGY


Clinical Professor: Charles E. Burnham, II, Ph.D. (Alabama, 1982); Dennis Thomas, Ph.D. (Cincinnati, 1995); Zhousheng Xiao, M.D. (Hengyang, 1987).


Clinical Professor: Kevan VanLandingham, M.D. (Virginia, 1985).

Clinical Professor: Keivan VanLandingham, M.D. (Virginia, 1985).

Clinical Professor: Keivan VanLandingham, M.D. (Virginia, 1985).

DIVISION OF PULMONARY AND CRITICAL CARE MEDICINE

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


RECTORY OF RHEUMATOLOGY, ALLERGY AND CLINICAL IMMUNOLOGY

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

Clinical Professor: Rex M. McCullum, M.D. (Vanderbilt, 1983).


Assistant Professors: Virginia B. Kraus, M.D. (Duke, 1982); Marc C. Levesque, M.D. (Yale, 1989); John S. Sundy, M.D. (Hahnemann, 1991); Alvin F. Wells, M.D. (South Florida, 1996).


ADJUNCT FACULTY


Adjunct Associate Professors: Scott D. Berkowitz, M.D. (Jefferson, 1979); Edward Breitschwerdt, D.V.M. (Georgia, 1974); David A. Hosford, M.D. (Emory, 1983); Tony Huang, M.D. (National Taiwan, 1983); David Peden, M.D. (West Virginia, 1984); John S. Penta, Ph.D. (Purdue, 1967); Walter J. Rogan, M.D. (California at San Francisco, 1973); Sandra L. White, Ph.D. (Michigan, 1974).


ADJUNCT FACULTY


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

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

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

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

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

Chilukuri

Electives

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

Muir and staff

MEDICINE-211C. Internal Medicine Subinternship (Duke/Durham Regional Hospital). Course Goals: To provide an internal medicine inpatient care experience at the intern level. (2) How Goals Are Achieved: Students are assigned to an inpatient service at Duke or Durham Regional Hospital. These services include the general medicine services at both hospitals, and internal medicine residents supervise the students. Alternative services include the MICU, Liver Service, Cardiology, and Hematology/Oncology. Internal medical residents and subspecialty fellows provide supervision on these services. The student functions as an intern on that service with the exception that orders must be countersigned by a medical house officer. A pager and sleep-in facilities
are available. The supervising resident or fellow determines the number of patients assigned with anticipated increases over the four weeks. (3) Methods of Evaluation: Students are evaluated by their residents, fellows, and senior staff attending. The evaluation form is made available to each student at the beginning of the rotation. There is a formal evaluation at four weeks. No final exam is given. Prerequisites: Available only to Duke medical students who receive grades of Honors or Pass+ in MEDICINE 205C. Prerequisite permission of the instructor. Credit: 5. Enrollment: max 17. Muir and staff

MEDICINE-213C. Tutorial in Medical PDC. (1) Course Goals: Primary—To broaden student exposure to ambulatory care in internal medicine and allow students to work intensively with a single, seasoned medical practitioner. Students learn the informational content relevant to the discipline, but also have the opportunity to observe how one doctor goes about daily practice. (2) How Goals Are Achieved: Students work in a one-to-one relationship with a faculty member in the Department of Medicine who sees patients regularly in the 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). Permission of the instructor. For permission information, please contact Sheila Gainey at 919-681-5258. Credit: 2 (10 hrs/ wk for 8 weeks), 4 (full time for 4 weeks or 20 hrs/ wk for 8 weeks or 10 hrs/ wk for 16 weeks), or 8 (full time for 8 weeks). Waugh and staff

MEDICINE-214C. Introduction to outpatient Primary Care Internal Medicine. Course Goals: At the end of the experience, students should be able to (1) Diagnose and manage a number of common internal medicine and primary care problems including a wide variety of diseases that are generally seen only in the ambulatory setting. (2) Competently and efficiently take a problem focused history, perform a directed physical exam and perform some office-based procedures. (3) How Goals Are Achieved: The student works with one or more faculty mentors within the Division of General Internal Medicine spending one or more days per week seeing patients in the Medical Private Diagnostic Clinic (MPDC). A highly diverse mix of patients is seen and might include persons with diabetes, heart disease, orthopaedic conditions, skin disease, common mental health problems, or neurologic disease. Patients also present for preventive health services. In the DGIM practice, patients routinely present with symptoms that have not been previously evaluated or diagnosed, allowing students to truly sharpen their clinical skills. In all cases, the student sees the patient first, then discusses the case with the attending. The student must outline in writing five goals that he or she wishes to accomplish during this rotation. The student’s goals should be delivered to Dr. Larry Greenblatt at least three weeks before the rotation begins. (4) Methods of Evaluation: The faculty mentor who works directly with the student does the student evaluation. Grades are based on the student’s interactions with patients, his or her clinical thinking regarding diagnosis and management of their problems, and documented records. Professionalism, fund of knowledge, and commitment to learning are highly weighted. Prerequisites: Third year and fourth year students who successfully completed the second-year medicine clerkship. Credit: 1 (10 hrs/ wk for 4 weeks), 2 (20 hrs/ wk for 4 weeks), or 4 (20 hrs/ wk for 8 weeks). Enrollment: max 2. Greenblatt and general internal medicine staff

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

MEDICINE-224C. Intensive Care Medicine Subinternship (Durham VA Hospital). (1) Course Goals: Primary — To provide training in clinical physiologic and pharmacologic principles of the care of the critically ill. Secondary — To develop students' skills in performance and interpretation of diagnostic procedures. (2) How Goals Are Achieved: Under the supervision of senior assistant residents, the pulmonary fellow and the critical care attending physician, students function as subinterns and are responsible for patient work-ups and daily bedside presentations. Students are given responsibilities for procedures and decision-making in direct proportion to the development of their patient management skills. Daily radiology and bedside attending rounds stress an integrated physiologic approach to the management of critically ill patients with emphasis on acute respiratory care, hemodynamic monitoring, acid-base balance and nutritional support. Each student is provided a handout of selected readings that supplements the didactic sessions on diagnosis, pathophysiology, and management of critical illness. The student on call schedule is every third night for the duration of this four-week course. The student registered for MEDICINE 224-C may drop the course up to one month before the start date. After that time, the student must arrange for a replacement if he/she subsequently drops the course. (3) Methods of Evaluation: Student evaluations are done by the fellows and faculty attending on the MICU and are based on observed performance. Information may be obtained by telephoning Dr. Gilbert Schreiber at 286-6946 (Staff Assistant: Mrs. Sharon Waddell) or via email at schre002@mc.duke.edu. Credit: 5. Enrollment: max 3. Schreiber and critical care staff

MEDICINE-230C. Pulmonary Medicine. (1) Course Goals: Primary - To provide training in clinical aspects of pulmonary medicine. The primary diseases emphasized include asthma, chronic obstructive lung disease, pulmonary vascular diseases including pulmonary embolus, acute respiratory failure, hypersensitivity, interstitial and immunologic lung diseases and pulmonary manifestations of systemic illnesses, i.e., sarcoid, scleroderma, cystic fibrosis, etc. Secondary - To provide experience with pulmonary laboratory techniques including pulmonary function testing, cardio-pulmonary exercise testing, chest radiology, and bronchoscopy. (2) How Goals Are Achieved: Students assigned to the Pulmonary Consult Services at either the VA or the 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 physi-
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MEDICINE-242C. Clinical Arrhythmia Service. (1) Course Goals: Primary - To provide students with an in-depth exposure to the diagnosis and management of cardiac arrhythmias, electrophysiologic studies, ablation of arrhythmias, cardiac pacemakers, and implantable defibrillators; to help students to understand the electrophysiologic events that result in arrhythmias and ECG changes. This course is not designed to be a substitute for the general cardiology elective (MEDICINE 244C and 245C). Secondary - To familiarize the student with certain basic techniques of arrhythmia diagnosis such as esophageal recording and pacing. (2) How Goals Are Achieved: The student spends four weeks working on the Clinical Arrhythmia Service. The student makes rounds with the Clinical Electrophysiology Service on inpatients with arrhythmia problems. The student is encouraged to attend electrophysiologic studies and assist in the analysis of data from these studies. Attendance of electrophysiologic surgical procedures is also encouraged. The student is responsible for the work-up of patients admitted to the Arrhythmia Service as well as inpatient consults and plays an important role in the follow-up of these patients while they are in the hospital. The student sees outpatients during Arrhythmia Clinics that meet on Monday, Tuesday, Wednesday, and Thursday in the PDC. The student assists in the evaluation of patients for permanent pacemaker implantations. Students are responsible for reviewing the literature on subjects related to the patients that they have seen on the clinical service. (3) Methods of Evaluation: Students are evaluated on their clinical skills in taking histories, performing physical examinations as well as in their presentation and assessment of the patient’s problem. They are also assessed on their ability to read and understand the relevant literature and their ability to assume a responsible role in the care of patients on the Clinical Arrhythmia Service. Credit: 4. Enrollment: max 1.

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

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

MEDICINE-245C. Consultative Cardiology. (1) Course Goals: To refine student understanding of normal and pathologic cardiovascular physiology while functioning in the role of a consultant for inpatients and outpatients with various cardiovascular problems; to develop the skills necessary to quickly and accurately interpret ECGs. (2) How Goals Are Achieved: Students are assigned to the consult service at either the VA Hospital or Duke, where, in concert with the resident, fellow and senior staff attending, they evaluate the operative risk for non-cardiac surgery as well as make decisions concerning evaluation and treatment of patients with ischemic and other types of heart disease. Students participate extensively in reading ECGs and a core curriculum experience including individually assigned times to work with HARVEY, the cardiology patient simulator and various computer-assisted-instruction programs. (3) Methods of Evaluation: Students are evaluated by the resident, fellow, and senior staff with whom they work. The evaluation questionnaire is made available at the beginning of the elective. Depending on circumstances, students may also be evaluated by written and practical examinations at the beginning and/or end of the elective. For permission information, please contact Sheila Gainey at 919-681-5258. Credit: 4. Enrollment: max 7. Waugh and cardiology staff.

MEDICINE-250C. Clinical Dermatology. The elective in clinical dermatology is designed to prepare students to perform an accurate skin examination, formulate appropriate differential diagnoses, and choose relevant diagnostic or therapeutic interventions. This course is valuable to any student interested in improving their ability and confidence in the cutaneous exam. Students in the rotation spend two weeks working in the outpatient dermatology clinics, one week on the inpatient consult service at Duke, and one week at the VA Medical Center. The outpatient clinical experience includes general dermatology clinics as well as a variety of specialty clinics such as pediatric dermatology, HIV dermatology, cutaneous oncology, and dermatologic surgery; clinic attendance can be tailored to the student's future career goals. Patient care is supplemented with lectures designed to provide the student with a foundation in dermatologic principles, and students are encouraged to attend weekly departmental teaching conferences. Student evaluations are based on the development of clinical skills as assessed by faculty and residents, and by a brief clinically oriented examination. Any questions may be discussed with the course director, who may be reached at 681-1629. Students are to report to the Dermatology Clinic, Duke South, Purple Zone, Clinic 3K, Room 3337 at 8:30 a.m. on the first day of the rotation for orientation. Dr. Prose is the course director, who may be reached at 684-5146. Credit: 4. Enrollment: max 7. Prose.

MEDICINE-256C. Ethical Issues in Medicine. This seminar examines ethical questions raised by modern medical science and technology with special attention to their implications for clinicians and their patients. It includes both historical and philosophical analysis of these questions, as well as coverage of selected practice-related issues.
MEDICINE-260C. Gastroenterology. (1) Course Goals: Primary - To provide an experience with digestive diseases from which the student can develop a sound fundamental approach to the diagnosis and management of these problems. Secondary - To provide an exposure to recent advances in the field including therapeutic and diagnostic endoscopy; to stimulate questions concerning digestive diseases and to attract students into the field. (2) How Goals Are Achieved: Participation in the care, work-up and management of patients hospitalized on the general wards of Duke or the VA Hospital under the guidance of the resident, fellow, and faculty members assigned either to the VA or Duke Consultation Service. The students' experience may include participation in the activities of the clinic endoscopy unit of the Division of Gastroenterology. This unit offers specialized tests and procedures necessary for the state of the art care of patients with digestive diseases. Procedural activities include upper endoscopy, endoscopic retrograde cholangiopancreatography, colonoscopy and polypectomy, endoscopic ultrasound, laser photodynamics therapy, and endoscopic papillotomy of the ampulla of Vater. Data derived from these and other laboratory studies are discussed in the context of specific patient problems in weekly conference settings. Students have an opportunity to interact with all the faculty of the Division at morning rounds and other conferences where patients from all of the services (Duke and VA) are discussed. (3) Methods of Evaluation: Student evaluation forms are completed by the resident, fellows, and faculty working with the student on individual patient care services. Final evaluation represents a composite of these forms that chiefly identifies clinical skills, fund of basic information, organizational ability, and degree of interest and participation. Credit: 4. Enrollment: max 4.

Liddle and gastroenterology staff

MEDICINE-270C. Outpatient Hematology-Oncology (Duke or Durham VA). (1) Course Goals: To give the student experience in the diagnosis, long-term treatment, and supportive care of patients with hematologic and oncologic disorders in the outpatient setting. The use and interpretation of peripheral blood films and other specialized laboratory tests (e.g., bone marrow aspirate/biopsy, serum electrophoresis, coagulation studies, tumor markers, leukemia cell markers), as well as an approach to the evaluation and treatment of common hematologic problems (anemias, bleeding and clotting disorders, hematologic and solid tissue malignancies) are included. Issues such as quality of life and care of the geriatric oncology patient are addressed. (2) How Goals Are Achieved: The student is assigned a staff member as preceptor with whom to work in the Hematology/Oncology clinic one to three half-days per week in clinic, depending on the student's schedule and the availability of physicians in clinic. If desired, a preceptor who concentrates mainly on hematology or oncology may be arranged. This course is offered for eight or, preferably, 16 weeks. (3) Methods of Evaluation: Students are evaluated by their preceptors on the basis of their ability to obtain a history, perform a physical examination, evaluate hematologic and other laboratory data, and propose assessments and plans of action. Credit: 1-2. Enrollment: max 4.

Telen and hematology/oncology staff

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

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

MEDICINE-275C. Clinical Coagulation. (1) Course Goals: Primary - To teach the clinical and laboratory approach to patients with a hemorrhagic or thrombotic disorder. The student learns to evaluate clinical coagulation disorders and become familiar with coagulation laboratory testing and interpretation. Secondary - To expose the student to recent advances in the area of coagulation research. (2) How Goals Are Achieved: The student spends four weeks on the Hematology Consult Service under the direction of hematology division faculty. The student is expected to work-up inpatients with coagulation problems referred to the Coagulation Service as well as participate in a half-day a week Coagulation Outpatient Clinic. Patients generally present with complex diagnostic as well as therapeutic problems. The rotation includes hematology lab rounds during which the student learns to interpret lab tests and review abnormal results. The student is expected to read standard texts regarding their patients' problems, as well as relevant reviews provided by the attending physician. The student may also interact with the Anticoagulation Management Service to gain a better understanding of various approaches to outpatient management of anticoagulant therapy. Students electing to do an eight week rotation have a more extensive laboratory and clinic research experience. (3) Methods of Evaluation: The student's performance is evaluated by the hematology attending with input from the fellow and/or medicine resident on the service. The evaluation is based on observation of the student's ability to do careful histories and physical examinations, to appropriately assess the problem and develop a logical diagnostic and therapeutic plan, and to demonstrate an increase in knowledge regarding laboratory tests and their application to clinic problems. Credit: 4 or 8. Enrollment: max 2. Telen and hematology staff
**MEDICINE-280C. Clinical Infectious Diseases.** (1) Course Goals: To provide experience in the clinical and laboratory diagnosis of infectious diseases and in their therapy. The primary emphasis is placed on learning from interaction with patients, resident staff, and faculty on the consultation service. Students are expected to work up assigned patients by interview, physical examination, and collation of laboratory results, leading to a summary and synthesis of the problem. Particular emphasis is placed on close follow-up of the patients during hospitalization, including attendance at procedures or operations whenever possible. Students should know their own patients well enough to be able to give a reasonable presentation on ward rounds or at conferences without notice. Students are expected to read standard texts in-depth about their patients' problems, as well as a few recent relevant primary references. Students are expected to attend the various conferences listed on the weekly schedule of division activities punctually including Microbiology Plate Rounds, Journal Club, and tutorials. They are asked to present cases and provide some discussion at the Thursday V.A. Conference. Each student should be prepared to present and briefly discuss articles that he or she considers to be interesting and timely at Journal Club. (2) Methods of Evaluation: Each student's performance is evaluated and graded by the resident, fellow, and attendings, using the usual "honors," "pass plus," "pass," "deferred," or "unsatisfactory" system that is utilized internally in the Department of Medicine. In arriving at a consensus, appropriate emphasis is placed on knowledge, enthusiasm, and evidence of improvement during the rotation. There is no written examination. Adds are accepted at any time providing the course has not been filled. However, because this course is usually oversubscribed, drops are not accepted within 30 days of the first day of classes unless the student finds his own replacement. MEDICINE-280C is a full-time experience. Also, it is offered as a sole-enrollment course and, as such, cannot be taken in conjunction with any other course without the permission of the advisory dean and the course director. Credit: 4. Enrollment: max 7.

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

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

**MEDICINE-307C. Neurology Clerkship.** This course is restricted to those students who did not take the Neurology rotation in their second year. It provides the student with a firm understanding of the neurological examination, formulation of clinical neurological problems, and practice with written and oral communications in a hospital setting. The student has the opportunity to apply the neuroanatomy, neurophysiology, neurochemistry, and neuropathology learned in the first year to the evaluation and care of his or her patients. The patients are drawn from the neurology services at Duke Hospital or the Durham VA Medical Center. The students elicit a history and perform a physical examination. The student records the findings in the hospital charts and presents the findings at regular staff rounds. The student then participates with a clinical team of faculty and house officers in the hospital evaluation of the patients. The student is encouraged to participate in all diagnostic procedures such as lumbar puncture. The student has the opportunity to follow patients through neuro-radiological and neuro-surgical procedures forming part of evaluation and treatment. The specific expectations for the student are: (a) to perform and record a competent neurological and history examination on each admitted patient; (b) to be competent in the hospital management of neurological patients including diagnostic evaluations such as hematomological and urine evaluations, lumbar puncture and appropriate electrical studies; (c) to assume responsibility as the primary care person for his or her patients; (d) to participate in daily work rounds with an assigned team of house officers and faculty; (e) to be sufficiently knowledgeable to participate in patient care decisions; (f) to attend faculty attending rounds and to present patients to faculty within 24 hours after admission; and (g) to participate in neurology service rounds and conferences during the course. The course includes faculty lectures. A written evaluation is provided to the students by faculty and house staff. There is an examination. Credit: 4. Enrollment: max 1.

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

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

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

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

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

**MEDICINE-322C. Outpatient Community Rheumatology.** The clerkship in clinical rheumatology in the community setting is based in the Danville, Virginia Rheumatology Outreach Clinic. Students travel with the attending physician to the outpatient site five days per month for two consecutive months participating in the evaluation of patients with rheumatic disease. New and return patients are seen, averaging 15-20 patients per visit. The student is under the direct supervision of the attending physician, as no fellows or residents are involved in this particular clinic. The student is expected to learn extensively about the approach to patients with rheumatic complaints and also gain an understanding of therapeutic options in the management of such patients. Credit: 2. Enrollment: max 1. Caldwell

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

**MEDICINE-450B or C. Pathophysiology and Therapeutics of Human Disease.** (1) Course Goals: Primary: This course is designed to familiarize advanced students of medicine (years 3 and 4 of medical school) with current understanding of the pathophysiological basis of common human diseases, and how currently recommended treatments of those diseases impact the disordered physiology. Secondary: The course will review many medical disorders commonly encountered in 21st century USA. It will familiarize students with these conditions; it will prepare them for their impending ca-
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reers as house officers and for their eventual entry into medical practice. (2) How Goals Are Achieved: The course has a lecture format. Each lecture is delivered by a Department of Medicine faculty member who is an expert in the disorders being discussed. A portion of each lecture is reserved for interactive questioning of the audience using a computerized Audience Response System that gives instantaneous summaries of audience responses to questions. Those responses form the basis for further discussion with the audience, allowing the instructor to emphasize the relevance of the questions to a full understanding of the lecture topic. (3) Methods of Evaluation: Grades are assigned on the basis of lecture attendance and student responses on mid-term and end-of-term written examinations covering the content of the lectures. Credit: 1.5. Enrollment: max 200. Haynes, Neelon, and staff

MICROBIOLOGY

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


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

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


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

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

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

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

Required Course
Electives

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

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

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

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

**NEUROBIOLOGY**


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

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

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

Elective

NEUROBIO-372B. Research in Neurobiology. Guided independent study and research experience in neurobiology. Nature of topic to be decided by individual arrangement with faculty advisor. Prerequisite: consent of faculty advisor. Credit: 1-16. Staff
Courses of Instruction  91


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

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

Assistant Clinical Professor Emeritus: Richard J. Dwane, M.D.

**Required Course**

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

**Electives**

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

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

*Courses of Instruction* 91
 OBGYN-231C. Clinical Reproductive Endocrinology and Infertility. Course for students who desire additional basic and clinical experience in examination, diagnosis, and treatment of obstetric and gynecologic patients with endocrinopathy and infertility. Course consists of clinical core of reproductive endocrine problems correlated with examination and treatment of patients both in the Endocrinology Outpatient Clinic, in surgery, and in the hospital. Exposure to assisted reproductive technologies is also available depending on the current clinical load. Credit: 4. Enrollment: max 1. Walmer, Couchman, Haney, Hammond, and reproductive endocrinology fellows

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

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

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

 OBGYN-249C. Clinical Gynecology and Urogynecology. For students preparing for obstetrics and gynecology, general practice, surgery, and urology. Emphasis is placed on the outpatient assessment of patients with acute and chronic gynecologic disorders including pelvic floor dysfunction, pelvic organ prolapse, urinary and fecal incontinence, and others. Students have the opportunity to work closely with faculty members in the Division of Gynecology. Inpatient care is not required, but participation in the operative care of gynecologic patients can be arranged if desired. Ample time for independent study is planned. The student is expected to utilize this time reviewing a specific clinical problem with frequent guidance and input from a member of the Gynecology Division with similar interests. Credit: 4 or 8. Enrollment: max 1. Weidner, Addisson, Amundson, and urogynecology fellows

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


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


Assistant Consulting Professors: Andrew N. Antoszyk, M.D. (N/A); David P. Berry, M.D. (South Carolina, 1975); John E. Bourgeois, M.D. (Virginia, 1979); David J. Browning, M.D. (Duke, 1981), Ph.D. (Duke, 1980); Craig Fowler, M.D. (Medical Coll. of Virginia, 1985); Anne Marie Hanneken, M.D. (Medical Coll. of Wisconsin, 1984); Edward K. Isbey, III, M.D. (North Carolina, 1981); David Jones, M.D., Ph.D. (Miami, N/A); Phillip McKinley, M.D. (Tulane, 1972); Walter C. McLean, Jr., M.D. (Virginia, 1975); Brian E. Smith, M.D. (Med. Coll. of Georgia, 1993); Charles F. Sydnor, M.D. (Virginia, 1959); Jeffrey S. Taylor, M.D. (Illinois, 1977); Carol Ziel, M.D. (Kentucky, 1987).


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

Electives

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

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

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

OPHTHAL-214C. Investigative Ophthalmology. The student is assigned a project relating to basic ophthalmologic problems. Technical assistance, sufficient equipment,
and laboratory animals are supplied for the completion of the project. The student is expected to attend all scheduled research seminars. Prerequisites: OPHTHAL-212C and OPHTHAL-210C suggested, but not required. Students must devote at least three months to the elective. Credit: 4 or 8. Enrollment: max 2.

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

**PATHOLOGY**


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

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


Associate Research Professors: George Cianciolo, Ph.D. (Miami, 1977); Carol W. Lewis, Ph.D. (North Carolina, 1972).


Adjunct Assistant Professors: Michael S. Ballo, M.D. (Case Western Reserve, 1991); James Bonner, Ph.D. (Mississippi State, 1987); John Butts, M.D. (Duke, 1972); Thomas B. Clark, III, M.D. (Med. Univ.
of South Carolina, 1983); James D. Crapo, M.D. (Rochester, 1971); Lynn Crook, M.D. (Med. Univ. of South Carolina, 1974); Ph.D. (Emory, 1966); Arthur Davis, M.D. (Minnesota, 1953); Peter Ingram, Ph.D. (Southampton, 1967); Myla Lai-Goldman, M.D. (Columbia, 1983); James Alan Popp, D.V.M. (Ohio State, 1968); Ph.D. (California at Los Angeles, 1972); Jerry E. Squires, M.D. (West Virginia, 1974); Ph.D. (Yale, 1971); Pamela Sylvestre, M.D. (Southern California, 1995); Peter Wentz, Ph.D. (Florida, 1972).


Required Course

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

Electives

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

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

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

**PATHOL-281B or C. Cytopathology Preceptorship.** This course consists of full-time rotation in the diagnostic cytopathology laboratories. By working with the laboratory staff, the student explores in detail the role played by diagnostic cytopathology in the diagnosis of disease. In addition to general cytology, the student has the opportunity to participate in the fine needle aspiration biopsy service. Although not a requirement, the student is encouraged to pursue special research projects. Preference given to Pathology Study Program students. Credit: 4 or 8. Enrollment: max 1.
PATHOL-342B. Special Topics in Pathology. Special problems in pathology are studied with a member of the senior staff. The subject matter is individually arranged. Permission of the instructor required. Credit: 1-16. Pizzo and staff

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

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

PATHOL-353B. Neuropathology. A view of neuropathology that emphasizes clinicopathologic correlation. Credit: 3. McLendon and staff

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


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

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

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

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


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

Assistant Associate Professor: William D. Mathew, Ph.D. (California, San Francisco, 1961).


Clinical Associates: Jeanne Barton, Dr.P.H. (North Carolina, 1990); Margaretta Bidegain, M.D. (Facultad de Medicina, Universidad de la Republica, 1984); C. Michael Cotten, M.D. (Miami, 1986); Maria
The basic course in pediatrics for all students is an eight-week clerkship in the second year. Its principal aim is to provide an exposure to the field of child health. The student has a varying series of experiences which should give a grasp of the concepts that underlie the discipline. Goals include acquiring familiarity and competence with the basic tools of information-gathering (history, physical examination, and laboratory data) and developing an approach to the integration of this material for the solution of problems of health and illness in infancy, childhood, and adolescence. This should be accomplished with continuing reference to the basic principles of pathophysiology encountered in the first year courses.
Those patients to whom the student is assigned provide the focus for case studies. In addition to the careful history and physical examination which must be recorded, the student is expected to organize an appropriate differential diagnosis and to seek and read pertinent reference material relevant to each patient. The student should learn to present each case verbally in an organized and succinct fashion, to follow the patient’s progress, and to interpret all studies which are performed. The student is expected to learn from a number of sources: standard textbooks and journals, current publications and conferences, and also from people—house staff, faculty, nurses, parents, and all others with whom contact is made in the clinical setting.

Objectives include an understanding of the roles played in pediatrics by other members of the health care team, both in the ambulatory and hospital settings. Patient care may involve nurse, social worker, recreation therapist, psychologist, physiotherapist, dietitian, and others. The eight weeks is divided to include time into several of the following settings: (a) Duke outpatient clinics and emergency room, (b) Duke inpatient, (c) Durham Regional Hospital, (d) Duke nursery, (e) Lincoln Community Health Center, and (f) community practices in and away from Durham. Credit: 8. Drucker

Electives

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

<table>
<thead>
<tr>
<th>Division</th>
<th>Faculty</th>
<th>Telephone</th>
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<tbody>
<tr>
<td>Allergy/Immunology</td>
<td>Rebecca H. Buckley, M.D.</td>
<td>684-2922</td>
</tr>
<tr>
<td>Critical Care Medicine</td>
<td>Stephen P. Sanders, M.D.</td>
<td>681-2016</td>
</tr>
<tr>
<td>Emergency Department</td>
<td>Ira Chelfetz, M.D.</td>
<td>661-5872</td>
</tr>
<tr>
<td>Endocrinology</td>
<td>Eric Higginbotham, M.D.</td>
<td>684-2246</td>
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<tr>
<td>Gastroenterology</td>
<td>Michael S. Freemark, M.D.</td>
<td>684-3772</td>
</tr>
<tr>
<td>Hematology/Oncology</td>
<td>William R. Treem, M.D.</td>
<td>684-4841</td>
</tr>
<tr>
<td>Infectious Diseases</td>
<td>Philip Rosoff, M.D.</td>
<td>684-3401</td>
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<tr>
<td>Medical Genetics</td>
<td>Ross McKinney, M.D.</td>
<td>684-6335</td>
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<tr>
<td>Nephrology</td>
<td>Y. T. Chen, M.D., Ph.D.</td>
<td>684-2036</td>
</tr>
<tr>
<td>Neurology</td>
<td>John W. Foreman, M.D.</td>
<td>684-4246</td>
</tr>
<tr>
<td>Perinatal Medicine</td>
<td>Ronald N Goldberg, M.D.</td>
<td>684-6024</td>
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<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>684-6775</td>
</tr>
<tr>
<td>Rural Health Clinics</td>
<td>Grace Falcone, RN, MSN, A\G\P, FNP</td>
<td>949-1139</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 60 days of the starting date without finding a replacement. Student must contact Ms. Falcone three weeks before the course starting date.

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

PEDS-215C. Endocrine Disorders in Children. Students attend in the Pediatric Endocrine, Diabetes, Neuroendocrine (Brain Tumor), and Insulin Resistance/Obesity Clinics and assume active roles in the evaluation and management of inpatients admitted to the Endocrine Service. Emphasis is placed upon the evaluation of growth and sexual development as indices of endocrine status during childhood. Students also participate in a monthly endocrine journal club and in weekly intra- and interdepartmental endocrine clinical and research conferences. Prerequisite: contact instructors. Credit: 4 or 8. Enrollment: max 2. Freemark and staff

PEDS-217C. Pediatric Hematology and Oncology. Includes all aspects of clinical and laboratory hematology as well as the diagnostic evaluation, care, and treatment of patients with malignant diseases. Emphasis is placed on fundamental concepts. Students will act as sub-interns on the inpatients hematology-oncology service. They will not be required to take night or weekend call. Students may be asked to research a specific topic and present a short presentation at the end of their rotation. Prerequisites: contact instructor. Credit: 4 or 8. Enrollment: max 1. Rosoff, Ware, Zimmerman, Kreissman, Breitfeld, and Martin

PEDS-225C. Neonatology. Students have patient care responsibilities and experiences in the Duke North Intensive Care Nursery. The course involves direct participation in patient care under the supervision of the faculty and housestaff. Emphasis is placed on the initiation of parent-child relationships and a pathophysiologic approach to assessment and management of the critically ill neonate. This is a sole-enrollment course and, as such, cannot be taken in conjunction with any other course. Credit: 5. Enrollment: max 1. Goldberg, Goldstein, Auten, Herrera, Tanaka, Meyers, Cotten, Bidegain, Tang, Izatt, Markad, and Malcolm

PEDS-231C. Clinical Pediatric Cardiology. This course provides an intensive learning experience in the clinical diagnosis and management of childhood heart disease. Emphasis is placed upon the pre and 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. Prerequisite: PEDS 205C. Credit: 4 (or 8 with special permission of the instructor). Enrollment: max 2. Bengur, Sanders, Talner, Armstrong, Herlong, and O'Laughlin

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

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

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

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

**PEDS-250C. Pediatric Intensive Care Unit.** This advanced course is designed to allow students a four-week experience as a subintern in the Pediatric Intensive Care Unit. Under supervision of faculty attendings and housestaff, the senior student assumes responsibility for the care of critically ill children admitted to the Medicine and Surgery services in the Pediatric Intensive Care Unit. Emphasis is placed on the development of the pathophysiologic approach to the diagnosis and therapy of a broad spectrum of pediatric illnesses as they present in acute care settings. Advanced concepts in pediatric critical care are emphasized. Students rotate night call with pediatric housestaff. Prerequisite: Peds-205C. Credit: 5. Enrollment: max 2.

**PEDS-260C. Advanced Clerkship in Pediatrics.** This course is designed to provide the student with an intensive, in-depth exposure to the diagnosis and management of pediatric patients hospitalized at Duke. Students are responsible for admission histories, physical examinations, and management throughout the hospitalization. The student serves as an acting intern throughout the rotation. Night call is expected every fourth night. This is a sole-enrollment course and cannot be taken in conjunction with any other course. Students must obtain a permission number from Dr. Robert Drucker to register for or to drop this course. Credit: 5. Enrollment: max: 2.

**PEDS-281C. Pediatric Neurology.** Students will partake in the evaluation and management of both hospitalized and ambulatory pediatric patients with neurological disorders. Emphasis is placed on the neurodevelopmental history, neurological examination, the use of laboratory tests and radiological tools and pharmacotherapy in the diagnosis and management of childhood neurological disorders. Prerequisite: contact Dr. Lewis. Credit: 4 or 8. Enrollment: max: 2.

**PHARMACOLOGY AND CANCER BIOLOGY**

Professor Anthony R. Means, Ph.D. (Texas at Austin, 1966), Chairman.
McNamara, Sr., M.D. (Michigan, 1968); Elliot Mills, Ph.D. (Columbia, 1964); J. Victor Nadler, Ph.D. (Yale, 1972); Saul M. Schanberg, M.D., Ph.D. (Yale, 1964, 1961); Debra A. Schwin, M.D. (Stanford, 1983); Shirish Shenolikar, Ph.D. (Leeds, 1975); Theodore Slotkin, Ph.D. (Rochester, 1970); Gary Stiles, M.D. (Vanderbilt, 1975).

Associate Professors: Timothy Haystead, Ph.D. (Dundee, 1988); Joseph Hetman, M.D. (Cornell, 1992); Ph.D. (Rockefeller, 1989); Homme Helllinga, Ph.D. (Cambridge, 1986); Sally Kornbluth, Ph.D. (Rockefeller, 1989); Madan Kwatra, Ph.D. (Montreal, 1978); Edward Levin, Ph.D. (Wisconsin, 1984); Daniel Lew, Ph.D. (Rockefeller, 1990); Ann Marie Pendergast, Ph.D. (Riverside, 1985); Rochelle D. Schwartz-Bloom, Ph.D. (Georgetown, 1983); Antonius Van Dongen, Ph.D. (Leiden, 1983); Xiao-Fan Wang, Ph.D. (Los Angeles, 1986); A. Richard Whorton, Ph.D. (Vanderbilt, 1975).


Required Course

**PHARM-200B. Medical Pharmacology.** This basic course in pharmacology for medical and graduate students describes the action of drugs in relation to biochemical and physiological processes and to the rationale for their clinical use. Additional topics include pharmacokinetics, drugs of abuse, and commonly encountered toxins. Nine lectures and one small-group, case-based discussion per week for eight weeks, May-June. Credit: 4.

Electives

**PHARM-233B. Essentials of Pharmacology, Toxicology, and Drug Discovery.** Drug absorption, distribution, excretion and metabolism; structure and activity relationships; drug and hormone receptors and target cell responses. C-L: Graduate School. Credit: 4. Enrollment: min 5, max 30. Slotkin and staff

**PHARM-234B. Interdisciplinary Approach to Pharmacology.** Several model systems (cardiovascular, reproductive, neural, and cell cycle) are to be used to explore the molecular, biochemical, and physiologic basis of drug action. C-L: Graduate School. Credit: 3. Enrollment: max 20. Whorton and staff

**PHARM-372B. Research in Pharmacology.** Laboratory investigation in various areas of pharmacology. C-L: Graduate School. Credit to be arranged. Credit: 1-16. Staff

**PSYCHIATRY**


**DIVISION OF BEHAVIORAL MEDICINE**

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

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


**DIVISION OF BIOLOGICAL PSYCHIATRY**

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


Adjunct Professors: Jau-Shyon Hong, Ph.D. (Kansai, 1973); Arief R. Khan, M.B.B.S. (Bangalore, 1972).
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DIVISION OF GENERAL PSYCHIATRY

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

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


Assistant Consulting Professor: Ervin Thompson, M.D. (Vanderbilt, 1972).


Consulting Associates: Ronald D. Hall, M.D. (East Tennessee State, 1987); Mary Mays, M.D. (Florida State, 1984); Carol J. Vander-Zwaag, M.D. (Mount Sinai, 1986).


DIVISION OF GERIATRIC PSYCHIATRY

Associate Professor: David Steffens, M.D. (Texas, 1988), Division Head.


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

Associate Professor: Harold G. Koenig, M.D. (California at San Francisco, 1962); John W. Williams, M.D. (North Carolina at Chapel Hill, 1984).

DIVISION OF MEDICAL PSYCHOLOGY

Professor Richard S. Surwit, Ph.D. (McGill, 1972), Division Head.

Professors: James A. Blumenthal, Ph.D. (Washington, 1975); Barbara J. Burns, Ph.D. (Boston Coll., 1972); Elizabeth J. Costello, Ph.D. (London, 1981); Herbert Crovitz, Ph.D. (Duke, 1970); Francis J. Keele, Ph.D. (Ohio, 1975); Martin Lakin, Ph.D. (Chicago, 1955); Patrick Logue, Ph.D. (North Dakota, 1965); David Madden, Ph.D. (California at Davis, 1977); Susan Roth, Ph.D. (Northwestern, 1973); Susan Schiffman, Ph.D. (Duke, 1970); Andrew Sherwood, Ph.D. (Hull, 1982); Ilene C. Segler, Ph.D. (Syracuse, 1973); Timothy J. Strauman, Ph.D. (New York, 1987); Robert J. Thompson, Ph.D. (North Dakota, 1971).


Adjunct Professors: Bernard T. Engel, Ph.D. (California at Los Angeles, 1956); Robert L. Hubbard, Ph.D. (Michigan, 1974); John Loochen, Ph.D. (Connecticut, 1976); Martin T. Lowy, Ph.D. (Purdue, 1982); Rune Simeonsson, Ph.D. (George Peabody Coll., 1971).

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


Associate Clinical Professors: James R. Clack, Ph.D. (Purdue, 1970); Karen O'Donnell, Ph.D. (North Carolina at Chapel Hill, 1983); Roffes S. Pinkerton, Ph.D. (Georgia, 1967); Clive J. Robins, Ph.D. (SUNY, 1962); Anna L. Stout, Ph.D. (South Carolina, 1980); Joseph E. Tailey, Ph.D. (Virginia, 1977).


Assistant Professors: Jeffrey N. Epstein, Ph.D. (SUNY at Stony Brook, 1989); Diane Johnson, Ph.D. (North Carolina at Greensboro, 1994); Barbara R. Keth, Ph.D. (Alabama, 1992); Thomas Lynch, Ph.D. (Kent State, 1996).

Assistant Clinical Professors: Michael Babay, Ph.D. (Kansas, 1995); Melanie J. Bonner, Ph.D. (Virginia Polytechnic Inst., 1995); John Barrow, Ph.D. (Houston, 1971); Robin A. Buhrike, Ph.D. (Southern Illinois, 1985); Jack J. Carhart, Ph.D. (Vanderbilt, 1998); Tracey Potts Carson, Ph.D. (Georgia, 1982); Scott N. Compton, Ph.D. (New Mexico, 1993); Jeanine M. Driscoll, Ph.D. (Maryland, 1996); Renee H. Dunn, Ph.D. (Southern Mississippi, 1996); Kathryn Gustafson, Ph.D. (Ohio, 1988); Steve Herman, Ph.D. (Duke, 1977); Judith C. Holders, Ph.D. (Southern Illinois, 1995); Martin Ionescu-Pioggia, Ph.D. (North Carolina at Chapel Hill, 1985); Scott H. Kollins, Ph.D. (Auburn, 1997); Deborah C. Kohl, Ph.D. (California School-Professional Psychology, 1993); Albert D. Loro, Ph.D. (Washington, 1976); Daphne C. McKee, Ph.D. (North Carolina at Chapel Hill, 1976); Oliver Oyama, Ph.D. (Indiana, 1985); Laura S. Porter, Ph.D., Ph.D. (SUNY, 1996); Ruth E. Quillian, Ph.D. (Miami, 1994); Rebecca Schen, Ph.D. (Fairleigh Dickinson, 1992); Gail A. Spiridigliozzi, Ph.D. (Kansas, 1993); Craig R. Stenberg, Ph.D. (Denver, 1992); Edward C. Suarez, Ph.D. (Miami, 1986); Barbara K. Walters, Ph.D. (Alabama, 1992); Susan P. Wisner, Ph.D. (Boston, 1987); William K. Wohlegemuth, Ph.D. (Miami, 1995).

Assistant Professors: Haydon B. Bosworth, Ph.D. (Penn State, 1996); Beverly H. Brunneret, Ph.D. (Kansas, 1995); Colin Davidson, Ph.D. (London, 1996); Brenda Plassman, Ph.D. (Arizona, 1996); Larry A. Tupler, Ph.D. (Emory, 1989); H. Ryan Wagner, Ph.D. (New Mexico, 1975); Lana Watkins, Ph.D. (North Carolina at Chapel Hill, 1991); Kevin P. Weinfurt, Ph.D. (Georgetown, 1997).

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


Clinical Associates: Linda Barnett, Ph.D. (Kentucky, 1981); Loretta E. Braxton, Ph.D. (North Carolina at Chapel Hill, 1989); Ernestine C. Briggs, Ph.D. (Illinois at Urbana, 1999); Anita Yvonne Bryant,
Ph.D. (Maryland, 1991); Jill S. Compton, Ph.D. (Michigan State, 1989); Lauren Durant, Ph.D. (Syracuse, 2001); Christopher Edwards, Ph.D. (Kentucky, 1997); Barbara Eldredge, Ph.D. (Southern Illinois, 1996); David Fitzgerald, Ph.D. (Notre Dame, 1996); Rebecca F. Frank, Ph.D. (North Carolina at Chapel Hill, 1994); Patricia J. Gammon, Ph.D. (North Carolina at Chapel Hill, 1990); Marylyn Goldberg, Ph.D. (Miami, 1988); Kristina Hardy, Ph.D. (Duke, 2000); Alisha B. Hart, Ph.D. (Colorado, 2000); Jill L. Hazlett, Ph.D. (Indiana State, 1990); Pamela L. Hazlett, Ph.D. (North Carolina at Chapel Hill, 1991); Stephanie T. Jenal, Ph.D. (Southern California, 1996); Laure Levinson, Psy.D. (Illinois School Professional Psychology, 1988); Robert Mankoff, Ph.D. (Georgia State, 1992); Douglas, Mason, Ph.D. (Florida Inst. Of Psychology, 2000); Christian F. Mauro, Ph.D. (Miami, 2001); Desiree W. Murray, Ph.D. (South Florida, 1977); Jennifer Norten, Ph.D. (North Carolina at Chapel Hill, 1995); Priti I. Parekh, Ph.D. (Duke, 2001); Guy Potter, Ph.D. (North Carolina at Chapel Hill, 2000); Lisa Reiter-Laverty, Ph.D. (Catholic, 1996); Victoria Reynolds, Ph.D. (Duke, 1999); Rashaun Roberts, Ph.D. (Case Western Reserve, 2000); Anthony J. Smith, Ph.D. (Southern Illinois, 1996); Monica Torres, Ph.D. (Kentucky, 2000); Elvira Y. Valencia, Ph.D. (Chicago Sch. of Professional Psychology, 2000); Janet Whidby, Ph.D. (Duke, 1967).

Consulting Associates: Steven J. Ashby, Ph.D. (Connecticut, 1976); Susanne Dunn, Ph.D. (Duke, 1969); Janet Foliano, Ph.D. (Indiana, 1995); Laura A. Gilliom, Ph.D. (North Carolina at Chapel Hill, 1997); Laura J. Hanisch, Ph.D. (Biola, 2000); Spencer Lyerly, Ph.D. (North Carolina State, 1987); Robert J. McCarthy, Ph.D. (South Carolina, 1972); Michael Murray, Ph.D. (South Florida, 1992); Richard R. Rumer, Ph.D. (North Carolina at Chapel Hill, 1982); Laura J. Weisberg, Ph.D. (Maryland, 2000).


DIVISION OF OUTPATIENT SERVICES


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Carolina at Chapel Hill, 1985); Ernest Raba, M.D. (Texas, 1972); Kathleen Seibel, M.D. (Minnesota, 1985); Philip M. Spiro, M.D. (Yale, 1983); Nathan R. Strahl, M.D. (North Carolina at Chapel Hill, 1983); Ronald L. Vereen, M.D. (Duke, 1981); James R. Weiss, M.D. (Louisiana, 1973); James S. Wells, Jr., M.D. (North Carolina at Chapel Hill, 1977).

DIVISION OF PSYCHIATRIC SOCIAL WORK

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

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


DIVISION OF SOCIAL AND COMMUNITY PSYCHIATRY

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


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

Associate Professor: Jeffrey W. Swanson, Ph.D. (Yale, 1985).


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


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


Consulting Associates: Bruce A. Berger, M.D. (Minnesota, 1977); Jeffrey Branchey, M.D. (North Carolina at Chapel Hill, 1977); Wiley Dickerson, M.D. (Medical Univ. of South Carolina, 1989); Amilda Horne, M.D. (Univ. Texas Biomedical Graduate School, 1979); Gordon Lavin, M.D. (Case Western Reserve, 1978); Robert A. Millet, M.D. (Louisiana State, 1991); Thomas D. Owens, M.D. (Louisiana State, 1965); Mark S. Reynolds, M.D. (Tulane, 1983); James A. Smith, III, M.D. (Howard, 1976).

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

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


Required Course

PSYCHIATRY-205C. Psychiatry. This course is a required six-week clerkship in clinical psychiatry for second year medical students. Students assume limited responsibili-
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ty with supervision for the diagnosis and treatment of patients with common and severe psychiatric illnesses. Educational settings include inpatient psychiatry services at four different hospitals, psychiatry outpatient clinics, and the psychiatry emergency rooms of two hospitals. Students participate in a series of core didactic lectures and didactic modules which expose them to basic psychopathologic entities, differential diagnosis of psychiatric symptoms, practical application of treatment modalities, and issues of cost effectiveness in diagnosis and treatment. Students also participate in lectures, rounds, and clinical case conferences particular to their rotation site. Students are encouraged to observe psychotherapy and to participate in supervised psychological treatments wherever appropriate opportunities can be provided. Credit: 6. Stein

Basic Science Electives

PSYCHTRY-223B. Neurobiological Basis of Behavior. The course surveys neuroanatomical, neurophysiological, neurochemical and neuropharmacological evidence of central nervous system function as it relates to normal and abnormal behavior. Clinical description, measurements of function and laboratory models of function, as well as the biological substrates of affective disorders and psychoses are emphasized. Scientific bases of current therapeutic procedures, especially psychopharmacological, are examined. Course format consists of assigned readings, study questions, and lectures by faculty and other active researchers. Mid-term and final examinations are given. Each student is expected to critique a circumscribed area of research literature focusing on the appropriateness of conceptualizations and experimental methods. Additionally, students have an opportunity to become acquainted with, and to participate in, ongoing research. Credit: 4. Enrollment: min 1. Krystal

PSYCHTRY-297B. Ethnic and Minority Health Patterns and Problems. Descriptive and analytical focus on the literature about ethnic and minority health patterns in the United States, the issues inherent therein, and the implications thereof for the delivery of medical services. Credit: 4. Enrollment: min 1. Carter and Anderson-Brown

PSYCHTRY-299B. Preceptorship in Behavioral Neurosciences. This course provides an opportunity for the student to work closely with a member of the faculty in an area of mutual interest with emphasis upon research (see the website: third-year.mc.duke.edu, Behavioral Neurosciences Study Program section, for partial list of interest areas; more complete descriptions available). Credit: 1-16. Krystal

Clinical Science Electives

PSYCHTRY-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. Tatham

PSYCHTRY-245C. Consultation–Liaison Psychiatry. The consultation-liaison services at both Duke Medical Center and VA Hospital offer clinical clerkships in the management of psychological problems of medical patients and somatic symptoms in psychiatric patients. The student does psychiatric consultations in various specialized medical and surgical services under supervision of residents and senior staff. Emphasis is placed on training the student in advanced interviewing techniques and in assess-
ment and intervention for psychological reactions or depression due to medical illness. The site selected and the specific specialty area chosen depend on the availability and location of psychiatric consultants with those interests. The rotation is flexible. We try to match student interests with the interests of available consultants. Students need to check with Dr. Volow (VA) or Dr. Varia (Duke) four weeks in advance on the current availability of this rotation. Credit: 4 or 8. Enrollment: max 1.

**PSYCHTRY-260C. Neuropsychiatry.** Neuropsychiatry is the study of how alterations in brain structure and function produce disturbances in human behavior. In this course, the student becomes familiar with the major neuropsychiatric syndromes: dementia, delirium, and selective organic mental syndromes such as organic personality syndrome (e.g., frontal lobe syndrome) and organic affective syndrome (e.g., post-stroke depression). The student develops an understanding of diagnosis and treatment based upon a multidisciplinary clinical approach including specialized clinical neuropsychiatric exams. The patient population is drawn from the Duke Medical Center and Durham VA Hospital psychiatry, neurology, and neurosurgery services. Depending on the site, the student may also have an opportunity to become familiar with specialized neuropsychiatric approaches including psychometric testing and neural imaging techniques such as EEG and computerized EEG, CT scan, MRI, cerebral blood flow, and PET scan. Credit: 4. Enrollment: max 1.

**PSYCHTRY-280C. Modern Psychotherapy: Intensive Clinical Introduction.** In this full-time (or near full-time) introduction, the student participates actively in assessment of outpatients for psychotherapy, short-term psychotherapy of inpatients, ongoing psychotherapy groups, and family therapy sessions. In addition he/she attends seminars on the various psychotherapeutic approaches: psychoanalytically oriented, cognitive, behavioral, interpersonal, systemic, etc. Readings are assigned and discussed. The student may pursue an area of special interest in greater depth with a selected preceptor. Permission of instructor is required to elect the course at any time other than section 41 of the fall term. Credit: 4. Enrollment: min 1.

**PSYCHTRY-343C. Clinical Aspects of Alcohol and Drug Abuse.** This course offers students experience in the outpatient treatment of patients with substance use disorders. Students may request assignment to the Durham VAMC Substance Abuse outpatient Program (VA-SAOP) or to the Duke Addictions Program (DAP). Emphasis is placed on understanding the relationships between addictive disorders and other psychiatric conditions and between addictions treatment and general medical care. Experiences include diagnostic evaluation, pharmacological management, and individual, group, and family psychotherapy. Students function as members of the multidisciplinary treatment team at either site. Students interested in this elective must contact Roy Stein (for the VA) or Jeff Georgi (for DAP) at least eight weeks prior to desired term in order to develop a plan appropriately tailored to the student's interests. Credit: 4-8. Enrollment: min 1, max 2.
Basic Science Electives

**RADONC-228B. The Basic Science of Oncology.** In this course we discuss the molecular and cellular biology of cancer including oncogenes, tumor suppressor genes, growth factors, chromosomal abnormalities, cellular invasion and metastases, and the control of cell cycling. Tumor biology is considered including concepts of tumor doubling time, cell loss, tumor hypoxia, and fiber and foreign body, viral, and tobacco induced carcinogenesis/mutagenesis. The course concludes with a consideration of the basic science underlying cancer prevention, diagnosis, and therapy including the pharmacology of cancer chemotherapy, biologic and immunotherapy principles, radiobiology and hyperthermic oncology, and the scientific basis of surgical oncology practice. Credit: 3. Enrollment: min 3, max 25. Colvin, Jirtle, and guest lecturers

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

Clinical Science Elective

**RADONC-215C. Clinical Radiation Oncology.** Radiation oncology plays a crucial role in the management of patients with cancer. The student begins this course with lectures, individual tutorials, and audio-visual education programs to review the crucial elements of radiation biology, medical radiation physics, and dosimetry. This is followed by clinical instruction based in the ambulatory clinics of the Radiation Oncology Department as well as participation in brachytherapy procedures, care of inpatients, and new patient consultations. This course provides an introduction to the role of radiation therapy in the treatment of malignant disease. Credit: 4 or 8. Enrollment: max 2. Marks and staff

RADIOLOGY

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


Associate Clinical Professors: D. Lawrence Burk, Jr., M.D. (Pittsburgh, 1981); Michael W. Hanson, M.D. (West Virginia, 1974); Richard A. Ledet, M.D. (Boston, 1984); Robert Vandemark, M.D. (Upstate Medical Center, 1980).

Associate Research Professors: Laurence Hedlund, Ph.D. (Pittsburgh, 1968); Ganesan Vaidyanathan, Ph.D. (Kentucky, 1987); Bruce Wieland, Ph.D. (Ohio State, 1973).

Courses of Instruction


Clinical Science Electives

RADIOL-210C. Clerkship in Neuroradiology. A specialized program of instruction in neuroradiology. The student will be paired with a faculty radiologist during the course. Credit: 4 or 8. Enrollment: max 2.

RADIOL-229C. Basic Radiology Clerkship. This course is designed to provide an overview of the various imaging modalities of diagnostic radiology and their clinical utility. The elective consists of: (a) lectures and film interpretation sessions supplemented by student presentations; (b) assignment to a variety of 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 required.

Basic Science Electives

RADIOL-250B. Research in Radiology. Advanced Laboratory in Medical Imaging. The student will be paired with a faculty engineer or physicist and a practicing radiologist for a semester project focused on some current clinical physics question. Working with the technical and clinical mentors, the student will design a research project that will explore via phantom evaluation, simulation, or software modeling the impact of the choice of imaging parameters on clinical imaging. Clinical imaging protocols will be evaluated to determine where the medical physicist/ biomedical engineer can provide useful insight in translating technical understanding to clinical protocols. The student will choose a project in CT, MRI conventional radiography, ultrasound, nuclear medicine, or advanced imaging processing. The course will include a weekly seminar on current imaging topics and will require a scholarly report which will be posted on the Imaging Physics web site for future reference. Credit: 1-16. Enrollment: max 10.
spent on the thoracic radiology service. Additional rotations may include the musculoskeletal, neuroradiology, mammography, vascular/interventional, pediatric, CT/abdominal imaging, ultrasound, nuclear medicine, gastrointestinal, and emergency radiology services. Credit: 4. Enrollment: min 4, max 9. Major and staff

RADIOL-230C. Thoracic Imaging. This course will provide the ability to interpret chest radiographs and increase the student's confidence in diagnosing cardiac and pulmonary diseases from chest films. Through formal teaching sessions and case presentations, as well as daily interactions with surgical and medical clinical teams, the student will be exposed to the broad range of modalities and interventional procedures conducted by the thoracic imaging division. Opportunities exist to become involved in research projects. During the course of one month, the student will have interpreted or observed the reading of more than 1,000 chest radiographs. Prerequisite: Basic Radiology Clerkship elective preferred but not mandatory. Credit: 4. Enrollment: max 1.

Goodman and staff

RADIOL-237C. Musculoskeletal Imaging. During this four week elective, the student will be exposed to conventional x-rays in bone radiology, emergency room bone films, bone tumor films and musculoskeletal MRI. At the conclusion, the student will be able to identify fractures and have a working knowledge of musculoskeletal radiology. Credit 4. Enrollment: max. 2.

SURGERY


DIVISION OF GENERAL SURGERY


Clinical Professor: Joseph A. Moylan, M.D. (Boston, 1964).

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

Associate Professors: Douglas S. Tyler, M.D. (Dartmouth, 1985); Steven N. Vaslef, M.D. (Virginia, 1984).


DIVISION OF EMERGENCY MEDICINE


Associate Clinical Professor: Susan Prames, M.D. (Penn State, 1991).


DIVISION OF EXPERIMENTAL SURGERY


Associate Professor: Celette S. Skinner, Ph.D. (North Carolina at Chapel Hill, 1991).


DIVISION OF THORACIC SURGERY

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


Associate Professors: James Jaggers, M.D. (Nebraska, 1988); David H. Harpole, M.D. (Virginia, 1994); Thomas A. D’Amico, M.D., (Coll. of Physicians and Surgeons, 1987); Robert D. Davis, M.D. (California, 1984).


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

Assistant Consulting Professors: John C. Lucke, M.D. (St. Louis, 1985); Amir A. Nesbit, M.D. (UCLA, 1983); Wayne H. Widsher, M.D. (SUNY at Upstate, 1975).


DIVISION OF NEUROSURGERY

Professor Allan H. Friedman, M.D. (Illinois, 1974), Chief.


Consulting Professor: Takanori Fukushima, M.D. (Tokyo, 1966).


Assistant Research Professors: Gary Archer, Ph.D. (Cincinnati, 1987); Rock C. Merlo, M.D. (Slovenia, 1987); Ph.D. (Iowa, 1993); Robert D. Pearlstein, Ph.D. (North Carolina, 1978).


DIVISION OF ORAL SURGERY


DIVISION OF ORTHOPAEDIC SURGERY


Courses of Instruction 113

(Tulane, 1973).

Associate Professors: David E. Attarian, M.D. (Duke, 1980); Robert D. Fitch, M.D. (Duke, 1976);
Richard D. Goldner, M.D. (Duke, 1974); William T. Hardaker, Jr., M.D. (Duke, 1973); L. Scott Levin, M.D.
(Temple, 1982); Claude T. Moorman, III, M.D. (Cincinnati, 1987); Steven A. Olson, M.D. (Columbia,
1966); William J. Richardson, M.D. (Eastern Virginia, 1977); Thomas Parker Vail, M.D. (Loyola,
1985).


Assistant Research Professors: Long-en Chen, M. D. (Peking Med. Coll., 1967), Ph.D. (Shanghai,

Assistant Professors: Carl J. Basamania, M.D. (George Washington, 1984); Brian E. Brigman, M.D.
(OCR Carolina, 1994); Mark Easley, M.D. (Virginia, 1992); Lloyd A. Hey, M.D. (Harvard, 1988);
Laurence D. Higgins, M.D. (SUNY, 1982); Stephen N. Lang, M.D. (Illinois, 1965); Edward G. Lilly, III,

Assistant Clinical Professors: George S.E. Aitken, M.D. (Case Western Reserve, 1982); Richard S.

Assistant Consulting Professors: Edward W. Bray, III, M.D. (Med. Univ. South Carolina, 1971);
William J. Callison, M.D. (Vanderbilt, 1953); Edwin B. Cooper, Jr., M.D. (Duke, 1966); Jon R. Davids,
M.D. (Harvard, 1985); David T. Dellaero, M.D. (Baylor, 1990); Rafael F Escamilla, Ph.D. (Auburn, 1995);
Robert W. Esposito, M.D. (Columbia, 1981); J. Lawrence Frank, M.D. (Duke, 1965); H. John Gerhard,
M.D. (Harvard, 1983); Stephen A. Grubb, M.D. (Northwestern, 1974); Ralph A. Liebelt, M.D. (Michigan,
1985); Keith M. Maxwell, M.D. (Oral Roberts, 1982); Ronald J. Neimkin, M.D. (Columbia, 1981);
William S. Ogden, M.D. (Med. Coll. Georgia, 1965); Thomas B. Pace, M.D. (Mississippi, 1982); Theodore M.
Pitts, M.D. (Yale, 1977); Edwin T. Preston, Jr., M.D. (Duke, 1960; Glyndon B. Shaver, Jr., M.D. (Tennessee,
1961).

Assistant Research Professors: Barry S. Myers, M.D., Ph.D. (Duke, 1991); Wen-Ning Qi, M.D. (Peking

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

DIVISION OF OTOLARYNGOLOGY

Professor Joseph C. Farmer, Jr., M.D. (Duke, 1962), Chief.


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

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

Assistant Professors: Gregory F. Hulka, M.D. (Duke, 1988); Richard L. Scher, M.D. (Cincinnati,

Assistant Consulting Professors: J. Charles Finn, M.D. (Case Western Reserve, 1989); Ronald Lane,
M.S., M.D. (Dartmouth, 1964); Johns F.P. Langford, M.D. (Mississippi, 1989); Peter Wallenborn, M.D.
(Virginia, 1979); C. Emery Williams, M.D. (Louisiana, 1963).

Adjunct Assistant Professor: Dewey T. Lawson, Ph.D. (Duke, 1972).

Clinical Associate: Thomas Y.L. Hung, M.D. (Massachusetts, 1996).

DIVISION OF PEDIATRIC SURGERY

Associate Professor: Michael A. Skinner, M.D. (Rush, 1984), Chief.

Assistant Professor: Samuel M. Mahaffey, M.D. (West Virginia, 1979).

Associate Professor: Henry E. Rice, M.D. (Yale, 1968).

DIVISION OF PLASTIC AND MAXilloFACIAL SURGERY

Professor L. Scott Levin, M.D. (Temple, 1982), Chief.


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

Assistant Clinical Professors: Gregory L. Ruff, M.D. (Michigan, 1978); Laura A. Gunn, M.D.

Consulting Staff: Glenn M. Davis, M.D. (Med. Univ. of South Carolina, 1974); Guido P. Gutter,
M.D. (Med. Coll. of Ohio, 1982); Joseph P. Hunstad, M.D. (Michigan State, 1961); Kim E. Koger, M.D.
(Duke, 1990); Verne C. Lanier, Jr., M.D. (Vanderbilt, 1966); Ronald Riefkohl, M.D. (Tulane, 1972); Roger
Manchester, M.D. (Bowman Gray, 1976); Luis R. Scheker, M.D. (Santo Domingo, 1976).

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


DIVISION OF UROLOGIC SURGERY

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

Professors: David M. Albala, M.D. (Michigan State, 1983); E. Everett Anderson, M.D. (Duke, 1958);
Glenn M. Preminger, M.D. (New York Med. Coll., 1977); Philip J. Walther, M.D., Ph.D., M.B.A. (Duke,
SURGERY-205C. Surgery. The required course in surgery is given in the second year and consists of an eight week clinical clerkship. The primary goal is the presentation of those concepts and principles which characterize the discipline of surgery. The fundamental features which form the foundation of surgical practice are presented at seminars three times weekly. The subjects discussed include antisepsis, surgical bacteriology, wound healing, inflammation, fluid and electrolyte balance, shock, the metabolic response to trauma, biology of neoplastic disease, gastrointestinal physiology and its derangements, and blood coagulation, thrombosis, and embolism.

The students are divided into two groups, one at Duke and the other at the Veterans Administration Medical Center, and each works with two members of the surgical faculty. Students are assigned patients on the surgical wards for diagnosis and management, and clinical rounds are made three times weekly with the faculty. A full-time teaching resident is assigned for the course in order to provide the students with continuous and readily available instruction at all times. A one hour session is devoted daily to demonstrations by the surgical specialties including neurosurgery, orthopaedics, otolaryngology, plastic surgery, and urology. The students attend four weekly sessions in experimental surgery, during which each student serves in rotation as the anesthesiologist, first assistant, and operating surgeon in performance of surgical procedures on experimental animals. Credit: 8.

Electives

SURGERY 227C. Advanced Urologic Clerkship. The diagnosis, management, and surgical treatment of patients with urologic disorders are stressed. Students are afforded intimate association with the entire staff in the clinics, wards, and operating rooms, and participate in surgery. Cystoscopic and urographic diagnostic methods along with other techniques are taught. Credit: 4 or 8. Enrollment: max 3. Paulson, Albala, Anderson, Wiener, Webster, Donatucci, Walther, and Robertson

SURGERY-228C. Clerkship in Pediatric Urology. The course is designed to give an overview of urologic problems in the pediatric population. It includes patient contact and seminar material as well as ward and operating room experience in the diagnosis, treatment, and long-term follow-up of children with urologic disease. Credit: 4. Enrollment: min 1, max 2. Wiener

SURGERY-235C. Clinical Neurosurgery. The course is designed for those students with a career interest in one of the neurological sciences. Duties include the work-up and
care of inpatients, work-up of clinic patients, assistance in the operating room, daily rounds, and night call. Weekly conferences are held in neurosurgery, neurology, neuropathology, and neuroradiology. There are also special lectures. Credit: 4 or 8. Enrollment: max 4. Friedman, Fuchs, and Turner

SURGERY-236C. Intermediate Clinical Neurosurgery. This elective, intended as an intermediate experience between SURGERY-233C and SURGERY-235C, focuses on the clinical presentation of common neurosurgical disorders, radiographic evaluation, and therapeutic options including the indications and contraindications for surgical intervention. The student works up one to three patients and assists at their operations the following day either once or twice per week, and attends the Saturday, neurosurgical conference. Credit: 1 or 2. Enrollment: max 1. Friedman

SURGERY-237C. Investigative Neurosurgery. The student is assigned a project relating to neurologic sciences and, within reason, is provided with technical help, recording equipment, and experimental animals necessary for its completion. Each student plans and executes his own individual project with the help of the neurosurgery staff. Attendance at weekly conferences is also required. Prerequisites: SURGERY-235C suggested. Credit: 8. Enrollment: max 2. Turner, Fuchs, Madison, and Sampson

SURGERY-239C. Clinical Otolaryngology. This course provides the student with a comprehensive survey of clinical otolaryngology. Duties include participation in both outpatient clinic activities and inpatient care in addition to assisting in the operating room. The student participates in ward rounds and in various conferences held by the division. Credit: 4 or 8. Enrollment: max 2. Farmer, Fisher, Scher, Witsell, Tucci, Hulka, and McElveen

SURGERY-241C. Surgical Intensive Care. This course is designed to broaden the student's knowledge and experience in dealing with critically ill patients. Under supervision, students function as sub-interns in the Surgical Intensive Care Unit (SICU). Students are assigned their own patients and actively participate in daily rounds as part of the SICU team. There is a morning lecture on aspects of critical care each day. Students take call one night in four and work on a one-on-one basis with SICU house staff in the supervised management of critically ill patients. Four weeks are spent in the SICU at Duke University Medical Center (trauma, vascular surgery, liver-kidney-pancreas transplantation, general surgery). There is emphasis on teaching of procedures and techniques necessary for the management of all critically ill patients including hemodynamic assessment and monitoring, cardiovascular resuscitation and use of vasoactive drugs, ventilator management including ARDS, prevention and management of nosocomial infections, and nutritional support. Students are formally evaluated by the SICU house staff and the attending physician. C-L: ANESTH-241C. Credit: 5. Enrollment: max 8. Sebastian, Vaslef, Tuttle-Newhall, and staff

SURGERY-244C. Introduction to Plastic, Reconstructive and Maxillofacial Surgery. This course is designed for students who may have a future interest in plastic surgery. Duties include the preoperative evaluation of patients, assisting in the operating room, making daily ward rounds, and participation in conferences. Credit: 4. Enrollment: max 5. Levin, Georgiade, Ruff, Zenn, and Gunn

SURGERY-246C. Clerkship in Plastic and Reconstructive Surgery. The student participates in evaluation and management of plastic surgery patients including preoperative assessment, surgical assistance, and postoperative follow-up in a private office and at Durham Regional Hospital. Daily seminars cover core topics such as skin and surgical techniques, wound healing, and scars. Credit: 4. Enrollment: max 1. Levin, Ruff, Georgiade, Zenn, and Gunn
SURGERY-247C. Plastic Surgery Research. Students are engaged in scholarly activities which are active, in-depth learning experiences related to microvascular, plastic, and/or reconstructive surgery. The students are expected to design, execute, and analyze data and to formulate hypotheses and draw conclusions from their projects. Credit: 1-8. Enrollment: max 4. Klitzman, Levin, and Olbrich

SURGERY-255C. Directed Study in Speech/Language Pathology and Audiology. Individual directed study in selected topics concerning normal and abnormal hearing, language and speech. In consultation with a faculty member, each student selects one or more areas of study. Emphasis is on fundamentals of normal and abnormal function, principles of evaluation, and management of disorders. Prerequisite: permission of instructor. Credit: 1. Enrollment: max 5. DeRuyter

SURGERY-259C. General Principles of Orthopaedics. A full experience on the Orthopaedic Service with duties and responsibilities similar to a first year resident. Inpatient care, outpatient examination, operating room experience, and emergency room call are included. Conference attendance is required. Individual or group discussions are conducted each day with attending staff/Residents. The purpose of the course is to present broad concepts of orthopaedics to students planning general practice, pediatrics, allied surgical specialties, or orthopaedics. Credit: 4. Enrollment: max 4 for 4 weeks. Urbaniak, Hardaker, Nunley, Goldner, Fitch, Easley, Lang, Richardson, Vail, Levin, Hey, Higgins, Basamania, Lilly, Moorman, Olson, Toth, Brigman, house staff

SURGERY-267C. Introductory Clinic Course in Children's Orthopaedics and Cerebral Palsy. This introductory clinic course is arranged for those interested in pediatric orthopaedic problems, neurological disease, and related fields. The course gives the student a working experience in the examination and evaluation of clinical outpatients, inpatients, and surgical patients. It demonstrates both the individual and 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

SURGERY-275C. Pediatric Cardiac Surgery. The student becomes an active member of the surgical team caring for infants and children with congenital heart defects. Responsibilities include ward work and participation during surgery. This student is involved in perioperative decision making. Weekly formal didactic sessions are conducted. Credit: 4. Enrollment: max 2. Jaggers

SURGERY-276C. Advanced Clerkship in Pediatric Surgery. This course is designed to familiarize the student with the whole range of surgical problems in children, but with emphasis on the pathophysiology of surgical and related problems in the newborn infant and the total care of the child with a malignancy. The student is encouraged to participate fully in the patient care aspects of the service and is considered an integral part of the patient care team. Although the course may be taken for the full eight weeks, it is felt that a four week experience is probably optimal for most students. It may be combined with other advanced surgical clerkships such as SURGERY-299C or with four weeks of neonatology (PEDS-225C) or other courses depending on the interests of the student. Prerequisite: brief pre-enrollment interview with Dr. Michael Skinner. Credit: 4 or 8. Enrollment: max 1. Skinner

SURGERY-277C. Orthopaedic Research. Individual projects are assigned for completion during a limited period of time. A student works with an investigator in the orthopaedic laboratory either at Duke Medical Center or the Durham Veterans Affairs Hospital. Clinical investigation studies are also available at both institutions. Prerequisite: SURGERY-259C. Credit: 8. Enrollment: max 4. Urbaniak, orthopaedic senior staff, and house staff
SURGERY-280C. General Surgical Oncology. The course is designed for the student interested in surgical oncology. The students are involved in patient care with a specific surgeon but, in addition, are expected to attend multidisciplinary conferences related to gastrointestinal and breast carcinoma. These multidisciplinary conferences involve medical and radiation oncology as well as surgical oncology. The student is also expected to evaluate surgical patients in an outpatient setting as well as participating in inpatient and operative patient care. This course is designed for students who have an interest in the basic sciences in relation to surgical oncology. Attendance at research conferences involved in the molecular and cellular biology of human cancers is also expected. Permission of instructor is required. Credit: 4. Enrollment: min 1, max 2. Lyerly, Leight, Seigler, Tyler, and Clary

SURGERY-281C. Introduction to Fractures and Musculoskeletal Trauma. Students participate in the emergency management of patients through the Duke or Durham Regional Hospital Emergency Rooms. Principles of fractures and trauma are given during emergency room assignment. Requirements are: attendance at one outpatient clinic per week, two nights on call in the emergency room per week, and attendance at Grand Rounds Conference on Wednesday at 7:00 a.m. and Fracture Conference on Saturdays at 7:30 a.m. Credit: 3. Enrollment: max 2. Urbaniak, Duke orthopaedic staff, and Durham Regional Hospital orthopaedic staff

SURGERY-283C. Advanced Surgery—Emphasis Cardiovascular/Thoracic. Advanced concepts in surgery are presented in seminars and in ward, clinic, and operating room experiences. Fifty to 75 percent of the time is devoted to cardiovascular/thoracic surgery and related basic topics and the remainder to surgery generally. Credit: 8. Enrollment: min 2, max 5. Wolfe, Anderson, Jones, Lowe, Smith, Young, Glower, Landolfo, Davis, Jaggers, D'Amico, and Harpole

SURGERY-299C. Advanced Surgical Clerkship. This course is structured to provide the student with a comprehensive approach to surgical disorders. Each student works in the clinics, on the wards, and in the operating rooms side by side with one senior surgeon to be selected from the approved list below. Credit: 5 or 10. Pappas, Bolinger, Davis, D'Amico, Georgiade, Grant, Jones, Jaggers, Landolfo, Leight, Lowe, Lyerly, McCann, Sebastian, Seigler, Smith, Vaslef, and Wolfe

SURGERY-303C. Trauma Service. This course is designed to provide students interested in trauma care with further experience both in the Emergency Department and on the inpatient Trauma Service. The course emphasizes both triage and resuscitation for major and minor emergency problems in the Emergency Department and also pre- and postoperative care on the inpatient Trauma Service. The student has a full-time experience by assuming duties and responsibilities similar to a junior intern. Emphasis is placed on developing skills in the care of patients with multisystem injuries in the Emergency Department, inpatient Service, and Operating Room. Students work in conjunction with the attending staff and the residents on the Trauma Service. Credit: 4. Enrollment: max 2. Vaslef, Georgiade, and Sebastian

SURGERY-305C. Emergency Medicine. Course Goals: 1) This elective will provide exposure to emergency clinical problems. 2) Students will see patients of all ages with the full range of chief complaints that present to the Duke University Emergency Department. 3) Students will gain experience in making initial evaluations as well as diagnostic and treatment plans with an emphasis on detecting and treating immediate life threatening conditions. 4) Their ability to rapidly obtain critical facets of a history and physical examination will improve. 5) Students will mature as clinical problem solvers by seeing several patients per day with undifferentiated chief complaints. How Goals Are Achieved: 1) Students will present to attendings and residents during approximate-
Special Interdisciplinary Study Programs

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

PROGRAM DIRECTORS: Kathryn P. King, M.D. (Coordinating Director), Richard Moon, M.D., Bryant W. Stolp, M.D., Ph.D., Steven N. Vaslef, M.D., Ph.D., and David S. Warner, M.D.

While the university offers a range of opportunities from biochemistry to organ physiology, anesthesiology, surgery, and critical care integrate these multiple systems into a larger perspective of human pathophysiology and pharmacology. Students have opportunities for research in cardiovascular and respiratory physiology, molecular pharmacology, neurobiology, and environmental science. Regardless of ultimate career choice, investigation in anesthesiology, surgery and critical care medicine provides strong basic science grounding and application of research principles.

An area of independent study is defined and a hypothesis proposed as part of an ongoing interaction between the student and the laboratory mentor. Necessary methodological skills are learned by the student early in the course of study to allow data acquisition for subsequent analysis and interpretation. As the year progresses, students participate in "work in progress" seminars that focus on the development of scientific information. Emphasis is placed on experimental design and statistical analysis. At the end of the year, each student is expected to have completed a project of sufficient merit to warrant presentation and publication. Further, the Department of Anesthesiology offers a unique opportunity for the students to present their projects in a formal setting moderated by an external reviewer of national stature.

All students are offered a workshop in "Research Methodology/Experimental Design" at the beginning of the year. Additional courses in Physiology and Medicine of Extreme Environments are available for interested students.

Students meet with the Coordinating Director to monitor progress in the laboratory. The Course Directors meet regularly regarding individual progress of students in the laboratories.


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.

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

The following course work is required of all students:

PSYCHTRY 223B Neurobehavioral Basis of Behavior.

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

PSYCHTRY 360B Neuropharmacology
PHARM 372B Cellular Endocrinology
NEUROBIO 270B Neurobiology
PSYCHTRY 213B Human Development I. Birth through Adolescence
PSYCHTRY 215B Comparative Personality Theory

Alternatives to the intensive laboratory research concentration are also offered. In addition to courses in the Department of Psychiatry, students may take courses offered through the Medical and Graduate Schools.


BIOMEDICAL ENGINEERING STUDY PROGRAM (BES)

PROGRAM DIRECTORS: Donald D. Glower, M.D. and Farshid Guilak, Ph.D.

This interdepartmental study program is designed to provide third year students with an opportunity to perform basic science research in the broad area of biomedical engineering. The program is designed to provide research opportunities to students interested in the quantitative understanding of the physiology of organs and organ systems. The faculty have research laboratories that investigate these areas at the microscopic and macroscopic levels. The course of study usually emphasizes either the employment of whole animal models or in vitro simulation of disease states. The development and employment of new instrumentation may be a component of the research effort, but not its exclusive objective. Emphasis in the student experience is placed upon the teaching of the quantitative method of understanding biological systems. The student is expected to learn to formulate hypotheses regarding biologic systems, develop appropriate methods to test such 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.

Truskey, Ph.D.; James R. Urbaniak, M.D.; Thomas P. Vail, M.D.; Olaf T. von Ramm, Ph.D.; Patrick D. Wolf, Ph.D.; Fan Yuan, Ph.D.

BIOPHYSICS STUDY PROGRAM (BPP)

PROGRAM DIRECTOR: Joseph Y. Lo, Ph.D.

This program encourages medical students to explore many exciting research topics in radiology and imaging, such as magnetic resonance microscopy, molecular imaging, breast ultrasound, and nuclear medicine. Students have the opportunity to work with a diverse group of research and clinical faculty from radiology as well as biomedical engineering and physics. The program strongly emphasizes the use of quantitative and engineering methods to solve clinically significant problems. Students may select from a broad array of research areas including tumor biology, digital image analysis, predictive modeling, computer aided diagnosis, imaging instrumentation, and medical physics, to name just a few.

Each student selects a faculty preceptor in consultation with the program directors and designs an individual plan in cooperation with the preceptor and directors. The primary emphasis of each student's plan is expected to be research. Students may, however, also be advised to take an existing course or to set up a tutorial with a faculty member to fill in deficient areas or to acquire needed quantitative or engineering skills. Depending on the subject area selected, a student may initiate a new research project of limited scope or take over a well-defined part of an existing project. Students are expected to produce a written summary of their work, possibly (but not necessarily) a paper suitable for publication in a scientific journal.

Students taking this program should have some prior training or experience in one or more of the following areas: mathematics, computer science, physics, chemistry, or engineering (electrical, mechanical, biomedical, etc.).


CANCER BIOLOGY STUDY PROGRAM (CBP)

PROGRAM DIRECTOR: O. Michael Colvin, M.D.

The Cancer Biology Study Program offers third year medical students a 32 credit program of basic science instruction. Each student has an opportunity to focus on an area of interest and pursue a scholarly activity. Through a combination of research preceptorship and classroom work, students are introduced to cancer research. The students may choose to investigate oncogenes, tumor suppressor genes, growth factors, chromosomal abnormalities, cellular invasion and metastases, tumor doubling time, cell loss, tumor hypoxia, tumor angiogenesis, chemical/ radiation/ foreign body/ viral/ tobacco carcinogenesis, biologic and immunotherapy principles, radiobiology and hyperthermic oncology, and the pharmacology of cancer chemotherapy.

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

CARDIOVASCULAR STUDY PROGRAM (CVS)
PROGRAM DIRECTOR: Neil J. Freedman, M.D.

This interdisciplinary study program is designed to provide third year medical students with an in-depth basic science research experience in one area of the broad discipline of cardiovascular science. The program is directed at those students potentially interested in a career in cardiovascular research. Faculty members in this study track come from numerous departments, including biochemistry, cell biology, immunology, pathology, and pharmacology. Students who elect this study program undertake a research project in a laboratory under the guidance of a faculty preceptor. In addition, students are encouraged to take course work each term to complement their research interests. Because a wide range of research opportunities is available, course work is individually tailored by the faculty preceptor to the interests of the student.


CLINICAL RESEARCH STUDY PROGRAM (CRP)
PROGRAM DIRECTOR: Christopher M. O'Connor, M.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.

Students are required to take two courses: Introduction to Statistical Methods (CRP 241B) and Principles of Clinical Research (CRP 242B) in the fall term. 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 with the knowledge regarding research tools to design clinical trials and to analyze the resultant health services research data. Participants also learn the essentials of research design, statistical analyses, health policy, and comparative health systems so that they can be contributors to the improvement of the system of health care, beginning with the improved health of the patient but extending to local, state, and national issues. Each student selects a faculty preceptor in consultation with the program director.

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

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

Required Research. In conjunction with the practicum, each student is required to produce a research paper analyzing an area of epidemiology, health service research, finance, health systems, or health policy, related to the student's practicum experience. He or she works with an advisor to determine and investigate the topic. This research activity extends throughout the nine months, accumulating with the acceptance of the completed paper. Oral presentations at the AOA Symposium are also expected.

Dual Degree Programs. In some instances, third year students may opt to enter one of several approved programs for dual degrees or study away from this campus. A student must apply both to the other school and to the Medical School by completing the Duke Third Year Elective Form. The approved dual degree programs include the M.D./M.P.H. program which allows third year students to enroll in one of several approved M.P.H. programs (Biostatistics; Environmental Sciences and Engineering; Epidemiology; Health Care and Prevention; Health Policy and Administration; and Maternal and Child Health) at the University of North Carolina at Chapel Hill and to complete all requirements for the M.P.H. degree during one academic year in fulfillment of their third year requirement. Dr. Branch is the director of this M.D./M.P.H. Program. Other dual degree programs include the Duke master's degree in Public Policy from the Sanford Public Policy Institute (M.D./M.P.P. program; Dr. Branch is the director), and the Duke Master's in Business Administration from the Fuqua School of Business (M.D./M.B.A. program; Dr. Kevin Schulman is the director). Some of these other programs may take more time, thereby necessitating an extension of the time required for completing the third year requirement. In addition, students may propose an individually-tailored Study Away option. Study away proposals are reviewed and approved individually by the Third Year Committee. Placements in the Cloister Program at the National Institutes of Health and at the National Institute of Environmental Health Sciences in Research Triangle Park are options; the supervision of students in the Study Away programs can be carried out by faculty from a number of study programs.


HUMAN GENETICS STUDY PROGRAM (HGP)

PROGRAM DIRECTORS: William K. Scott, Ph.D. (Director); Assistant Directors: Marcy C. Speer, Ph.D., 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 spring 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:** Jeffrey R. Dawson, Ph.D.

A fundamental understanding of the immune system is central to the effective management of disease in a vast array of public health and clinical settings. The Immunology Study Program will appeal to students interested in the public health initiatives of vaccine design and the management of infectious diseases. This research experience can also be focused on one of a wide variety of pervasive clinical problems. Aberrations of the immune system can be studied in a fundamental way using animal models and within the context of the primary immunodeficiencies they cause. Diseases of chronic inflammation and autoimmunity highlight the damaging effects of exaggerated or inappropriate immune responses and can be examined through research focused on the pathogenesis of diseases such as asthma and rheumatoid arthritis. Modulation of normal immune responses is also critical to the management of solid organ and bone marrow transplantation and is becoming increasingly important in the treatment of tumor. All of these issues can be explored in a fundamental way using well-defined animal models and within the context of the associated human diseases. The student may also choose to undertake research pertinent to the myriad molecular processes that underlie normal lymphocyte development and function and use this opportunity to master some of the new technologies available to biomedical research.

The ISP emphasizes original research. This program offers third year medical students an opportunity to undertake basic research in immunology and to integrate with graduate students, fellows, and faculty of the Department of Immunology. Preceptors can be chosen from across this broad discipline with projects in all of the above sub-specialties available at Duke. Preceptors will be asked to provide a short list of projects that can be undertaken in their laboratory within the constraints of this program (available on request from the Program Director). The primary goal of the program is to encourage and develop the student’s own creativity in the sciences and to provide a substantial research base that will serve students well in their clinical years.

An optional in-depth course in the basic concepts of cellular and molecular Immunology is offered in the spring semester (3 hours per week). Further, there are a variety of seminars and journal clubs that bring the Immunology Department together for presentations of current work and help us all to keep up-to-date with this ever-expanding discipline.

INFECTIONOUS DISEASES STUDY PROGRAM (IDP)
PROGRAM DIRECTOR: Thomas G. Mitchell, Ph.D.

Knowledge of infectious diseases is relevant to care of patients of all ages and in each clinical specialty from surgery, pediatrics, and medicine to obstetrics-gynecology and family medicine. This study program provides students with the opportunity to directly explore infectious diseases in a laboratory setting coupled with lecture/seminar courses designed to enhance knowledge of the host, microorganisms, and their interactions. The goals of the program are to instill a critical assessment of information, to provide the opportunity for creative acquisition of data, to encourage independent thinking, and to provide insight into modern technology and the interrelationship of clinical infectious diseases with basic microbiology and immunology. Most of the participating faculty members are involved in research that relates to microbial pathogenesis.

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

• Preceptorship. This is the major emphasis of the program with students functioning essentially as graduate students. At least 40 hours per week with negotiated time off.

• Courses. During the spring term, students may take either Medical Immunology (MICROBIO 330B), Virology and Viral Oncology (MICROBIO 252B), or Microbial Pathogenesis (MICROBIO 282B), depending on the student’s laboratory research interests.

• Seminars. Students in the Infectious Diseases Study Program attend seminars in which faculty members, fellows, and students present their ongoing research. Such presentations enable the student to observe and participate in the 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.


NEUROSCIENCES STUDY PROGRAM (NSS)
PROGRAM DIRECTOR: Daniel Laskowitz, M.D.

Overview: The Neurosciences Study Program provides a multidisciplinary opportunity for third year medical students over the broad range of basic and clinical neurosciences. Many of the most intractable and prevalent diseases of our time afflict the nervous system, and in many ways research in the neurosciences represents one of the final frontiers of medicine and biomedical science. Areas of study include molecular and cellular neuroscience, neuroimaging, developmental neurobiology, systems and cogni-
tive neuroscience, and the neurobiology of disease. Faculty in the program are drawn from many departments including Neurobiology, Radiology, Pharmacology, Cell Biology, Psychology, Neurosurgery, Neurology, Pediatrics, Medicine, Psychiatry, and Ophthalmology, and are engaged in research that ranges from fundamental properties of ion channels and neurotransmitter receptors to cognition and perception. The program emphasizes a basic research experience under the guidance of a mentor along with opportunities to attend seminars and present results in written, oral, and poster presentations.

**Research:** The basic component of the Neurosciences Study Program is an in-depth research experience in a research laboratory under the supervision of one of the participating faculty. Students will work full-time in a laboratory pursuing an independent research project including conducting experiments, analyzing results, and communicating findings.

**Proposal:** All students are expected to prepare a 2-3 page proposal (usually by early April) outlining the aims of the proposed research in consultation with their chosen mentor. This proposal should state the problem to be studied, the rationale and relevance of the problem, the specific hypotheses to be tested, a brief description of the experiments to be performed, and references.

**Courses:** Students will have the opportunity to take or audit graduate level courses offered in the Departments of Neurobiology, Cell Biology, and Pharmacology, as well as courses in biostatistics and human disease pathophysiology and therapeutics. In addition, Vascular, Neurology, Neurosurgery, and Stroke Center conferences can also be attended. Importantly, there are no specific course requirements in the Program, but rather students may pursue their own particular interests by taking or auditing courses recommended by their mentor or relevant to their research project.

**Seminars:** Students will be able to attend regular seminar series including the Neurobiology Seminar, Signal Transduction Colloquium, Cell Biology Seminar, and Brain Imaging Seminar as appropriate for their particular research project.

**Meetings:** Students will attend monthly informal meetings to present proposed research plans, discuss ongoing projects, and to assess progress. These meetings may include presentations by invited speakers to discuss particular topics of interest.

**Posters:** Students are expected to submit abstracts to present results in poster or oral format at the annual Alpha Omega Alpha research day in the Searle Center that occurs in early June.

**Final Thesis:** In June (for eight-month students) or September (for 12-month students), students are required to write up a description of their hypotheses, the outcome of their experiments, and conclusions of their work (15-20 pages).

**Presentations:** In conjunction with the final report, each student will give a 30 minute presentation on the work accomplished to all participants in the Program.


**OPHTHALMOLOGY AND VISUAL SCIENCE STUDY PROGRAM (OVS)**

**PROGRAM DIRECTORS:** Catherine Bowes Rickman, Ph.D. and David L. Epstein, M.D.

- **Description:** The purpose of this study program is to provide third year
medical students with research skills and experience that can be applied to future careers as clinician scientists in ophthalmology and other fields. Although there is a primary emphasis on laboratory science, clinical research programs of inquiry based on strong scholarship are also possible. There is a focus on clinical investigators forming a true partnership with basic science researchers in attempting to advance the understanding and therapy of ocular diseases. There is an emphasis on hypothesis formation and the planning and execution of experiments that can address and then redefine the hypothesis.

- **Curriculum.** Each student chooses a preceptor according to her/his interests. Together they determine a topic of investigation which requires hands-on laboratory or clinical research by the student. Joint preceptors (for example, a clinical investigator and a basic science researcher) are acceptable and, in fact, encouraged. The course of study must be approved by the study program directors. At the end of the year, each student is expected to produce an in-depth paper based on the research. Throughout the year students attend: a) regular lectures on topics about ophthalmology and visual science given by Duke faculty as well as outside lecturers; b) participate in bimonthly research workshops in which students and faculty make presentations of hypotheses, assumptions therein, methods, and results, and c) give formal presentations of research work at the conclusion of the year.

- **Research Opportunities.** Opportunities include research in physiology, pathology, and molecular and cell biology of the eye as they relate to eye diseases. Opportunities also exist in biophysics and instrumentation, laser cell biology, and scientific basis of glaucoma, corneal, and retinal diseases.

**FACULTY:** Tereté Borras, Ph.D.; Catherine Bowes-Rickman, Ph.D.; Edward G. Buckley, M.D.; David L. Epstein, M.D.; Mark W. Grinstaff, Ph.D.; Glenn J. Jaffe, M.D.; Gordon Klintworth, M.D., Ph.D.; Paul Lee, M.D.; Brooks W. McCuen II, M.D.; Alan D. Proia, M.D., Ph.D.; P. Vasantha Rao, Ph.D.; Dennis W. Rickman, Ph.D.; Cynthia A. Toth, M.D.; Fulton Wong, Ph.D.

**PATHOLOGY STUDY PROGRAM (PSP)**

**PROGRAM DIRECTORS:** Patrick J. Buckley, M.D., Ph.D. (Coordinating Director), William D. Bradford, M.D., and Charles Steenbergen, M.D., Ph.D.

Pathology is the study of disease through the utilization of structural and functional changes to gain information about the human organism's response to injury. The goal of the Pathology Study Program is to provide the medical student with a thorough learning experience in pathology and laboratory medicine under the guidance of a senior faculty preceptor. The essential elements of this program are: a) organized course work, b) independent, but guided research experience (bench or library), and c) active participation in small group seminars.

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

### PSP Track I

- **Required Courses:** Systemic pathology; didactic lectures PATHOL 241B; student seminar
- **Elective Courses:** None
- **Independent Study:** Research with thesis required
- **Max number students:** 6

### PSP Track II

- **Required Courses:** Systemic pathology; didactic lectures PATHOL 241B; autopsy, surgical, or
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 plan of each student selected for the Pathology Study Program must be reviewed and approved by Dr. Buckley, Dr. Bradford, or Steenbergen prior to registration.


PHARMACOLOGY AND MOLECULAR THERAPEUTICS (PMT)

PROGRAM DIRECTOR: Madan M. Kwatra, Ph.D.

The PMT program is based on utilization of the basic concepts of biology and chemistry to determine how drugs affect humans. It encompasses the study of the biological targets of drug action, the mechanism by which drugs act, the therapeutic and toxic effects of drugs, as well as the development of new therapeutic agents. Participating faculty members have particular strengths in the areas of receptor function and cellular signaling mechanisms as targets of drug action. Special emphasis is placed on the complex regulatory mechanisms that govern mammalian cell growth and differentiation, how these mechanisms are perturbed in human diseases (such as cancer) and how our knowledge of these regulatory mechanisms might lead to improved therapies. Current research interests of the faculty include:

1. the mechanism of action of neuropeptides and neurotransmitters;
2. ontogeny of signaling pathways in nervous, cardiovascular and immune tissue;
3. cellular signaling mechanisms, including the actions of calcium and cyclic nucleotides on protein phosphorylation/ dephosphorylation;
4. receptor function and cell signaling mechanisms regulating cell growth, proliferation and death;
5. the molecular basis of rational drug design.

The major emphasis of the PMT program is on student-generated independent...
study/research projects conducted in close association with a faculty preceptor. In addition, a weekly seminar series, the Signal Transduction Colloquium, exposes participating students to a variety of topics presented by experts in the various relevant fields of research.

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

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

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

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

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

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

For all students, the program consists of the following:

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

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

Class of 2001 with Postgraduate Year One Appointment

Key: Student Name, Hometown, Undergraduate College, Internship Institution and Discipline, (if applicable), City and State, Residency Institution and Discipline, City and State, Ultimate Career Choice

Altman, Jennifer Jean, (Belle Mead, New Jersey) - Tulane University, University of North Carolina - Pediatrics, Chapel Hill, NC, Pediatric Infectious Diseases
Anderson, Deverick John (Little Rock, Arkansas) - University of North Carolina at Chapel Hill, Duke University - Internal Medicine, Durham, NC
Asplin, Iain Robert Murray, (Penzance, Cornwall, United Kingdom) - University of Virginia, Children's Hospital - Boston Medical Center - Pediatrics, Boston, MA, Pediatrics
Balius, Anastasia Marie (Anaheim, California) - University of California at Berkeley, Duke University - Surgery, Durham, NC, General Surgery
Banerjee, Audreesh (Newark, Delaware) - University of Delaware, Washington University - Internal Medicine, St. Louis, MO
Bindal, Vishal (Herndon, Virginia) - Duke University, Residency Deferred
Blackmon, Scott Michael (Tabor City, North Carolina) - University of North Carolina, Riverside Regional Medical Center - Transitional, Newport News, VA, Duke University - Ophthalmology, Ophthalmology
Brown, Kimberly Ellen (Temple Hills, Maryland) - Howard University, University of Illinois at Chicago - Internal Medicine, University of Pennsylvania - Ophthalmology, Philadelphia, PA, Ophthalmology
Burnett, Daniel Rogers (South Windsor, Connecticut) - University of Pennsylvania, Mayo Clinic - Transitional, Jacksonville, FL, Stanford University - Ophthalmology, Palo Alto, CA, Ophthalmology
Buxbaum, Evan Reece (Boston, Massachusetts) - Williams College, University of Vermont — Pediatrics, Burlington, VT, Pediatrics
Cavazos, Christina Margarita (Laredo, Texas) - Harvard University, Beth Israel Deaconess — Radiology, Brookline, MA, Radiology
Chappell, Jonathan Douglas (Mooreville, North Carolina) - Davidson College, University of North Carolina — Orthopaedics, Chapel Hill, NC, Orthopaedic Surgery
Chenwok, David Hunter (Fredericksburg, Virginia) - University of North Carolina, Scripps-Mercy Hospital — Preliminary, San Diego, CA, Emory University — Ophthalmology, Atlanta, GA, Cigler, Tessa (Charlotte, North Carolina) - Harvard University, New York Hospital — Cornell — Internal Medicine, New York, NY
Cohen, Theodore Howard (San Francisco, California) - Oberlin College, Brigham & Women's Hospital — Internal Medicine, Boston, MA
Erickson, Christian Paul (Waco, Texas) University of Texas — Austin, Mount Sinai — Internal Medicine — Preliminary, Miami, FL, M.D. Anderson Cancer Center — Radiation Oncology, Houston, TX, Radiation Oncology
Evans, Lilian Qushair (Charlotte, North Carolina) - University of North Carolina at Charlotte, Carolinas Medical Center — Family Medicine, Charlotte, NC, Family Medicine
Gelaw, Bethlehem (Addis Ababa, Ethiopia) - University of Pennsylvania, St. Vincent’s Catholic Medical Center — Transitional, New York, NY
George, Isaac (Wendell, North Carolina) - Massachusetts Institute of Technology, Columbia College of Physicians and Surgeons — Surgery, New York, NY, General Surgery
Gist, Lauren Elizabeth (Del Mar, California) - Wellesley College, University of California — Pediatrics, San Diego, CA, Pediatrics
Gopal, Satish (Cary, North Carolina) - University of North Carolina at Chapel Hill, University of Michigan — Medicine/Pediatrics, Ann Arbor, MI, Medicine/Pediatrics
Green, Ari Justin (Shaker Heights, Ohio) - Miami University, University of California — Internal Medicine/Preliminary, San Francisco, CA, University of California — Neurology, San Francisco, CA
Grunberg, Gregory Enrico (New York, New York) - Amherst College, Cornell University — Neurology, San Francisco, CA, Internal Medicine Primary, New York, NY, Internal Medicine
Halperin, Terri J. (Granville, New York) - Harvard College, Beth Israel Hospital — Surgery Preliminary, Boston, MA, Brigham and Women’s Hospital — Plastic Surgery, Boston, MA, Burns or Pediatric Plastic Surgery
Harker, Eric James (Boise, Idaho) - Williamette University, University of Colorado — Internal Medicine, Denver, CO, Internal Medicine
Harrild, David Michael (Sharon, Massachusetts) - Dartmouth College, University of California at San Francisco — Pediatrics, San Francisco, CA, Pediatric Cardiology
Hartwig, Matthew Galen (Hattiesburg, Mississippi) — Southern College, Duke University — Surgery, Durham, NC, Pediatric Surgery
Hobbs, Hasan Ayyub (Stone Mountain, Georgia) - Morehouse College, National Naval Medical Center — Surgery, Bethesda, MD, Urology
Holmes, Thomas Michael (Buies Creek, North Carolina) - Duke University, Brigham & Women's Hospital — Neurology, Boston, MA, Neurology
Jacobs, Michael Keith (Stone Mountain, Georgia) - Vanderbilt University, Presbyterian St. Luke's - Transitional, Denver, CO, University of Alabama — Dermatology, Birmingham, AL
Johnson, Kristine Erica (Winston Salem, North Carolina) - University of North Carolina, University of Colorado — Internal Medicine, Denver, CO, Internal Medicine Infectious Diseases
Kaminski, Brian Jonathan (Cincinnati, Ohio) - Duke University, Stanford University — Medicine, Palo Alto, CA, Emergency Medicine
Kong, Garheng (Fresno, California) - Stanford University, Residency Deferred
Kratz, Carin Maria (Fresno, California) - Harvard University, Riverside Regional Medical Center — Transitional, Newport News, VA, Duke University — Radiation, Durham, NC, Radiology
Kuhl, Elizabeth Anne (Manassas, Virginia) - Vanderbilt University, Naval Medical Center — Transitional Program, San Diego, CA, Pathology
Kukes, Thelma Joelle (Santa Monica, California) - Amherst College, St. Joseph Mercy — Transitional, Ann Arbor, MI, University of Michigan — Ophthalmology, Ann Arbor, MI, Public Health
Lam, Gordon Ka Wing (Honolulu, Hawaii) - Princeton University, Duke University — Medicine, Durham, NC, Rheumatology
Lawrence, Laura Brooke (Asheville, North Carolina) - Wake Forest University, University of North Carolina — Pediatrics, Chapel Hill, NC, General Pediatrics, International and Public Health
LeGrand, Alexander Benton (Hampton, Virginia, Australia) - North Carolina State University, Duke University — Orthopaedic Surgery, Durham, NC, Orthopaedic Surgery
Lévêque, Jean-Christophe André (Olney, Maryland) - Amherst College, University of Michigan — Neurosurgery, Ann Arbor, MI, Neurosurgery
Liao, Peggy Bayee (Novi, Michigan) - University of Michigan, Healthone Alliance — Transitional, Denver, CO, University of Michigan — Dermatology, Ann Arbor, MI, Dermatology
Looney, Colin Guy (Durham, North Carolina) - Washington and Lee University, Duke University - Orthopaedic Surgery, Durham, NC
Mallette, Quinterol Joseph (Hartford, Connecticut) - Duke University, Residency Deferred — Biotech Equity Research
Martinez, Frank William (Chicago, Illinois) - University of Illinois, Boston University — Emergency Medicine, Boston, MA, Emergency Medicine
Martinez, Roger Anthony (Socorro, New Mexico) - Stanford University, New York Methodist Hospital — Emergency Medicine, Brooklyn, NY, Emergency Medicine
McIntire, Katherine Neal (San Diego, California) - University of California at Los Angeles, Residency Deferred, Emergency Medicine/Trauma
Mitchell, Duane Anthony (Somerset, New Jersey) - Rutgers College, Duke University — Pathology, Durham, NC, Academic Medicine
Morcos, John Peter (Suitland, Maryland) - Massachusetts College of Pharmacy, Johns Hopkins — Internal Medicine, Baltimore, MD, Gastroenterology
Murphy, Richard Andrew (Rockville Center, New York) - Duke University, Columbia Presbyterian Medical Center — Internal Medicine, New York, NY, Health and Human Rights
Murray, John P. (Winchester, Massachusetts) - Boston College, Duke University — Internal Medicine Preliminary, Durham, NC, University of Michigan — Radiology, Ann Arbor, MI, Radiology
Parsons, Daniel J. (Minneapolis, Minnesota) - Trinity University, University of North Carolina — Internal Medicine — Preliminary, University of North Carolina — Dermatology, Dermatology
Patel, Akash Arvind (Cary, North Carolina) - North Carolina State University, Moses Cone Memorial Hospital — Internal Medicine Preliminary, Greensboro, NC, Emory University — Dermatology, Atlanta, GA, Dermatology
Pham, Duykhanh Thi (Montreal, Canada) - University of North Carolina, Duke University — Surgery, Durham, NC, Cardiothoracic Surgery
Pollock, Cristina González (Wilmington, North Carolina) - University of North Carolina, University of North Carolina — Pediatrics, Chapel Hill, NC
Port, Carolyn Clayton (Charlotte, North Carolina) - Duke University, Medical College of Virginia — Pediatrics, Richmond, VA, Pediatrics
Quinn, Michele Terese (Charlotte, North Carolina) - University of North Carolina, Duke University — Obstetrics & Gynecology, Durham, NC
Raetz, Jaqueline Giulia Margot (Rougemont, North Carolina) - Yale University, University of Washington — Family Medicine, Seattle, WA
Raj, Katelyn Anne (San Rafael, California) - University of California, Santa Barbara, Duke University — Internal Medicine Preliminary, Duke University — Radiation Oncology, Radiation Oncology
Richheimer, William (Orange, Connecticut) - Cornell University, Exempla St. Joseph — Internal Medicine Preliminary, Denver, CO, California Pacific — Ophthalmology, San Francisco, CA
Richmond, Marc Eric (Franklin Square, New York) - University of Pennsylvania, Yale University — Pediatrics, New Haven, CT, Pediatric Cardiology
Sachdev, Molly (Buffalo, New York) - Duke University, Duke University — Internal Medicine, Durham, NC, Cardiology
Sarvis, Sarah Susannah (Springfield, Virginia) - Massachusetts Institute of Technology, University of Massachusetts — Internal Medicine Preliminary, Worcester, MA, Cornell Medical Center — Diagnostic Radiology, New York, NY
Sclafani, Ryan Bennett (Worcester, Massachusetts) - Duke University, University of Michigan, Ann Arbor, MI, Otolaryngology
Schroder, Kelly Allan (Ogden, Utah) - Utah State University, Residency Deferred
Shin, Eun Ji (Baltimore, Maryland) - Harvard University, Johns Hopkins University — Internal Medicine, Baltimore, MD
Sinna, Shamim Abbas (Columbia, Maryland) - University of Maryland, College Park, MCP — Hahnemann University Hospital — Obstetrics/Gynecology, Philadelphia, PA, Maternal Fetal Medicine
Stevens, Keesha (Goldsboro, North Carolina) - Duke University, Emory University — Medicine/Psychiatry, Atlanta, GA, Medicine/Psychiatry
Sudarshan, Sharon (Wichita Falls, Texas) - Harvard University, Barnes-Jewish Hospital — Surgery, St. Louis, MO, General Surgery
Tebben, Christopher Lee (Greensboro, North Carolina) - University of North Carolina, Rush-Presbyterian-St. Luke's Medical Center — Internal Medicine, Chicago, IL, Cardiothoracic Surgery
Tillen, Elizabeth Jill (New York, New York) - University of Michigan, Albert Einstein College of Medicine — Emergency Medicine, Bronx, NY, Emergency Medicine
Vo, Mary Beth Dixon (Society Hill, South Carolina) - Duke University, University of North Carolina — Pediatrics, Chapel Hill, NC, Pediatric Primary Care
Walton, Kelly Ann (Charlotte, North Carolina) - University of North Carolina, Carolinas Medical Center — Internal Medicine Preliminary, Duke University — Ophthalmology, Ophthalmology
Waugh, Michael Stuart (Durham, North Carolina) - Bucknell University, Duke University — Internal Medicine, Durham, NC, Internal Medicine
Weiss, Stefan Craig (Hollywood, Florida) - Yale University, Stanford University — Dermatology, Palo Alto, CA, Dermatology
Wellons, Melissa Fair (Hattiesburg, Mississippi) - Duke University, University of Alabama — Internal Medicine, Birmingham, AL, Infectious Diseases
Weng, Hailing (Taipei, Taiwan, ROC) - Duke University, Duke University — Internal Medicine, Durham, NC, Cardiology
Wilfert, Rachel A. (Chapel Hill, North Carolina) - Amherst College, Duke University — Internal Medicine, Durham, NC, Public Health
Wool, Roxanne Taïs Priscille Manuella (Baltimore, Maryland) - Yale University, Exempla St. Joseph — Internal Medicine Preliminary, Denver, CO, Boston University — Ophthalmology, Boston, MA, Medical Retina
Wu, Joy Yee-ja (Voorhees, New Jersey) - Stanford University, Brigham & Women’s Hospital — Internal Medicine, Boyton, MA, Academic Medicine
Yacoubian, Talene Alene (Chattanooga, Tennessee) - Harvard College, Brigham & Women’s Hospital — Neurology, Boston, MA, Neurology
Yi, Steve Sang-Pong (Potomac, Maryland) - Stanford University, Metrowest Medical Center — Transitional, Framingham, MA, Brigham & Women’s Hospital — Anesthesiology, Boston, MA, Cardiothoracic Anesthesia
Zhang, John Quingfei (Asheville, North Carolina) - Davidson College, Flushing Hospital — Transitional, Flushing, New York, Boston University — Ophthalmology, Boston, MA, Ophthalmology
Ziajko, Laura Anne (San Diego, California) - Ohio State University, Naval Medical Center — Psychiatry, San Diego, CA, Psychiatrist, Clinical and Research