Doctor of Medicine Program
# School of Medicine Calendar 2000-2001

## First Year (Freshmen) Students

### Fall Term 2000

<table>
<thead>
<tr>
<th>August</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9-11</td>
<td>Wednesday-Friday - Begin orientation and 2000-2001 academic year</td>
</tr>
<tr>
<td>14</td>
<td>Monday, 8:00 a.m. - Begin Block I</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>September</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Monday, Labor Day holiday</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>October</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Friday, 6:00 p.m. - End Block I</td>
</tr>
<tr>
<td>10</td>
<td>Tuesday, 8:00 a.m. - Begin Block II</td>
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<table>
<thead>
<tr>
<th>November</th>
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<tbody>
<tr>
<td>21</td>
<td>Tuesday, 6:00 p.m. - Begin Thanksgiving holiday</td>
</tr>
<tr>
<td>27</td>
<td>Monday, 8:00 a.m. - Classes Resume</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>December</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Friday, 6:00 p.m. - End Block II and Fall 2000 Term</td>
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</tbody>
</table>

## Spring Term 2001

<table>
<thead>
<tr>
<th>January</th>
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</thead>
<tbody>
<tr>
<td>2-12</td>
<td>Tuesday-Friday - Begin Practice course intensive learning period and Spring 2001 Term</td>
</tr>
<tr>
<td>15</td>
<td>Monday - Martin Luther King, Jr. holiday</td>
</tr>
<tr>
<td>16</td>
<td>Tuesday, 8:00 a.m. - Begin Block III</td>
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<table>
<thead>
<tr>
<th>February</th>
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</thead>
<tbody>
<tr>
<td>9</td>
<td>Friday, 6:00 p.m. - End Block III</td>
</tr>
<tr>
<td>12</td>
<td>Monday, 8:00 a.m. - Begin Block IV</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>April</th>
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</thead>
<tbody>
<tr>
<td>18</td>
<td>Wednesday, 6:00 p.m. - End Block IV and begin spring vacation</td>
</tr>
<tr>
<td>30</td>
<td>Monday, 8:00 a.m. - Begin Block V</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>June</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>29</td>
<td>Friday, 6:00 p.m. - End Block V and 2000-2001 academic year</td>
</tr>
</tbody>
</table>

## Second Year (Sophomore) Students

### Fall Term 2000

<table>
<thead>
<tr>
<th>July</th>
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<tbody>
<tr>
<td>31</td>
<td>Monday, 8:00 a.m. - Begin Practice course intensive learning period</td>
</tr>
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<table>
<thead>
<tr>
<th>August</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>25</td>
<td>Friday, 6:00 p.m. - End intensive learning period</td>
</tr>
<tr>
<td>28</td>
<td>Monday, 8:00 a.m. - Begin classes in sections 81,41</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>September</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Monday, Labor Day holiday</td>
</tr>
<tr>
<td>20</td>
<td>Wednesday, 6:00 p.m. - End classes in section 41</td>
</tr>
<tr>
<td>25</td>
<td>Monday, 8:00 a.m. - Begin classes in section 42</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>October</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Wednesday, 6:00 p.m. - End classes in regular sections 81,42</td>
</tr>
<tr>
<td>23</td>
<td>Monday, 8:00 a.m. - Begin classes in sections 82,43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>November</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>15</td>
<td>Wednesday, 6:00 p.m. - End classes in section 43</td>
</tr>
<tr>
<td>20</td>
<td>Monday, 8:00 a.m. - Begin classes in section 44</td>
</tr>
<tr>
<td>22</td>
<td>Wednesday, 6:00 p.m. - Begin Thanksgiving holiday</td>
</tr>
<tr>
<td>27</td>
<td>Monday, 8:00 a.m. - Resume classes in section 82,44</td>
</tr>
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</table>
Alternate Schedule for Psychiatry/Medical Practice, Fall 2000

<table>
<thead>
<tr>
<th>Week</th>
<th>Schedule</th>
<th>Dates</th>
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</thead>
<tbody>
<tr>
<td>81</td>
<td>PSC</td>
<td>August 28 – October 6</td>
</tr>
<tr>
<td>81</td>
<td>MPS</td>
<td>October 9 – October 20</td>
</tr>
<tr>
<td>82</td>
<td>PSC</td>
<td>October 23 – December 1</td>
</tr>
<tr>
<td>82</td>
<td>MPS</td>
<td>December 4 – December 15</td>
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Spring Term 2001

January

<table>
<thead>
<tr>
<th>Week</th>
<th>Schedule</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Begin classes</td>
<td>January 2 – January 9</td>
</tr>
<tr>
<td>15</td>
<td>Martin Luther</td>
<td>January 21 – January 22</td>
</tr>
<tr>
<td>24</td>
<td>Begin classes</td>
<td>January 24 – January 25</td>
</tr>
<tr>
<td>29</td>
<td>Begin classes</td>
<td>January 29 – January 30</td>
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</tbody>
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February

<table>
<thead>
<tr>
<th>Week</th>
<th>Schedule</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>End classes</td>
<td>February 21 – February 22</td>
</tr>
<tr>
<td>25</td>
<td>Begin classes</td>
<td>February 25 – February 26</td>
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</tbody>
</table>

March

<table>
<thead>
<tr>
<th>Week</th>
<th>Schedule</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>End classes</td>
<td>March 21 – March 22</td>
</tr>
<tr>
<td>25</td>
<td>Begin classes</td>
<td>March 25 – March 26</td>
</tr>
</tbody>
</table>

April

<table>
<thead>
<tr>
<th>Week</th>
<th>Schedule</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>End classes</td>
<td>April 18 – April 19</td>
</tr>
</tbody>
</table>

Alternate Schedule for Psychiatry/Medical Practice, Spring 2001

<table>
<thead>
<tr>
<th>Week</th>
<th>Schedule</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>81</td>
<td>PSC</td>
<td>January 2 – February 9</td>
</tr>
<tr>
<td>81</td>
<td>MPS</td>
<td>February 12 – February 23</td>
</tr>
</tbody>
</table>
82 PSC February 26 - April 6
82 MPS April 9 - April 20

Summer Term 2001

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

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

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

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

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

Alternate Schedule for Psychiatry/Medical Practice, Summer 2001
81 PSC April 30 — June 8
81 MPS June 11 — June 22
82 PSC June 25 — August 3
82 MPS August 6 — August 17

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

Summer Term 2000

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

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

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

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

Fall Term 2000

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

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

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

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

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

Spring Term 2001

January

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

February

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

March

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

April

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

May

12-13 Saturday-Sunday - Graduation activities

Summer Term 2001

April

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

May

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

June

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

July

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

August

18 Saturday, 12:00 noon - End classes in sections 16,82,44
Mission Statement and the Medical Curriculum

The mission of the Duke University School of Medicine is:

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

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

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

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

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

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

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

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

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

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

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

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

**Doctor of Medicine Degree**

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

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

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

In February, 1995, the Duke University School of Medicine was fully accredited for
seven years by the Liaison Committee on Medical Education of the Association of
American Medical Colleges and the Council on Medical Education of the American
Medical Association.
Course Requirements—First Year. The student studies the principles of all the basic science disciplines. Rather than mastering an encyclopedic array of facts, the purpose is to acquire familiarity with the major principles of each subject. In addition, during the first two years students are required to participate in the Practice course which is designed to expand primary and continuity care experience for Duke medical students. The course is a combined clinical curricular experience which emphasizes progressive knowledge and competencies.

The first year consists of instruction in the following:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

First to Second Year. Completion of core basic science courses in one calendar year.
Second to Third Year. Completion of core clinical science courses within fourteen months.
Third to Fourth Year. Completion of thirty-two basic science credits within nine months.
Fourth Year to Graduation. Completion of thirty-two clinical science credits within one calendar year.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

### Admission Procedures

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

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

Upon receipt of the application materials from AMCAS, if credentials indicate, a supplemental application and other information are mailed which serve as notification
Admission Procedures 35

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

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

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

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

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

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

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

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

| Alabama         | Birmingham, Margaret M. Tarpey |
| Arizona         | Phoenix, Beth Ann Banks; Scottsdale, Andrew S. Jacob; Sun City West, Stanley Karansky; Tucson, Tracy W. Gaudet |
| Arkansas        | Little Rock, Karl Staub |
| California      | Carlsbad, Mark Landon; Hillsborough, Jerome M. Javer; Irvine, A. Brian Davis; La Jolla, Herman F. Froeb; Los Angeles, Jo Carol Hiatt; Douglas F. Smiley; Monterey Park, Jonathan L. Chang; Oakland, Krammich Chan; Orange, Timothy R. S. Harward, Cyril Leung; Redwood City, John B. Simpson; Sacramento, Sidney M. Gospe, Jr.; San Diego, Karen Van Hoesen; San Francisco, Laurens N. Garlington, Robert Kahn, R. Gray Patton, Henry Safrit, Katherine Young; Santa Fe Springs, Irwin Arouk; Richard A. Schatz; Santa Monica, J. Thomas Rosenthal; Ventura, Burt J. Averbach; Walnut Creek, David S. Forth |
| Colorado        | Denver, Frederick L. Grover, Michael J. Jobin, Alan Klein, York E. Miller; Littleton, David S. Shimm |
| District of Columbia | Jonca C. Bull, Kurt D. Newman |
| Florida         | Gainesville, Jerry Berger; Hollywood, Norman Moskowitz; Miami, Leonard A. Kalman; Miami Beach, Stephen W. Unger; Naples, James Halikas; Tampa, Americo A. Gonzalvo, Douglas Reintgen |
| Georgia         | Atlanta, W. Scott James, Jr. |
| Hawaii          | Honolulu, Garrett F. Saikley; Kailua, Thomas E. Austin; Waiau, Ned Stoughton |
| Idaho           | Boise, Joann Leone |
| Illinois        | Belvidere, Febe I. Wallace; Chicago, John H. Buehler, Herbert Engelhard, George H. Gardner; Elk Grove Village, Gary E. Kay |
| Indiana         | Indianapolis, Gale M. McCarty |
| Kansas          | Overland Park, David L. Smith |
| Kentucky        | Hopkinsville, Robert B. Bressler; Lexington, Julia L. Stevens |
| Louisiana       | Baton Rouge, Karen H. Miller; New Orleans, Nancy Haslett |
| Maryland        | Baltimore, Robin E. Rutherford; Chevy Chase, James R. Gavin, III; Olney, Joseph Buffington |
| Michigan        | Detroit, John J. Fath; Flint, Melissa Hamp; Grosse Pointe, John M. Lesesne; Troy, C. Edward Coffey |
| Minnesota       | Waconia, Paul W. Sperduto |
Montana: Dillon, Scott McKee
Nebraska: Omaha, Linda K. Matson
Nevada: Las Vegas, Thomas L. Lambert; Reno, Thomas Fyda
New Hampshire: Portsmouth, Eric D. Lister
New Jersey: Hackensack, John C. Alexander, Steven P. Honickman; Morristown, Michael S. Entmacher; Summit, Neal D. Shore; Pompton Plains, Charles W. Ross; Princeton, Timothy Patrick-Miller; Summit, Wayne S. Barber; Watchung, R. Christopher Stucky
New York: New York, David L. Feldman, Margaret W. Hilgartner, Bruce Horton, Cynthia L. Krause, David L. Milbauer; Portland, J. Paul Lunas
North Dakota: Minot, Jennifer L. Hunter
Ohio: Cincinnati, Donald Rucknagel; Cleveland, Stephen E. Alpert; Cleveland Heights, Brenda P. Crownover, Richard L. Crownover; Columbus, Miles E. Drake, Jr.; Elyria, William L. Hassler
Oklahoma: Tulsa, James A. Young
Oregon: Portland, Marcia Freed
Rhode Island: Lincoln, Henry G. Magendantz; Providence, Benjamin T. Jackson
South Carolina: Greenville, Will Flanagan; Charleston, Angus McBride, Jr.
South Dakota: Sioux Falls, Samir Abu-Ghazaleh
Tennessee: Chattanooga, Roger G. Vieth; Memphis, Peter D. Jones, Susan P. Watson
Texas: Dallas, Stephen R. Hammes; Galveston, J. Andrew Grant, Jr.; Houston, Madeline Duvic, Kenneth Gould, Jr., Barry N. Hyman, Eugenia Kleinerman, Leonard A. Zwelling
Utah: Provo, Clark T. Bishop
Virginia: Alexandria, Andrea M. Jackson; Falls Church, Thomas A. Mayer
Washington: Auburn, Joseph Gehrett; Bellingham, James M. Douglas, Jr.; Kirkland, David Pitkethly; Renton, Wallace H. J. Chang; Seattle, Gregory J. Raugi; Woodinville, Alice M. Ormsby
West Virginia: Morgantown, Lisa Gangarose
Wyoming: Laramie, Elizabeth Schreiner
Combined Degree Programs

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

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

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

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

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

Year 2—Core Clinical Science Year. This year encompasses a comprehensive approach to medicine oriented to the patient as a whole. It provides fundamental training in clinical medicine with emphasis on the relationships between general biological processes from conception through birth, development and maturation, to senescence and death, as well as individual clinical states. Special consideration is devoted to the pattern of developmental sequences and to the changes in that pattern determined by genetic composition and the particular environment in which the patient lives.
The second year consists of the four-week Orientation to the Clerkship Year course followed by eight-week rotations in internal medicine, surgery, obstetrics/gynecology, pediatrics, a six-week rotation in psychiatry coupled with a two-week rotation in cost-effective care, and either an eight-week rotation in family medicine or a four-week rotation in family medicine and a four-week rotation in neurology, and the year-long Practice course.

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

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

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

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

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

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

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

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

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

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

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

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

Course of study. The degree requires 24 units of graded course work and a research project for which 12 units of credit are given. Seven courses constituting 22 units are required for all degree candidates. The student's clinical research activities provide the setting and the data for the project, which serves to demonstrate the student's competence in the use of quantitative methods in clinical research.

Application procedure. The Clinical Research Training Program and the Clinical Research Study Program offered to third year students through the Medical School are two distinct programs. Medical students interested in pursuing the MHS degree should contact the Program Director, William E. Wilkinson, PhD, to discuss their interests and to obtain instructions regarding the application procedure.

Primary Care Program. In September 1994, Duke University School of Medicine instituted the Primary Care Program for medical students. The goal of the program is to develop leaders in primary care disciplines of medicine. Any student matriculating in the Medical School and expressing an interest in becoming a primary care physician can apply to join this program. The program functions much as an academic society, with periodic informal meetings of generalist faculty and program students. Students are encouraged to elect the eight-week family medicine clerkship during the second year. Though the third and fourth years remain elective years for all medical students, Primary Care Program students are encouraged to participate in either the Clinical Research Study Program or the Epidemiology and Public Health Study Program during the third year. These study programs provide an opportunity for dual degrees, such as MD/ MBA, MD/ MHS, MD/ MPP, or MD/ MPH. During the fourth year of clinical electives, students are encouraged to take the basic neurology clerkship, a generalist
subinternship, and at least one ambulatory care rotation in a generalist discipline such as community medicine or geriatric medicine. Throughout the four years, students are assigned a primary care mentor as well as an advisory dean. Students may join the program at any time during the first three years and may withdraw from the program at any time. Participation also does not necessitate a primary care career choice. The program is jointly sponsored by the Departments of Community and Family Medicine, Medicine, Obstetrics/ Gynecology, and Pediatrics. Additional information may be obtained by contacting Barbara Sheline, MD, MPH, Box 3886, Duke University Medical Center, Durham, NC 27710, sheli002@mc.duke.edu.

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

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

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

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

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

Course of Study. The student in the MD/MBA program begins the program in the School of Medicine. As in the regular MD program, the first year is devoted to the basic medical sciences and the second year to the basic clinical disciplines. Upon successful completion of the second year, the student takes a leave of absence from the Medical School and enters the Fuqua School of Business where the first-year curriculum is the same as that of other MBA students. After the completion of two semesters, the student returns (commonly in the month of May) to the School of Medicine to begin the first half of an eight month scholarly experience through, typically, the Epidemiology and Public Health Study Program or the Clinical Research Study Program. In the fall of that year (the beginning of the fourth year), the student continues enrollment in the School of Medicine but returns to the School of Business to complete course work. During the spring of the fourth year, the student completes the second four months of the scholarly activity period. The fifth and final year is spent at completing the Medical School elective clinical work tailored to the student’s specialized needs.
Eligibility. Applicants for the MD/MBA program must qualify for admission to both the School of Medicine and the Fuqua School of Business. The usual approach is to apply to the Fuqua School of Business during the second year of Medical School. It is helpful, however, for a student to indicate upon admission to the School of Medicine that he/she has an interest in the joint degree program of the School of Medicine and the Fuqua School of Business. Neither school gives preference to joint degree candidates in the admission process.

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

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

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

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

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

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

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

Deadlines. For those seeking simultaneous admission to both schools: at the end of the junior year take the new Medical College Admissions Test (MCAT) and the Law School Aptitude Test (LSAT). For admission to the Medical School, the AMCAS application procedure should be completed. Upon receipt of the supplemental application form from Duke, the box
indicating MD/JD Program should be checked. The deadline for the AMCAS procedure is November 1. There is no deadline for the Law School but January 15 or earlier submission is suggested.

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

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

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

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

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

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

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

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

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

TUITION AND FEES

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

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

1999-2000 Cost of Education

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition</td>
<td>26,700</td>
</tr>
<tr>
<td>Accident and Sickness Insurance</td>
<td>778</td>
</tr>
<tr>
<td>Laptop computer rental fee</td>
<td>1,650</td>
</tr>
<tr>
<td>First Year Fee</td>
<td>275</td>
</tr>
<tr>
<td>Annual Cost of Books and Supplies: first year</td>
<td>1,620</td>
</tr>
<tr>
<td>Annual Cost of Books and Supplies: second year</td>
<td>1,450</td>
</tr>
<tr>
<td>Annual Cost of Books and Supplies: third and fourth years</td>
<td>690</td>
</tr>
<tr>
<td>Lodging: first year</td>
<td>4,980</td>
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<tr>
<td>Lodging: second year</td>
<td>5,395</td>
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<tr>
<td>Lodging: third and fourth years</td>
<td>3,320</td>
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<td>Board: first year</td>
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<td>4,420</td>
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<td>Board: third and fourth years</td>
<td>2,720</td>
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<td>Student Health Service</td>
<td>222</td>
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<tr>
<td>Student Government</td>
<td>50</td>
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<tr>
<td>Continuation of Enrollment Fee</td>
<td>3,535</td>
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<tr>
<td>Graduate Student Fee</td>
<td>19</td>
</tr>
<tr>
<td>Motor Vehicle Registration: car</td>
<td>120</td>
</tr>
<tr>
<td>Motor Vehicle Registration: motorcycle</td>
<td>31</td>
</tr>
</tbody>
</table>

1. Mandatory fees.
2. Sphygmomanometer, ophthalmoscope, otoscope, and other equipment required of each student must conform to rigid...
3. Mandatory fees.
4. Mandatory fees.
5. The School of Medicine encourages students to interrupt their studies to pursue approved research that is complementary to the medical curriculum at Duke or elsewhere for no credit. To retain full-time student status for loan deferment purposes, students may seek approval to enroll in the Continuation of Enrollment option. Only students eligible to be enrolled at Duke during the...
All individuals registered in the Duke University School of Medicine as M.D. degree candidates are considered to be full-time students if they are registered for a minimum of five credits each semester. Registration at or in excess of that is billed at the full-time rate. Each student determines the number and types of courses taken with their advisory dean and, when applicable, one or more of the satisfactory progress committees.

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

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

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

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

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

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

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

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

• Juris Doctor and Master of Business Administration Programs

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

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

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

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

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

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

Refunds of Tuition and Fees. Tuition and fees refunds are governed by the following policy:
1. In the event of death a full refund of tuition and fees is granted.

2. Students who withdraw from the Medical School or are approved to take an official leave of absence before the end of the first week of classes (as determined by the calendar corresponding to the student's curriculum) receive a full refund of tuition.

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

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

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

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

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

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

LIVING ACCOMMODATIONS

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

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

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

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

MOTOR VEHICLE REGISTRATION

Each motor vehicle operated on Duke University campuses by students enrolled in the School of Medicine must be registered at the Medical Center Traffic Office, PRT Lev-
el, Parking Deck II, within five days after operation on the campus begins, and thereafter
must display the proper registration decal.
All students must pay an annual fee of $120 for each four-wheeled motor vehicle
and $32 for each motorbike or motor scooter registered. Bicycles are registered free of
charge at the Public Safety Department, 2010 Campus Drive.
To register a vehicle, the student must present a valid state registration for each
vehicle registered and a valid state operator’s license.
Parking, traffic, and safety regulations are given each student at the time of
registration of the vehicle(s). Students are expected to abide by these regulations.

MERIT AWARDS FOR MEDICAL STUDENTS
The School of Medicine offers awards to students from the following scholarships
based solely on academic excellence to support the Senior Scholarship and Dean’s Tu-
iton Scholarship Programs:
William G. Anliyan, M.D., Scholarship, established 1988, by gifts from faculty, staff
and friends.
Barham Endowed Merit Fund, established November, 1984, by gift from Mr. and Mrs.
Joseph Barham, Oak Ridge, Louisiana.
Family Dollar Scholarship, established November, 1984, by gift from Mr. Leon
Levine, Chairman of the Board, Family Dollar Stores, Inc., Charlotte, North Carolina; for
minority students.
Dr. William Redin Kirk Memorial Trust for North Carolinians, established March, 1984,
by bequest of Mr. Frederick H. Pierce, Owensboro, Kentucky.
Mary W. and Foster G. McGaw Scholarship, established February, 1986, by bequest
from Foster G. McGaw.
Dr. Kenneth L. Pickrell Scholarship, established February, 1984, by gift from the
Department of Surgery, Duke University Medical Center, for an entering student.
School of Medicine Merit Fund, established 1984, by gifts from medical alumni,
students, and American Medical Association-Education and Research Foundation.
Senior Scholarships from the above funds (except Pickrell) are offered to third year
students for use during their fourth year of study. Selection by a special committee is
based on outstanding academic achievement and extracurricular activities during the
first two and one-half years of medical school. These scholarships, to be paid toward tu-
ition, are in the range of $5,000 each for ten awards.
Financial need is not a criteria for selection; however, applicants who feel their
financial need is greater than the merit award may apply for financial aid.
The Dean’s Tuition Scholarships. Seven Dean’s Tuition Scholarships in the
amount of current tuition are given to academically excellent first year under-represent-
ed minority students each year. Preference is given to residents of North Carolina. Selection
is made by the dean based on recommendations from the Medical School
Admissions Committee. Annual renewal is contingent upon satisfactory academic
progress.
The Nanaline H. Duke Scholarships. Eight Nanaline H. Duke Scholarships valued
at the current amount of tuition are awarded to academically excellent first year stu-
dents. Selection is made by the dean based on recommendations from the Medical
School Admissions Committee. Annual renewal is contingent upon satisfactory aca-
demic progress.

MEDICAL STUDENT RESEARCH SCHOLARSHIPS
Several groups now sponsor medical student research scholarships. In most of the
scholarship programs, students selected for scholarships are eligible to receive thirty-
two basic science credits for the experience.
Some have delegated the responsibility to the Medical School to select participants
in the program, others have their own independent selection processes. For most
programs, a full twelve months is required for the research experience. These scholarships are coordinated through the Student Research Scholarship committee. Queries can be made through Ms. Catharine Hershey, 684-5901, email: hersh003@mc.duke.edu or Dr. Wendell Rosse, 684-3724, email: rosse001@mc.duke.edu. All students applying to these programs prepare their applications and receive interviews during the second year of medical school. Announcement of the scholarship recipients is usually made in April.

**Eugene A. Stead Student Research Scholarships**

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

**Four School Physician Scientist Program**

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

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

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

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

**Howard Hughes Medical Institute Research Fellowships**

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

**Howard Hughes Medical Institute/NIH “Cloisters” Fellowships**

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

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

Sarnoff Society Endowment For Cardiovascular Science

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

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

FINANCIAL AID

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

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

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

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

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

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

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

Financial Information 51
Financial Assistance to Upperclassmen. Annual reapplication is required of all need based aid recipients. Upperclassmen seeking financial assistance for the first time may consult with the director of financial aid.

Duke University School of Medicine Endowed Funds.

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


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

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

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

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

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

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

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

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

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

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

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

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

Doris A. Eagles Scholarship, established in 1999.

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

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

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

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

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

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


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

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

H. B. and Adelaide F. Ingle Medical Scholarship, established in 1976, by gift from Mr. and Mrs. Harry B. Ingle.
B. Everett Jordan Scholarship, established in 1974, by the late Senator B. Everett Jordan and his widow, Katherine Jordan.


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

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

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

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

Medical Alumni/Davison Scholarship, established 1995.

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

Medical School Annual/Alumni Gifts Scholarship, established 1994.

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


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

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

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

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

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


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

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


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

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

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

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

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

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

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

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

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

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

**Loans**

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

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

**Loans From Outside The University**

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

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

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

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

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

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

**Student and Professional Organizations**

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

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

President: Garheng Kong

**Davison Society.** All medical students are dues-paying members of the Davison Society, named for the first dean of Duke University School of Medicine. The society is governed by the Davison Council which consists of elected officers (president, service vice-president, social vice-president, secretary, treasurer, and intramural sports chairman) and elected representatives from each class. Primary responsibilities of the council include: chartering of medical student groups, budgeting funds for student groups and medical school activities, organization of medical school activities and social events, appointment of medical students to Medical Center and university committees, coordinating the selection of faculty and resident awards for excellence in teaching, and representing student views to the pertinent faculty and administration. The Davison
Council also coordinates medical student projects with community service groups such as Habitat for Humanity, Share Your Christmas, Durham City Schools Seventh Grade Sex Education Program, AIDS Volunteer Network, Durham Community Kitchen, and the North Carolina Museum of Life and Science Saturday Science Program.

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


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

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

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

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

Duke Medical Alumni Association. The Duke Medical Alumni Association seeks to support and promote the interests of Duke University Medical Center and its extended community and to nurture lifelong relationships and learning. The Duke Medical Alumni Association contributes a framework through which the Medical Center family continues to thrive, alumni concerns are addressed, and alumni participation in the life and vitality of Duke University Medical Center is encouraged. Our membership reaches back to 1932 and embraces those just now beginning their first year in medical school. Today, the Duke Medical Alumni Association includes more than 5,000 Duke School of Medicine graduates and 6,500 former house staff members who live and work in every state across the nation and in 46 countries around the globe; encompasses future physician alumni - with a roster of some 400 current students and some 800 house staff officers; and seeks the involvement of nearly 1,000 faculty members at Duke University Medical Center. Each year the Duke Medical Alumni Association sponsors events and activities including the Duke Medical Alumni Association Fitness Center; Medical Parents Weekend; the Davison Ball; the "History of Duke Medicine", a program during Medical Alumni Weekend that focuses attention on the Medical Center's unique history; Aesculapian, the medical student yearbook; student orientation activities, including the annual Freshman Orientation Picnic as well as a copy of Davison of Duke, the mem-
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, medalion, and cash award of $200. It is presented by the Department of Anatomy to the most outstanding student in anatomy during the first year in the Medical School.

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

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

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

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

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

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

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

Courses of Instruction

ANESTHESIOLOGY


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


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


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


Clinical Science Electives

ANE-240C. Clinical Anesthesiology. This course is designed to directly expose students to the clinical practice of anesthesiology. Throughout the rotation, each student is assigned on a weekly basis to an individual resident or attending physician who supervises the student's active participation in the pre-, intra-, and post-operative anesthetic care and management of patients. Opportunities exist for students to participate in the various subspecialty areas of anesthesiology including pediatric, obstetric, cardiac, and neurosurgical anesthesia as well as the recovery room, ICU, and pain clinic. While initial assignments are made prior to the first day of the rotation, there is flexibility with regard to students' particular areas of interest. The evaluation of patients preoperatively is taught with emphasis placed upon formulating a plan of anesthetic management that is appropriate for the individual patient. The consequential impact of anesthetics and surgical procedures upon particular disease states is stressed also. Students review the clinical pharmacology of anesthetic and adjuvant drugs as well as apply the principles of pharmacology, physiology, and anatomy to the clinical anesthetic management of patients. Didactic information regarding principles of airway management including endotracheal intubation is presented and reinforced with application in the clinical setting. Participants are exposed to basic methods of administering anesthetics and monitoring the depth of anesthesia through physiologic responses of the patient. Instruction to the appropriate techniques and complications of obtaining vascular access for administering drugs and monitoring hemodynamic status is provided although not all cases may be suitable for student involvement in technical procedures. In addition to this clinical work, students attend various lectures including an introductory series (covering preoperative assessment, airway management, and 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 offered September to December, January, February, and March. Credit: 4. Enrollment: max 6, min 2. Dwane and staff
ANE-241C. Surgical Intensive Care. This course is designed to broaden the student’s knowledge and experience in managing critically ill patients. Under supervision, students function as sub-interns in the Surgical Intensive Care Unit (SICU). Students reassigned their own patients and actively participate in daily rounds as part of the SICU team. There is a morning lecture on aspects of critical care each day. Students take call one night in four and work on a one-on-one basis with SICU house staff in the supervised management of critically ill patients. Time may be spent in the SICU at Duke University Medical Center (trauma, vascular surgery, liver-kidney-pancreas transplantation, general surgery) and/or the SICU at the Durham VA Medical Center (cardiothoracic and vascular surgery, general surgery). There is emphasis on teaching of procedures and techniques necessary for the management of all critically ill patients including hemodynamic assessment and monitoring, cardiovascular resuscitation and use of vasoactive drugs, ventilator management including ARDS, prevention and management of nosocomial infections, and nutritional support. Students are formally evaluated by the SICU house staff and the attending physician. C-L: SUR 241C. Credit: 5. Enrollment: max 8. Young and staff

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

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

BIOCHEMISTRY

Associate Professors: Michael D. Been, Ph.D. (Washington, 1982); Lorena S. Beese, Ph.D. (Brandeis, 1984); Ronald C. Greene, Ph.D. (California Inst. Tech., 1994); Homme W. Hellinga, Ph.D. (Cam-
bridge, 1966); Russel E. Kaufman, M.D. (Ohio State, 1973); Terrence Oas, Ph.D. (Oregon, 1986); Eric Toone, Ph.D. (Toronto, 1988).


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


Required Course

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

Electives

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

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

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

BIOLOGICAL ANTHROPOLOGY AND ANATOMY

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


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

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

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

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

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

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

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

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


**Required Course**

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

**Electives**

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

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

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

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

**CELL BIOLOGY**


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

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


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


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


Required Courses

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

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


Electives

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

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

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

CBI-340B. Tutorial in Cell Biology/Physiology. Selected topics are chosen for intensive reading and discussion. Topics may be chosen relating to basic problems of cytology, growth and development, biophysics, endocrinological control, neuroanatomy, physiological differentiation, and evolutionary origins of functional microsystems. Pre-requisites: permission of faculty preceptor. Credit: 1-3. Enrollment: max 8. Staff

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

Clinical Professor James L. Michener, M.D. (Harvard, 1978), Chairman.
Associate Professors: Colleen McBride, Ph.D. (Minnesota, 1990); Joel Schildkraut, Ph.D. (Yale, 1967).
Assistant Research Professors: Patricia K. Fullagar, Ph.D. (North Carolina, 1989); Kathryn I. Pollack, Ph.D. (Houston, 1996)

DIVISION OF CLINICAL RESEARCH

Professor William E. Wilkinson, Ph.D. (North Carolina, 1968), Division Chief.
Professor: Stephen L. George, Ph.D. (Southern Methodist, 1969).
Associate Research Professor: Victor Hasselblad, Ph.D. (UCLA, 1967).
Assistant Professors: Terry Cox, M.D. (Kansas, 1975); Ph.D. (North Carolina, 1995); David M. DeLong, Ph.D. (North Carolina, 1977); Susan Halabi, Ph.D. (Texas, 1994); Bercedis L. Peterson, Ph.D. (North Carolina, 1988); Carl F. Pieper, Dr.P.H. (Columbia, 1990).
Research Associate: Cynthia J. Coffman, Ph.D. (NC State, 1997).

DIVISION OF COMMUNITY HEALTH

Assistant Clinical Professor Susan D. Epstein, M.P.A. (Univ. of New Hampshire, 1974) Division Chief.
Clinical Professor: Kathryn A. Andolsek, M.D. (Northwestern Univ., 1975).
Assistant Consulting Professor: Gwendolyn C. Murphy, Ph.D. (UNC-Chapel Hill, 1993).

DIVISION OF MEDICAL INFORMATION SCIENCES


FAMILY MEDICINE PROGRAM

Clinical Professor Lloyd Michener, M.D. (Harvard, 1978), Division Chief and Chair.
Clinical Professor: Kathryn A. Andolsek, M.D. (Northwestern, 1975).
Assistant Clinical Professor: Hershey S. Bell, M.D. (Toronto, 1992); Vice Chair.
Assistant Clinical Professors: Joyce A. Copeland, M.D. (North Carolina, 1975); Margaret Gradyson, M.D. (Cincinnati, 1981); Mary Lee Lobach, M.D. (Vanderbilt, 1984); Ronald P. Olson, M.D. (Calgary, 1986); William Purdy, M.D. (Case Western, 1977); Sarah Ro, M.D. (Loma Linda, 1991); Barbara L. Sheline, M.D., M.P.H. (North Carolina, 1984); Amrit Singh, M.D. (West Virginia, 1990); Lawrence R. Wu, M.D. (Duke, 1982).
Associate: Catherine M. Sevrens, R.N.P. (Yale, 1971).

DIVISION OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE

Assistant Professor Samuel D. Moon, M.D. (Virginia, 1975), M.P.H. (North Carolina, 1991), Division Chief.
Associate Clinical Professors: George W. Jackson, M.D. (Western Reserve, 1968); Jerry J. Tulis, Ph.D. (Catholic Univ., 1969).
Assistant Consulting Professor: John Dement, Ph.D. (North Carolina, 1980).


Assistant Research Professor: Hester J. Lipscomb, Ph.D. (North Carolina, 1995).

Associate: Thomas O. Brock, III, Ph.D. (Wake Forest, 1974).


DIVISION OF PHYSICAL THERAPY

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


DIVISION OF PHYSICIAN ASSISTANT EDUCATION

Clinical Associate Justine Strand, PA-C (Duke, 1981), Division Chief.

Assistant Clinical Professor: Joyce A. Copeland, M.D. (North Carolina, 1975), Medical Director.

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


DUKE DIET AND FITNESS CENTER

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

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

Clinical Associate: Lisa Giannetto, M.D. (Loyola, 1986).

ADJUNCT FACULTY

Adjunct Professors: Barbara S. Hulka, M.D. (Columbia, 1959), M.P.H. (Columbia, 1961); Anastasiou, A. Tsitakis, Ph.D. (California, 1974).


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

COMMUNITY FACULTY


Duke University Affiliated Physicians


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

**Required Courses**

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

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

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

**J. Copeland**

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

**Basic Science Electives**

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

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

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

**Clinical Science Electives**

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

**CFM-251C. Integrative Medicine: Research and Clinical Perspectives.** The purpose of the course is to familiarize Duke students with the large variety of complementary and alternative medicine techniques that many of their patients are likely using in the triangle community and to provide a rigorous scientific review of clinical effects. Duke faculty members will be responsible for guiding students in critically evaluating these practices and the available literature on the possible benefits and risks. Community clinicians will be invited to participate as guest lecturers to explain what patients might expect to experience in dealing with a complementary practitioner. It is expected that the rigorous and balanced course outlined will facilitate communication between the students and their patients in the future. Credit: 3. Enrollment: min 28, max 70. Burk
CFM-254C. Community Medicine. This elective combines patient care with study of community health issues and a population-based approach to treatment. Students develop an intervention plan for a problem they perceive and that is perceived by the community. Student also practice study design and implementation via a quality assurance project. This elective may be taken in Madison County in western North Carolina, or in Durham through the Division of Community Health. Credit: 3. Enrollment: max: 1. B. Sheline and staff

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

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

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

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

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

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

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

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

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

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

- **Occupational and Environmental Medicine**
  - Sam Moon, MD
  - Carol Epling, MD

- **Community Health**
  - Kathryn Andolsek, MD, MPH
  - Victoria Kaprielian MD

- **Sports Medicine**
  - Rich Ferro, MD
  - Andrew Bonin, MD

- **Obesity Treatment**
  - Howard Eisenson, MD

- **Geriatrics**
  - Amrit Singh, MD

- **Managed Care**
  - Victoria Kaprielian, MD
  - Lloyd Michener, MD

All interested students should contact the coordinator of Medical Student Programs.

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

DIVISION OF BIOLOGY

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

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

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

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

DIVISION OF MEDICAL INFORMATION SCIENCES

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

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

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

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

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

**GENETICS**

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


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

Required Course

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

**Elective**

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

**IMMUNOLOGY**

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

Courses of Instruction

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

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

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

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

INTERDISCIPLINARY COURSES

Required Course

IND-206C. Medical Practice and Health Systems/MPS. This two-week required clerkship uses lectures, small group discussions, practical projects, and readings to improve students' awareness and understanding of the complexity of the physician's role in rapidly changing systems of healthcare delivery. The course emphasizes the profession...
sional and ethical tensions that emerge while striving to optimize care for individuals and the populations of individuals. Consideration of cost focuses on the nature and behavior of costs relevant to healthcare and explores the ambiguities inherent in assessing cost effectiveness of interventions from the divergent viewpoints of payors, managed care organizations, physicians and individual patients. Interdepartmental faculty additionally provide perspective on past and present patterns of medical practice and offer possible models of future physician practices. Credit 2.

Bredehoeft, L. Branch, and staff

Basic Science Electives

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

IND-308B. Abortion in American Culture. Few issues have cleaved American society as deeply as abortion. This seminar explores the American experience with abortion--before and after Roe v. Wade--examining issues of religion, politics, law, medicine, gender, and ethics. We will study aspects of fertility and family planning, the experiences of women both as abortionists and undergoing abortions, unwed mothers, teenage pregnancy and young parenthood, and the rise of advocacy groups in favor of an opposed to abortion. The seminar will draw also from the practices of Britain, Europe, and Japan. Credit: 1/2. Enrollment: min 1. English

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

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

Clinical Science Electives

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

IND-304C. Medicine in the Third World: A Haitian Perspective. This course is divided into a didactic period conducted between September and December followed by one week in Haiti in early January. The didactic portion of the course will involve seven to ten two-hour sessions to discuss history, medicine, religion, culture, and travel in the third world. In addition, some rudimentary knowledge of the Kreyol language will be introduced. During the didactic portion each student will read a book on a topic relating
to Haiti and lead a group discussion related to their reading. While in Haiti, the student will participate as a member of a mission team involving members of the medical and divinity schools. Each student will keep a journal while in Haiti. Four weeks after the trip, each student will turn in a short paper dealing with a topic of personal interest that incorporates all of their experience in the course. Goals of the course: (a) exposing students to health care in the third world; (b) an appreciation for physical diagnosis skills developed by physicians trained without the use of Western technologies and; (c) an appreciation for the natural progression of disease in an environment where health care resources are limited to absent. Credit: 2.

MEDICINE

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

DIVISION OF CARDIOLOGY

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


Associate Research Professor: Judith C. Rembert, Ph.D. (North Carolina, 1992).


Assistant Research Professors: Patricia A. Cowper, Ph.D. (California-Davis, 1984); Eric L. Eisenstein, D.B.A. (Cleveland State, 1995); Karsten Peppel, Ph.D. (Washing-

DIVISION OF DERMATOLOGY

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


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

DIVISION OF ENDOCRINOLOGY, METABOLISM, AND NUTRITION

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


DIVISION OF GASTROENTEROLOGY

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

Professors: Paul G. Killenberg, M.D. (Pennsylvania, 1963); Michael McLeod, M.D. (Duke, 1960);


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

Assistant Professors: Wendy Z. Davis, M.D. (Duke, 1989); Peter J. Mannon, M.D. (Boston, 1983);


DIVISION OF GENERAL INTERNAL MEDICINE

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

Professor: David B. Matchar, M.D. (Maryland, 1980).

Associate Professors: Kevin Schulman, M.D. (NY Univ., 1988); David L. Simel, M.D. (Duke, 1980);

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

Assistant Professors: Helen Hoenig, M.D. (Arizona, 1985); Robert E. Martell, M.D. (Wayne State, 1993);

Assistant Clinical Professors: Jack I. Twersky, M.D. (Hahnemann, 1982); Pao-Hwo Lin, Ph.D. (Texas, Austin, 1990);

DIVISION OF GERIATRICS

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

Professor: Kenneth W. Lyles, M.D. (Med. Coll. of Virginia, 1974).

Associate Professor: Kenneth E. Schmader, M.D. (Bowman Gray, 1980).

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

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


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

DIVISION OF HEMATOLOGY

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


Courses of Instruction

DIVISION OF INFECTIOUS DISEASES

Professor John D. Hamilton, M.D. (Colorado, 1964), Chief.
Professors: G. Ralph Corey, M.D. (Baylor, 1973); John Perfect, M.D. (Med. Coll. of Ohio, 1975);
Associate Professor: John A. Bartlett, M.D. (Virginia, 1981).
Associate Clinical Professor: Charles B. Hicks, M.D. (George Washington, 1979).

DIVISION OF MEDICAL ONCOLOGY

Professor Keith M. Sullivan, M.D., James B. Wyngaarden Clinical Professor of Medicine, (Indiana, 1971), Chief.
Associate Professors: Nelson J. Chao, M.D. (Yale, 1981); Michael R. Cooper, M.D. (Duke, 1983); Clayton A. Smith, M.D. (Southwestern, 1984); James J. Vredenburgh, M.D. (Vermont, 1963).
Associate Clinical Professor: Gwynn D. Long, M.D. (Bowman Gray, 1983).
Associate Research Professors: David Adams, Ph.D. (Nebraska, 1979); Susan M. Ludeman, Ph.D. (Catholic Univ., 1979).
Associates: Darrel P. Cohen, M.D. (Boston, 1992); Cristina Gasparetto, M.D. (Rome, 1986); Scott G. Lilly, M.D. (Medical College of Ohio, 1993); Wed-Chin Lin, M.D. (National Taiwan Univ., 1986); Susan J. Lifton, M.D. (Albany, 1989); P. Kelly Marcom, M.D. (Baylor, 1989); Kellie E. Rizzieri, M.D. (Rochester, 1991); Heather S. Shaw, M.D. (Duke, 1993).

DIVISION OF NEPHROLOGY

Professor Thomas M. Coffman, M.D. (Ohio, 1980), Chief.
Associate: Michelle P. Winn, M.D. (East Carolina, 1992).
Visiting Instructor: Matthew J. Oliver, M.D. (Western Ontario, 1993).

DIVISION OF NEUROLOGY

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

ASSOCIATE RESEARCH PROFESSORS: John R. Gilbert, Ph.D. (North Carolina, 1982); Michael P. Vitek, Ph.D. (Dartmouth, 1983).


DIVISION OF PULMONARY AND CRITICAL CARE MEDICINE
Professor Neil R. MacIntyre, M.D. (Cornell, 1972), Acting Chief.


ASSISTANT PROFESSORS: Martha S. Carraway, M.D. (Wake Forest, 1985); Martha A. DeFeo, M.D. (Wake Forest, 1985); Michael J. Laskowske, M.D. (Duke, 1985); William K. Scott, M.D. (South Carolina, 1996); Marie E. Weyl-Wolf, M.D. (Duke, 1986).

ASSISTANT CLINICAL PROFESSOR OF MEDICINE: Mark P. Steele, M.D. (Illinois, 1982).

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


DIVISION OF RHEUMATOLOGY, ALLERGY AND CLINICAL IMMUNOLOGY
Professor David S. Pisetsky, M.D. (Albert Einstein, 1973), Chief.

PROFESSORS: Nancy B. Allen, M.D. (Tufts, 1978); Michael S. Hershfield, M.D. (Pennsylvania, 1967); Barton F. Haynes, M.D., Frederic M. Hanes Professor (Baylor, 1973); Edward W. Holmes, M.D., Walter Kempe Professor of Medicine (Pennsylvania, 1967); Nicholas M. Kredich, M.D. (Michigan, 1962); Ralph Snyderman, M.D. (Mount Sinai, 1985); Victor F. Tapson, M.D. (Hahnemann, 1982).


ASSOCIATE CLINICAL PROFESSOR: Rex M. McCallum, M.D. (Vanderbilt, 1980).


ADJUNCT FACULTY

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

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

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


EMERITI


Required Courses

MED-205C. Medicine. The second year clerkship in medicine provides students with the basic humanistic and clinical skills as well as some of the factual information used in the practice of medicine. It is a time for students to consolidate what has been learned during the first year and apply it to the study of their "own" patients. Since it is not possible to cover systematically the entire body of internal medicine during the next eight weeks, students are provided with a series of representative learning experiences based on the case-study method. The goals are to teach a method of patient evaluation and care and to provide a firm foundation in medical problem-solving that will be helpful throughout the student's future careers. It is specifically expected that students will:

1. Perform and record a complete history and physical examination on each patient they admit. (During the first four weeks, this should be a minimum of two patients per week; thereafter at least three patients per week).
2. Discuss their plans(s) for the evaluation and care of the patient after the resident has also assessed the patient with both returning to the bedside to resolve any discrepant historical or physical examination findings.
3. Have their complete work-up including analysis of primary data (e.g. peripheral blood smear, urinalysis, sputum gram stain, ECG, etc.) in the chart by 8:00 a.m. the next day. It is important during the clerkship to learn to evaluate primary data in timely fashion.
4. Take primary responsibility for the care of their patients, following them daily, writing progress notes in the chart, knowing what has happened to their patients since last seen, as well as knowing the rationale for and outcomes of all diagnostic tests and therapeutic interventions.
5. Participate in various diagnostic/therapeutic procedures (e.g., lumbar puncture, thoracentesis, paracentesis, arthrocentesis, arterial blood gas drawing, placement of intravenous lines) and perform these procedures under appropriate supervision.
6. See each of their patients on a daily basis before morning work rounds, review what has happened since last seen, formulate a preliminary plan of care and treatment for each patient and then present these formulations to their ward teams during morning work rounds.
7. Prepare for their bedside case presentations by reading, at a minimum, relevant sections in a standard textbook of medicine.
8. Present their patients to an attending physician within 24 hours of admission, knowing all pertinent medical information as well as the rationale for their ongoing plan(s) for care and evaluation.
9. Not miss any attending rounds without prior permission from
their attending physician. (10) Attend all the Chair’s Conferences, sign-out rounds with the Chief Medical Resident, Physical Diagnosis Teaching Rounds, Medical Grand Rounds, and the Student-Lecture Series unless urgent ward duties preclude doing so. Weight: 8. Waugh and staff

Electives

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

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

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

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

MED-210C. Advanced General Medicine (Duke/Durham-VA). (1) Course Goals: To expand the experience and knowledge gained during the second year medicine clerkship. Primary - Providing additional experience in the management of hospitalized patients with a wide variety of general internal medical problems. Secondary - Developing a comprehensive understanding of the pathophysiology of the common problems encountered on an internal medicine inpatient service. This course is recommended for visiting students and Duke students who receive a grade of straight Pass in MED 205C. (2) How Goals Are Achieved: Students are assigned to one of the general medical wards at either Duke or the VA Hospital. They are assigned patients in rotation with the second year students on the service and are expected to perform and complete an initial evaluation, develop a care plan, write the orders (to be countersigned by the intern), present the patient at teaching rounds, and follow the patient throughout the hospital course. Students are assigned three to five patients per week and are expected to do outside reading on each. The student may be advanced to the subinternship level during the eight week period at the recommendation of the chief medical resident. (3) Methods of Evaluation: The evaluation form is made available to each student at the beginning of the rotation. There are formal mid-term and final evaluations. No final exam is given. Requests for Duke or Durham VA rotation are accepted on first-come, first-served basis. Call 681-6745. Credit: 10. Enrollment: max 6. Waugh and staff

MED-211C. Internal Medicine Subinternship (Duke/Durham-VA-Durham Regional Hospital). (1) Course Goals: To provide an internal medicine inpatient care expe-
rience at the intern level. (2) How Goals Are Achieved: Students are assigned to one of the two inpatient services (Duke or VA) and are supervised by a second or third year internal medicine resident. The student functions as an intern on that service with the exception that orders must be countersigned by a medical house officer. A pager and sleep-in facilities are available. No other medical intern is assigned to the subintern’s patient. The number of patients assigned is determined by the supervising resident with anticipated increases over the four weeks. (3) Methods of Evaluation: Students are evaluated by their resident and senior staff attending. The evaluation form is made available to each student at the beginning of the rotation. There is a formal evaluation at two weeks and an informal evaluation at four weeks. No final exam is given. Prerequisites: available only to Duke medical students who receive grades of Honors or P+ in MED 205C. Students must obtain the written permission of Dr. Robert Waugh to register for or drop this course. Call 681-6745. Students may indicate a preference for Duke or the VA Hospital on a first-come, first-served basis but ultimate assignments to one institution or another will be made on the basis of factors such as team availability and patient census. Credit: 5 or 10. Enrollment: max 13.

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

MED-214C. Introduction to Outpatient Primary Care Internal Medicine. Course Goals: (1) To broaden exposure to outpatient diagnosis and management of internal medicine problems including a wide variety of diseases that are generally seen only in clinic; (2) to develop the student’s skills in (a) taking a problem-focused history, (b) performing a directed physical exam, and (c) doing office-based procedures; (3) to provide the student as much as possible with a continuity of care experience. How Goals Are Achieved: This course is similar to MED 217C, but is designed to be more flexible and less intensive. The student chooses a faculty mentor within the Division of General Internal Medicine and spends one or more days per week with this mentor seeing patients in the Medical Private Diagnostic Clinic (MPDC). In all cases the student sees the patient first then discusses the case with the attending. The student must outline in writing five goals that he/she wishes to accomplish during this rotation. This should be delivered to Dr. Lia Logio at least three weeks before the rotation begins. Methods of Evaluation: Student evaluations are done by the faculty mentor who works directly with the student. Grades are based on the student’s interactions with patients and his/her thought process regarding diagnosis and management of their problems. Improvement during the course of the rotation and enthusiasm are highly weighted. Prerequisites: Third year and fourth year students who have successfully completed the second-year medicine clerkship. Credit: 1 (10 hrs/ wk for 4 weeks), 2 (20 hrs/ wk for 4 weeks), or 4 (20 hrs/ wk for 8 weeks). Logio and general internal medicine staff

MED-220C. Emergency Medicine. (1) Course Goals: Primary - To provide a broad exposure to emergent clinical problems, emphasizing acute internal medicine in such a
way that students can see patients before any other physician contact, permitting the learner to make initial diagnoses and plan short-term "workups". Secondary - To develop students' ability to rapidly obtain history and shorten the amount of time required to do a focused physical examination, to enhance dexterity when performing minimally invasive procedures, to gain experience and confidence by evaluating undifferentiated patient complaints, and to teach the concepts of triage and prehospital care. (2) How Goals Are Achieved: Each student works with attending physicians and residents (not interns) approximately twenty twelve-hour shifts, and in general does not spend the night. In collaboration with residents or senior staff, students are involved in diagnostic evaluations and therapeutic interventions. Didactic sessions cover clinical topics related to emergency medicine. (3) Methods of Evaluation: Residents and senior staff evaluate the student. Each student presents one case and leads a conference discussion on the diagnosis and treatment of the critically ill they have seen during the rotation. 

Prerequisites: none mandatory, prior experience in other electives is beneficial. Credit: 4 or 8. Enrollment: min 1, max 4.

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

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

MED-230C. Pulmonary Medicine. (1) Course Goals: Primary - To provide training in clinical aspects of pulmonary medicine. The primary diseases emphasized include asthma, chronic obstructive lung disease, pulmonary vascular diseases including pul-
monary embolus, acute respiratory failure, hypersensitivity, interstitial and immuno-
logic lung diseases and pulmonary manifestations of systemic illnesses, i.e., sarcoid,
scleroderma, cystic fibrosis, etc. Secondary - To provide experience with pulmonary lab-
oratory techniques including pulmonary function testing, cardio-pulmonary exercise
testing, chest radiology, and bronchoscopy. (2) How Goals Are Achieved: Students as-
signed to the Pulmonary Consult Services at either the VA or at Duke Hospital. They
have primary responsibility for workup and presentation of selected patients on these
services. All patients are presented and followed at daily rounds with fellows and facul-
ty. Students also participate in a half-day outpatient clinic each week. Joint seminars and
conferences involving both the Duke and VA Consult Services are held each week to
provide instruction in pulmonary function evaluation, pulmonary physiology, chest ra-
diology, pulmonary pathology and clinical pulmonary medicine. (3) Methods of Eval-
uation: Student evaluations are done by fellows and faculty assigned to the Consult
Services during the period of the course and are based on observed performance. Ques-
tions should be directed to Carolyn Ray, 681-5963. Credit: 4. Enrollment: min 1, max 4.

MED-242C. Clinical Arrhythmia Service. (1) Course Goals: Primary - To provide
students with an in-depth exposure to the diagnosis and management of cardiac ar-
rhythmias, electrophysiologic studies, ablation of arrhythmias, cardiac pacemakers,
and implantable defibrillators; to help students to understand the electrophysiologic
events that result in arrhythmias and ECG changes. This course is not designed to be a
substitute for the general cardiology elective (MED 244C and 245C). Secondary - To fa-
miliarize 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 stu-
dent is encouraged to attend electrophysiologic studies and assist in the analysis of data
from these studies. Attendance of electrophysiologic surgical procedures is also encour-
gaged. 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 stu-
dent assists in the evaluation of patients for permanent pacemaker implantations. Stu-
dents 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. En-
rollment: max 1. Wharton, Grant, Greenfield, Sorrentino, and Bahnson

MED-243C. Cardiology Subinternship (Asheville VA). (1) Course Goals: Primary - To provide
experience in the assessment and management of patients with acquired
heart disease. Secondary - To familiarize the student with both invasive and non-inva-
sive procedures available at this medical center. (2) How Goals Are Achieved: The stu-
dent 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
ronds 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 re-
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 evalu-
ates 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-
**MED-244C. In-Patient Cardiology Subinternship.** (1) Course Goals: Primary - To provide an in-depth experience in the evaluation and care of in-patients with various cardiovascular problems. Secondary - To refine student understanding of the cardiovascular history, physical examination and non-invasive and invasive laboratory testing in evaluating and managing patients with known or suspected cardiovascular disease. (2) How Goals Are Achieved: Students are assigned to the Duke CCU, the VA CCU, or a cardiology in-patient service at Duke, and, in concert with the housestaff, cardiology fellows, and senior staff attending, work up and manage patients admitted to these various services. They also participate in a core curriculum experience, including individually assigned times to work with HARVEY, the cardiology patient simulator and various computer assisted instruction programs. (3) Methods of Evaluation: Students are evaluated by all resident, fellow, and senior staff with whom they work. The evaluation form is available at the beginning of the elective. Depending on circumstances, students may also be evaluated by written and practical examinations at the beginning and/or end of the elective. Credit: 5. Enrollment: max 6. Waugh and cardiology staff

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

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

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

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

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

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

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

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

MED-275C. Clinical Coagulation. (1) Course Goals: Primary - To teach the clinical and laboratory approach to patients with a hemorrhagic or thrombotic disorder. The student learns to 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. Pre-requisite: Approval of the faculty based on prior performance. Credit: 5. Enrollment: max 4. Telen and hematology/oncology staff

MED-280C. Clinical Infectious Diseases. (1) Course Goals: To provide experience
in the clinical and laboratory diagnosis of infectious diseases and in their therapy. The primary emphasis is placed on learning from interaction with patients, resident staff, and faculty on the consultation service. Students are expected to work up assigned patients by interview, physical examination, and collation of laboratory results, leading to a summary and synthesis of the problem. Particular emphasis is placed on close follow-up of the patients during hospitalization, including attendance at procedures or operations whenever possible. Students should know their own patients well enough to be able to give a reasonable presentation on ward rounds or at conferences without notice. Students are expected to read standard texts in-depth about their patients' problems, as well as 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 used internally in the Department of Medicine. In arriving at a consensus, appropriate emphasis is placed on knowledge, enthusiasm, and evidence of improvement during the rotation. There is no written examination. Adds are accepted at any time providing the course has not been filled. However, because this course is usually oversubscribed, drops are not accepted within thirty days of the first day of classes unless the student finds his own replacement. MED-280C is a full-time experience. Also, it is offered as a sole enrollment course and, as such, cannot be taken in conjunction with any other course without the permission of the advisory dean and the course director. Credit: 4. Enrollment: max 5.

MED-290C. Metabolism and Endocrinology. (1) Course Goals: Primary—The student has an in-depth experience in the evaluation and management of patients with endocrine disorders. Secondary—The student learns basic principles of hormone physiology and 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, Drezner, Ellis, Feinglos, Feldman, Guyton, Domalik, Green, Luttrell, Neelon, Weber, McNeill.) Prior arrangements may be made with a particular faculty member under the appropriate course number. The student is exposed to clinical endocrine disorders by seeing patients in two endocrine outpatient clinics (Diabetes/General Endocrine, and VA General Endocrine Clinic), as well as experiencing the inpatient Endocrinology Diabetes Management/General Endocrine Consult Service. The student has the opportunity to review general literature on common endocrinologic conditions and endocrinologic emergencies as well as learning basic assessment skills of the patient with diabetes, thyroid disease, and other common endocrinologic presentations. Division conferences include Grand Rounds, Research Seminar, Inpatient Attending Rounds, and Consult Rounds with opportunities to integrate basic concepts with clinical applications. (3) Methods of Evaluation: A written critique is provided by the student's preceptors with comments from other members of the division as appropriate. Credit: 4. Enrollment: max 5. Hamilton and infectious diseases staff

MED-300C. Nephrology. (1) Course Goals: Primary - To provide clinical experience in the diagnosis, assessment and treatment of renal diseases and hypertension. Secondary - To integrate renal physiology, immunology, pathology, and biochemistry into the clinical assessment of renal diseases. (2) How Goals Are Achieved: Students participate fully in both inpatient and outpatient assessment of patients presenting with fluid and electrolyte disorders, problem hypertension, acute renal failure, end-stage renal disease, and related complications. The student rounds daily with a renal fellow or senior resident, attends regular faculty teaching rounds and scheduled conferences devoted to correlations with basic science review of renal biopsy material, transplantation,
etc. Special emphasis is placed on renal physiology and pathophysiology, renal histopathology, and hypertension. Students may elect to participate at the VA Hospital or on the private or nonprivate services at Duke. (3) Methods of Evaluation: Written comments from the faculty. Credit: 4. Enrollment: max 4. Coffman and nephrology staff

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

**MED-308C. Clinical Neurology Subspecialties.** (1) Course Goals: To provide the student with 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 Neuro-muscular Diseases, Epilepsy and Sleep Disorders, Cerebrovascular Disorders, Memory Disorders, or Neuro-oncology are available. Appropriate reading material is utilized to complement the clinical experience. MED-207C or MED-307C are prerequisites for this course. (3) Method of Evaluation: Standard written evaluation form by faculty supervisor. Approval by the course director in order to ensure access to the desired neurologic subspecialty is required. Credit: 1-2. Enrollment: max 5 (if participating in different subspecialties) Chilukuri and neurology staff

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

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

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

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

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

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

**MICROBIOLOGY**

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


Associate Professors: H. Mario Geysen, Ph.D. (Melbourne, 1976); William Phelps, Ph.D. (Minnesota, 1965); Norman F. Weatherly, Ph.D. (Kansas, 1963).


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


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

**Required Course**

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

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

**Electives**

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

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

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

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

**NEUROBIOLOGY**


Associate Professors: Helene Benveniste, M.D. (Copenhagen, 1986); Ph.D. (Copenhagen, 1991); Rose-Marie Boustany, M.D. (Amer. Univ. Beirut, 1979); Neal B. Cant, Ph.D. (Michigan, 1973); Joseph M. Corless, M.D. (Duke, 1972); Ph.D. (Duke, 1971); Michael M. Harglund, Ph.D. (Washington, 1988); Darrell V. Lewis, M.D. (Minnesota, 1969); Donald C. Lo, Ph.D. (Yale, 1989); Roger D. Madison, Ph.D. (Duke, 1981); Miguel A. L. Nicolelis, M.D. (Sao Paulo, 1984); Ph.D. (Sao Paulo, 1988); Stephen Nowicki, Ph.D. (Cornell, 1963); Peter H. Reinhart, Ph.D. (Australian National Univ., 1985); Donald E. Schmecht,
Courses of Instruction

**Required Course**

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

**Electives**

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

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

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

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

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

**OBSTETRICS AND GYNECOLOGY**

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


Assistant Professors: Nels C. Anderson, Ph.D. (Purdue, 1964); Lori A. Bastian, M.D. (Emory, 1987); James D. Bowie, M.D. (Oklahoma, 1967); aff J. Brown, M.D. (Stanford, 1988); Grace M. Couch-

*Courses of Instruction* 93


Adjunct Assistant Professor: Neil J. Finkler, M.D. (Mount Sinai, 1982). Assistant Consultant Professor: Edward C. Christakos, M.D.; Allen P. Killam, M.D.; Roy T. Parker, M.D.; Warren E. Patow, M.D.; Charles H. Peete, Jr., M.D.

**Required Course**

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

Electives

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

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

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

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

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

**OBG-247C. Clinical Obstetrics.** For students preparing for general practice of medicine, pediatrics, or obstetrics and gynecology. This course studies the relationship of clinical factors during pregnancy, labor, and delivery. Emphasis is placed on abnormal conditions of pregnancy as related to the infant. Current problems in the maternal-fetal relationship are outlined. The student functions on an intern level and takes part in activities of the housestaff and faculty. Credit: 5 or 10. Enrollment: max 2. Her bert, Livingston, Murtha, and fellows on obstetrical service
OBG-249C. Clinical Gynecology and Urogynecology. For students preparing for obstetrics and gynecology, general practice, surgery, and urology. Emphasis is placed on the outpatient assessment of patients with acute and chronic gynecologic disorders including pelvic floor dysfunction, pelvic organ prolapse, urinary and fecal incontinence, and others. Students have the opportunity to work closely with faculty members in the Division of Gynecology. Inpatient care is not required, but participation in the operative care of gynecologic patients can be arranged if desired. Ample time for independent study is planned. The student is expected to utilize this time reviewing a specific clinical problem with frequent guidance and input from a member of the Gynecology Division with similar interests. Credit: 4 or 8. Enrollment: max 1. Bump, Addison, Weidner, Amundsen, and urogynecology fellows.

OBG-253C. Preparation for Practice, Cabarrus Memorial Hospital, Concord, North Carolina. This is an opportunity to receive both didactic exposure and clinical exposure in obstetrics and gynecology in the community hospital. The student is expected to function as an intern. The student participates actively in the care of the patients in the labor and delivery area, assists at surgery, and renders postpartum and postoperative care. This is a community hospital experience rather heavily credited in clinical obstetrics. The student is exposed to a large volume of clinical material. The practitioners in the community are all board certified obstetricians and gynecologists and are interested in student teaching. A Duke faculty person provides additional guidance by visiting once per week. This elective can be taken for four weeks for four units or eight weeks for eight units. The students are housed in quarters available for them. Prerequisites: permission of Dr. Livengood prior to signing for the course. Credit: 4, 6, or 8. Enrollment: max 1. Livengood and staff of the Cabarrus Memorial Hospital.

OPHTHALMOLOGY

Joseph A. C. Wadsworth Clinical Professor David L. Epstein, M.D. (Johns Hopkins, 1968), Chairman.


Associate Clinical Professor: Judy H. Seaber, Ph.D. (Duke, 1985).


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

Electives

O PH-210C. Medical Ophthalmology. The ophthalmic signs and symptoms of systemic disease are presented in a lecture series. Oriented for those students interested pri-
Courses of Instruction  

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

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

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

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

**OPH-216C. Clinical Neuro-Ophthalmology.** An advanced clinical preceptorship that provides students with exposure to a variety of neuro-ophthalmologic problems, including diseases affecting the optic nerve and central visual pathways and disorders of eye movement. Emphasis is placed on history taking, acquisition of specialized examination techniques (visual fields, pupils, ocular motility, and fundus), and the logical analysis of clinical information. The course meets one day per week, either on Tuesday or Thursday and begins at 8:30 a.m. Prerequisites: OPH-212C. Credit: 1. Enrollment: max 1. Pollock

**PATHOLOGY**


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


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

Assistant Professors: Michael S. Balo, M.D. (Case Western Reserve, 1991); Rex Bentley, M.D.
Required Course

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

Electives

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

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

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

**PTH-281B or C. Cytopathology Preceptorship.** This course consists of full-time rotation in the diagnostic cytopathology laboratories. By working with the laboratory staff, the student explores in detail the role played by diagnostic cytopathology in the diagnosis of disease. In addition to general cytology, the student has the opportunity to participate in the fine needle aspiration biopsy service. Although not a requirement, the student is encouraged to pursue special research projects. Preference given to Pathology Study Program students. Credit: 4 or 8. Enrollment: max 1. Ballo, Olatidoye, Dodd, Bigner, and cytopathology staff

**PTH-342B. Special Topics in Pathology.** Special problems in pathology are studied with a member of the senior staff. The subject matter is individually arranged. Permission of the instructor required. Credit: 1-16. Pizzo and staff

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

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

**PTH-353B. Neuropathology.** A view of neuropathology that emphasizes clinico-pathologic correlation. Credit: 3. McLendon and staff

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

**PTH-364B. Skeletal Pathology.** An overview of skeletal pathology beginning with the development of the normal skeleton, a systematic review of inflammatory, neoplastic, metabolic, arthritic, vascular, dysplastic, and traumatic diseases of the skeleton. Clinical correlation. Credit: 2. Enrollment: min 4, max 10. Harrelson

**PTH-366B. Pulmonary Pathology and Pathophysiology.** Emphasis is on pulmonary pathology and pathophysiology of infections, metabolic, environmental, neoplastic diseases, and certain diseases of unknown etiology (sarcoid, alveolar proteinosis, e.g.). Credit: 3. Enrollment: min 2, max 15. Roggli and Sporn
PTH-3808 or C. Surgical Pathology—Emphasis: Electron Microscopy. This course is an apprenticeship in which the student becomes engaged in the actual preparation and diagnosis of tissue changes using both light and electron microscopy. The student, of necessity, learns how to operate the electron microscope. Prerequisites: PTH-359B suggested, but not required. Permission of instructor is required. Credit: 4 or 8. Enrollment: max 1. Shelburne and Vollmer

PTH-3855. 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 the directors in each disease field. Topics include molecular cytochemistry, immunodeficiency diseases, mechanisms of microbial antibiotic resistance, hemoglobinopathies, neurologic/neuromuscular diseases, coagulopathies, cancer susceptibility genes, tumor suppressor genes, ethical issues in genetic susceptibility testing, genetherapy, and more. Credit: 3. Enrollment: min 5 max 50. Stenzel and Hale

PEDIATRICS

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


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


Assocate Research Professors: Pasquale Chitano, Ph.D. (Milan, 1992); Michael D. Fechoz, Ph.D. (North Carolina, 1969); Donald E. Flemer, Ph.D. (Emory University, 1967); Francis Heidtage, Ph.D. (Missouri, 1978); Haxiang Jiang, M.D., Ph.D. (Shanghai Medical University, China, 1975, 1991); Stewart P. Johnson, Ph.D. (Case Western Reserve, 1983); Rashid N. Nassar, Ph.D. (Duke, 1974); Karen J. O'Donnell, Ph.D. (North Carolina, 1983).

Assistant: Associates: Michelle L. Bailey, M.D. (SUNY, 1995); Gregory N. Barnes, M.D., Ph.D. (Kentucky, 1992, 1990); Laura M. Brooks, M.D. (Virginia, 1994); Michael P. Carboni, M.D. (Northeastern Ohio Univ. College of Medicine, 1990); Timothy A. Driscoll, M.D. (The Ohio State University, 1990); Richard P. Howery, M.D. (Michigan, 1991); Jennifer Lawson, M.D. (Vermont, 1990); L. Scott Levin, M.D. (Temple, 1962); Laurie A. Myers, M.D. (Ohio State, 1992); Maria A. Pane, M.D. (UNM, 1989); Roberts H.A. Smith, M.D. (Texas-Houston, 1990).


Research Associates: Yan An, Ph.D. (Ottawa, Canada, 1995); Ulus Atasoy, M.D. (Miami, 1994); Deeksha Sarihvani Bai, Ph.D. (Amritsar, India, 1997); Robert M. Beary, Ph.D. (Tulane University, 1998); Shih-Fong Chao, Ph.D. (North Carolina, 1992); Enyu Ding, Ph.D. (Graduate Sch. of Chinese Acad. of Agric. Sciences, Beijing, China); Bernard M. Fischer, DVM, Ph.D. (North Carolina State, 1988, 1997); Bradley L. Hodges, Ph.D. (Illinois, Urbana-Champaign, 1997); Kitaro Kosaka, M.D. (Kyoto Prefectural Univ. of Medicine, Kyoto, Japan); Qiang Li, M.D. (China Medical, Shenyang, Peoples Republic of China, 1983); Ph.D. (Saskatchewan, Saskatoon, Canada, 1996); Hui-Ming Liu, M.D. (Shanghai Bethune, 1978); Kathleen Mckenna, M.D. (Saint Joseph's, Philadelphia, 1995); Alison J. McVie, Ph.D. (Univ. of Glasgow, Scotland, 1997); Svetlana N. Rylova, Ph.D. (Shemyakin and Ovchinnikov Institute, Moscow, Russia, 1998); Wen-Ling Shau, Ph.D. (Iowa State, 1993); Robert D. Stevens, Ph.D. (London, 1969); Sarah P. Young, Ph.D. (Institute of Child Health, London, England, 1997).


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


**Required Course**

**PED-205C. Pediatrics.** The basic course in pediatrics for all students is an eight-week clerkship in the second year. Its principal aim is to provide an exposure to the field of child health. The student has a varying series of experiences which should give a grasp of the concepts that underlie the discipline. Goals include acquiring familiarity and competence with the basic tools of information-gathering (history, physical examination, and laboratory data) and developing an approach to the integration of this material for the solution of problems of health and illness in infancy, childhood, and adolescence. This should be accomplished with continuing reference to the basic principles of pathophysiology encountered in the first year courses.

Those patients to whom the student is assigned provide the focus for case studies. In addition to the careful history and physical examination which must be recorded, the student is expected to organize an appropriate differential diagnosis and to seek and read pertinent reference material relevant to each patient. The student should learn to present each case verbally in an organized and succinct fashion, to follow the patient's progress, and to interpret all studies which are performed. The student is expected to learn from a number of sources: standard textbooks and journals, current publications and conferences, and also from people—house staff, faculty, nurses, parents, and all others with whom contact is made in the clinical setting.

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

Credit: 8.

**Electives**

**PED-210C. Advanced Pediatrics.** This course permits the student to elect an in-depth experience within pediatrics. Each student has a specific faculty preceptor who develops and implements the curriculum tailored to the individual's needs. Listed below are the faculty representatives to contact. Arrangements for the elective must be made with these individuals prior to enrolling in the course. The name of the preceptor with whom a student is working must be noted on the registration card submitted to the Registrar's Office. Credit: 1 to 8. Enrollment: max 1.

<table>
<thead>
<tr>
<th>Division</th>
<th>Faculty</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergy/Immunology</td>
<td>Rebecca H. Buckley, M.D.</td>
<td>684-2922</td>
</tr>
<tr>
<td>Cardiology</td>
<td>Stephen P. Sanders, M.D.</td>
<td>681-2916</td>
</tr>
<tr>
<td>Critical Care Medicine</td>
<td>Ira Cheifetz, M.D.</td>
<td>681-5872</td>
</tr>
<tr>
<td>Emergency Department</td>
<td>Karen Frush, M.D.</td>
<td>684-2246</td>
</tr>
<tr>
<td>Endocrinology</td>
<td>Michael S. Freemark, M.D.</td>
<td>684-3772</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>William R. Treem, M.D.</td>
<td>681-4841</td>
</tr>
</tbody>
</table>

1. The student participates in the initial evaluation, stabilization and management of pediatric medical and surgical patients in the emergency department. Special emphasis is placed on the approach to the pediatric trauma victim. Weekly didactic lectures and case review conferences are offered. The student is expected to research a relevant topic of his/her interest and lead a brief discussion with faculty and house staff during the elective. The student is evaluated by the ED Attending staff and receives ongoing feedback throughout the rotation as well as a formal exit interview.
PED-211C. Pediatric Infectious Diseases. This course provides experience in the clinical and laboratory diagnosis of infectious diseases and in their therapy. The student works closely with the infectious disease fellow and participates actively in evaluation of patients. Daily rounds in microbiology laboratory. Credit: 4 or 8. Enrollment: max 2. McKinney, Gutman, Katz, Drucker, Walter, Clements, Alexander, and Fisher

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

PED-217C. Pediatric Hematology and Oncology. Includes all aspects of clinical and laboratory hematology as well as the diagnostic evaluation, care, and treatment of patients with malignant diseases. Emphasis is placed on fundamental concepts. Students will act as sub-interns on the inpatients hematology-oncology service. They will not be required to take night or weekend call. Students may be asked to research a specific topic and present a short presentation at the end of their rotation. Prerequisites: contact instructor. Credit: 4 or 8. Enrollment: max 2. Rosoff, Falletta, Ware, Adams, Zimmerman, Martin, Howrey, and Driscoll

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

PED-231C. Clinical Pediatric Cardiology. This course provides an intensive learning experience in the clinical diagnosis and management of childhood heart disease. Emphasis is placed upon the pre and postoperative management of children with surgical heart disease as well as upon the outpatient management of children with less serious heart disease. The student also is exposed to pediatric acute care medicine and the modalities available to maintain cardiovascular function in the extremely ill child. Scope: history, physical examination, and special diagnostic techniques (echocardiography, electrocardiography, cardiac catheterization and cineangiography). Students

1. The Rural Health Clinics rotation provides a broad exposure to general pediatric problems in a medically indigent community. Four days a week (Monday through Thursday) the student travels with a senior pediatric resident to each of four rural county health departments to provide pediatric care in collaboration with public health nurses and child health clinicians. There is approximately two hours a day driving time, which allows for a one-on-one tutorial with the senior resident. The Special Topics course may vary from two to four weeks in length. Student may not drop within sixty days of the starting date without finding a replacement. Student must contact Dr. Barton three weeks before the course starting date.
participate on daily ward rounds, outpatient clinics four days per week, and all clinical and didactic teaching conferences of the Division. Prerequisites: PED 205C. Credit: 4 (or 8 with special permission of the instructor). Enrollment: max 2. Bengur, Sanders, Talner, and Armstrong

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

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

**PED-241C. Pediatric Nephrology.** The course is designed to provide experience in diagnosis, interpretations of laboratory tests, natural history, and treatment of acute and chronic disorders of the kidney in children. The student also is exposed to the management of fluid and electrolyte disorders in infants and children. Prerequisites: PTH-362B suggested; prior approval of Dr. Wigfall. Credit: 4. Enrollment: max 1. Foreman and Wigfall

**PED-243C. Adolescent Medicine.** Students participate in a weekly seminar with emphasis on the behavioral and developmental aspects of adolescence, drug abuse, sports medicine, and the pregnant teenager. Patient interactions are arranged in the Youth Clinic at the Duke General Pediatric Clinic on Monday afternoon and/ or the Sports Medicine Clinic on Thursday afternoon. Tutorial and supervisory time to discuss specific patients and pertinent literature are arranged. Credit: 2 Enrollment: max 2. Bravender

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

**PED-260C. Advanced Clerkship in Pediatrics.** This course is designed to provide the student with an intensive, in-depth exposure to the diagnosis and management of pediatric patients hospitalized at Duke. Students are responsible for admission histories, physical examinations, and management throughout the hospitalization. The student serves as an acting intern throughout the rotation. Night call is expected every fourth night. This is a sole-enrollment course and cannot be taken in conjunction with any other course. Students must obtain the written permission of Dr. Robert Drucker or Dr. Deborah Kredich to register for or to drop this course on or after January 1, 2000. Credit: 5. Enrollment: max 2. Drucker, Kredich, and faculty

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

PHARMACOLOGY AND CANCER BIOLOGY

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


Associate Professors: Joseph Heitman, M.D. (Cornell, 1992); Ph.D. (Rockefeller, 1989); Homme W. Heilinga, Ph.D. (Cambridge, 1996); Elwood A. Linney, Ph.D. (California at San Diego, 1973); Donald McDonnell, Ph.D. (Baylor, 1987); Tobias Meyer, Ph.D. (Basel, 1986); Ann Marie Pendergast, Ph.D. (Riverside, 1985); Rochelle D. Schwartz, Ph.D. (Georgetown, 1983); Shirish Shenolikar, Ph.D. (Leeds, 1975); Antonius VanDongen, Ph.D. (Leiden, 1988); Xiao-Fan Wang, Ph.D. (Los Angeles, 1986); A. Richard Whorton, Ph.D. (Vanderbilt, 1975).

Assistant Professors: Sheila Collins, Ph.D. (Massachusetts Inst. Tech., 1985); Christopher Counter, Ph.D (McMaster, 1996); Robert T. Fremeau, Jr., Ph.D. (George Washington, 1985); Samuel E. George, M.D. (Washington Univ. 1980); Walter Koch, Ph.D. (Cincinnati, 1990); Madan M. Kwatra, Ph.D. (Montreal, 1980); Edward D. Levin, Ph.D. (Wisconsin, 1984); Tso-Pang Yao, Ph.D. (San Diego, 1994); John D. York, Ph.D. (Washington Univ., 1993).


Associate Research Professor: Jorge Bartolome, Ph.D. (Univ. Chile, 1978).

Assistant Research Professors: Ram Gupta, Ph.D. (Delhi, 1982); Maxine Okazaki, Ph.D. (Toronto, 1984); Frederic J. Seidler, Ph.D. (Duke, 1986).

Adjunct Professors: Humberto Viveros, M.D. (Univ. Chile, 1962); Joseph Yanai, Ph.D. (Colorado, 1971).

Adjunct Associate Professor: Richard J. Kavlock, Ph.D. (Miami, 1977).

Adjunct Assistant Professors: Rochelle Hanley, M.D. (Michigan, 1978); Christopher Lau, Ph.D. (Duke, 1982); David Martin, Ph.D. (London, 1987); Hernan A. Navarro, Ph.D. (Kentucky, 1987).

Emeriti: Norman Kirshner, Ph.D.; Leon Lack, Ph.D.; Athos Ottolegrand, M.D.

Required Course

PHR-2008. Medical Pharmacology. This basic course in pharmacology for medical and graduate students describes the action of drugs in relation to biochemical and physiological processes and to the rationale for their clinical use. Additional topics include pharmacokinetics, drugs of abuse, and commonly encountered toxins. Nine lectures and one small-group, case-based discussion per week for eight weeks, May-June. Credit: 4.

Nadler and staff

Electives


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

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

Courses of Instruction 105
PHR-372B. Research in Pharmacology. Laboratory investigation in various areas of pharmacology. C.L.: Graduate School. Credit to be arranged. Credit: 1-16. Staff

PSYCHIATRY

Professor K. Ranga Krishnan, M.D. (Madras Medical College, 1978), Chairman.

DIVISION OF BEHAVIORAL MEDICINE

Professor Redford B. Williams, Jr., M.D. (Yale, 1967), Division Head.
Professor: Roy J. Mathew, M.B. (Medical College of Trivandrum, India, 1970).
Associate Consulting Professor: Valerie F. Holmes, M.D. (Louisville, 1980).
Assistant Clinical Professors: Lakshmi Kamaraju, M.D. (Andhra, 1976); Indira M. Varia, M.D. (Shah Medical College, 1968); Michael R. Volow, M.D. (Satah Hall, 1964).
Clinical Associates: John G. Giragos, M.D. (Beirut, Lebanon); Katayoun Tabrizi, M.D. (Tehran, 1984).
Research Associates: John Feaganes, Ph.D.; Michael J. Helm.

DIVISION OF BIOLOGICAL PSYCHIATRY

Professor: John G. Looney, M.D. (Southwestern, 1969).
Associate Clinical Professors: Jay-Guyard, M.D. (de Nuevo Leon, Mexico, 1961); Ingrid Pisetsky, M.D. (Albert Einstein, 1971).
Assistant Professor: Lisa Amaya-Jackson, M.D. (North Carolina, 1966).
Assistant Clinical Professors: Allan Chrisman, M.D. (George Washington, 1971); Karl Stevenson, M.D. (Brian Gray, 1966).
Consulting Associates: Peter F. Adland, M.D. (Georgetown, 1975); Linwood R. Allsbrook, M.D. (Kentucky, 1981); Peter T. Daniolos, M.D. (N. Dakota, 1990); Bryon Herbel, M.D. (North Dakota, 1966); D. Randall Johnson, M.D. (Medical Univ. of South Carolina, 1963); Michael S. Lancaster, M.D. (Tulane,
1975); Nancy J. Livingston, M.D. (Duke, 1972); Vladimir Maletic, M.D. (Belgrade, 1981); William Mackey, M.D. (Tennessee, 1969); Karen M. Munstat, M.D. (Medical College of Ohio, 1990); Daphne Rosenblitt, M.D. (Du-ke, 1974); Donald L. Rosenblitt, M.D. (Duke, 1973); David A. Smith, M.D. (Ala-bama, 1980).


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

DIVISION OF GENERAL PSYCHIATRY

Professor: Jesse O. Cavenar, Jr., M.D. (Arkansas, 1963).

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

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

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


Instructor: Bedey Hanusa, M.S. (Indiana).

DIVISION OF GERIATRIC PSYCHIATRY


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


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

Associate in Research: R. Corey Remle, B.A. (South Carolina, 1992).


DIVISION OF MEDICAL PSYCHOLOGY

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

Professors: Irving Alexander, Ph.D. (Princeton, 1949); James A. Blumenthal, Ph.D. (Washington, 1975); Barbara B. Burns, Ph.D. (Boston College, 1972); Robert Carson, Ph.D. (Northwestern, 1957); C. Keith Conners, Ph.D. (Duke, 1960); Herbert Crovitz, Ph.D. (Duke, 1970); Martin Lakin, Ph.D. (Chi-cago, 1955); Patrick Logue, Ph.D. (North Dakota, 1965); David Marden, Ph.D. (California-Davis, 1977); Susan Roth, Ph.D. (Northwestern, 1973); Susan Schifman, Ph.D. (Duke, 1970); Iliene C. Siegler, Ph.D. (Syracuse, 1973); Richard S. Surwit, Ph.D. (McGill, 1972); Robert J. Thompson, Ph.D. (North Dakota, 1971).

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


Adjunct Professors: Bernard T. Engel, Ph.D. (California-Los Angeles, 1956); Florence Kaslow, Ph.D. (Bryn Mawr, 1969); Francis J. Keefe, Ph.D. (Ohio, 1975); John Lochman, Ph.D. (Connecticut, 1976); Rune Sioonsson, Ph.D. (George Peabody College, 1971).


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

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

Assistant Professors: Kathryn Gustafson, Ph.D. (Ohio, 1988); Barbara R. Keith, Ph.D. (Alabama, 1992); Edward C. Suarez, Ph.D. (Miami, 1986).

Assistant Clinical Professors: Michael Babayak, Ph.D. (Kansas, 1995); Melanie J. Bonner, Ph.D. (Virginia Polytechnic Inst., 1995); John Barrow, Ph.D. (Houston, 1971); Robin A. Buhre, Ph.D. (Southern Illinois, 1982); Tracey Poits Carson, Ph.D. (Georgia, 1982); Jeanine M. Driscoll, Ph.D. (Maryland, 1996); Jeff N. Epstein, Ph.D. (South Carolina, 1994); Steve Herman, Ph.D. (Duke, 1977); Martin Ionescu-Pioggia, Ph.D. (North Carolina, 1985); Diane E. Johnson, Ph.D. (North Carolina, 1994); Ronette L. Kolotkin, Ph.D. (Minnesota, 1978); Deborah C. Kotai, Ph.D. (California School-Professional Psychology, 1993); Albert D. Loro, Jr., Ph.D. (Washington, 1976); Thomas Lynch, Ph.D. (Kent State, 1996); Jerri M. Oehler, Ph.D. (Duke, 1964); Oliver Oyama, Ph.D. (Indiana, 1985); Rebecca Schein, Ph.D. (Fairleigh Dickenson, 1992); Gail A. Spiridigliozzi, Ph.D. (Kansas, 1988); Craig R. Stenberg, Ph.D. (Denver, 1982); Barbara K. Walters, Ph.D. (Alabama, 1992).


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

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

Assistant Consulting Professors: William D. Barley, M.D. (Texas Tech., 1980); William V. Burlingame, Ph.D. (Washington, 1967); Brian Esterling, Ph.D. (Miami, 1991); Susan Head, Ph.D. (Louisiana State, 1991); Edward Landis, III, Ph.D. (Louisville, 1999); Richard L. Mungen, Ph.D. (Michigan, 1979); Linda Barnett, Ph.D. (Kentucky, 1981); Loretta E. Braxton, Ph.D. (North Carolina, 1989); Anita Yvonne Bryant, Ph.D. (Maryland, 1991); Jill S. Compton, Ph.D. (Michigan State, 1989); Scott N. Compton, Ph.D. (Nebraska, 1996); Renee H. Dunn, Ph.D. (Southern Mississippi, 1996); Barbara Elder, Ph.D. (Southern Illinois, 1990); David Fitzgerald, Ph.D. (Notre Dame, 1995); Rebecca F. Frank, Ph.D. (North Carolina, 1994); Patricia J. Gammon, Ph.D. (North Carolina, 1990); Mary Gifford-Smith, Ph.D. (Pittsburgh, 1998); Marylou Goldberg, Ph.D. (Miami, 1988); Jill L. Hazlett, Ph.D. (Minnesota, 1993); Judith Holder, Ph.D. (Southern Illinois, 1995); Stephanie T. Jenal, Ph.D. (Southern California, 1993); Robert Mankoff, Ph.D. (Georgia State, 1992); Desiree W. Murray, Ph.D. (South Florida, 1977); Stephanie Noll, Ph.D. (Duke, 1997); Jennifer Norton, Ph.D. (North Carolina, 1995); Ruth E. Quillian, Ph.D. (Miami, 1994); Lisa Reiter-Lavery, Ph.D. (Catholic, Washington, 1996); Anna L. Remen, Ph.D. (North Carolina, 1999); Victoria Reynolds, Ph.D. (Duke, 1993); Anthony J. Smith, Ph.D. (Southern Illinois, 1996); Patrick R. Steffen, Ph.D. (Miami, 1998); Jones F. Thomas, Ph.D. (Virginia, 1997); Janet Whidby, Ph.D. (Duke, 1987); William K. Wohlgenuth, Ph.D. (Miami, 1995); Mark E. Wolfever, Ph.D. (Toledo, 1997).

Consulting Associates: Steven J. Ashby, Ph.D. (Connecticut, 1976); Susanne E. Dunn, Ph.D. (Duke, 1989); Laura A. Gilliam, Ph.D. (North Carolina, 1997); Russell P. Hopfenberg, Ph.D. (Boston, 1992); Spencer Lylerly, Ph.D. (North Carolina State, 1987); Robert J. McCarthy, Ph.D. (South Carolina, 1972); Michael Murray, Ph.D. (South Florida, 1993); Richard R. Rumer, Ph.D. (North Carolina, 1982).

Adjunct Associates: Juesta M. Caddel, Ph.D. (VA Polytechnic Institute and State Univ., 1991); Anita P. Holmes, M.P.H., J.D. (North Carolina, 1972); Mareah Steketee, Ph.D. (California School of Professional Psychology, 1992).

Instructors: C. Toby McCoy, Ph.D. (Vanderbilt, 1986); John T. Edwards, Ph.D. (Georgia, 1977); Elizabeth W. Jackson, Ph.D. (North Carolina, 1996); Susmita Kashkar-Zuck, Ph.D. (Wisconsin, 1995); Pamela Maxon, Ph.D. (Pennsylvania State, 1994); Kevin P. Weinert, Ph.D. (Georgetown, 1997).

Research Associates: Wenhong Cao, M.D. (Medicine Huan Medical, 1983); Anastasia Georgiadis, Ph.D. (Uppsala, 1998); Thomas Haney, M.S.P.H. (North Carolina, 1978); Celia F. Hysel, Ph.D. (North Carolina, 1997); Kari K. Lewis, Ph.D. (North Carolina State, 1996); Margaret Maytan, M.D. (Umea, Sweden); Alexander V. Medvedev, Ph.D. (Institute Cytology, Russia, 1991); Daniel A. Cordoba Montoya, Ph.D. (Universidad Nacional de Cordoba, Argentina, 1998); William S. Sampson, IV, Ph.D. (North Carolina, 1998); Srinivasan Sudha, Ph.D. (Indian Institute of Science, India, 1997); Miranda A. van Tilburg, Ph.D. ( Tilburg, Netherlands, 1997); Aaron White, Ph.D. (Miami, 1999); Jennifer Zervakis, Ph.D. (Duke, 1997).


**DIVISION OF OUTPATIENT SERVICES**


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

Assistant Professors: Kathryn M. Conner, M.D. (Maryland, 1993); Andrew Krystal, M.D. (Duke, 1987).

Adjunct Assistant Professors: Charles D. Casat, M.D. (Boston, 1963); Tana A. Grady, M.D. (Duke, 1986); Rajinder Judge, M.D. (Birmingham, U.K., 1984).

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

Assistant Consulting Professors: Jack W. Bonner, III, M.D. (Southwestern, 1965); Martin G. Groder, M.D. (Columbia, 1964); Robert D. Phillips, M.D. (Pennsylvania, 1952); Leo Potts, M.D. ( Adelaide, 1954); Richard Selman, M.D. (Emory, 1972); Cynthia B. Shinn, M.D. (Yale, 1950); Suzanne Sutherland, M.D. (Michigan State, 1968); Pierre V. Tran, M.D. (de Franche, France, 1987).


DIVISION OF PSYCHIATRIC SOCIAL WORK

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


DIVISION OF PSYCHIATRIC SOCIAL WORK

Associate Professor Marvin S. Swartz, M.D. (Tufts, 1980), Division Head.
Adjunct Professor: David B. Larson, M.D. (Temple, 1973).

Associate Clinical Professor: Keith G. Meador, M.D. (Louisville, 1982).
Associate Research Professor: Deborah T. Gold, Ph.D. (Northwestern, 1986).
Associate Consulting Professor: Nicholas Stratas, M.D. (Toronto, 1957).
Assistant Professors: Elizabeth M.Z. Farmer, Ph.D. (Duke, 1991); Jeffrey W. Swanson, Ph.D. (Yale, 1985).
Adjunct Associate Professor: B. Kathleen Jordan, Ph.D. (Duke, 1986).
Clinical Associates: Lucile D. Clotfelter, M.D. (North Carolina, 1986); James N. Finch, M.D. (South Florida, 1981); Holly B. Rogers, M.D. (Texas, 1990); Carol Saur, M.S.N (America School of Nursing, 1968).
Instructor: Joanne B. Dellaero, M.Ed. (Houston, TX 1991).

Required Course

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

Basic Science Electives

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

PSC-223B. Neurobiological Basis of Behavior. The course surveys neuroanatomical, neurophysiological, neurochemical and neuropharmacological evidence of central nervous system function as it relates to normal and abnormal behavior. Clinical description, measurements of function and laboratory models of function as well as the biological substrates of affective disorders and psychoses are emphasized. Scientific bases of current therapeutic procedures, especially psychopharmacological, are examined. Course format consists of assigned readings, study questions, and lectures by faculty and other active researchers. Mid-term and final examinations are given. Each student is expected to critique a circumscribed area of research literature focusing on the appropriateness of conceptualizations and experimental methods. Additionally, students have an opportunity to become acquainted with, and to participate in, ongoing research. Credit: 4. Enrollment: min 1. Krystal
PSC-297B. Ethnic and Minority Health Patterns and Problems. Descriptive and analytical focus on the literature about ethnic and minority health patterns in the United States, the issues inherent therein, and the implications thereof for the delivery of medical services. Credit: 4. Enrollment: min 1. Carter and Anderson-Brown

PSC-299B. Preceptorship in Behavioral Neurosciences. This course provides an opportunity for the student to work closely with a member of the faculty in an area of mutual interest with emphasis upon research (see the booklet, Basic Science Elective Program for Students in the Third Year, Behavioral Neurosciences Study Program section, for partial list of interest areas; more complete descriptions available). Credit: 1-16. Krystal

Clinical Science Electives

PSC-227C. Behavioral Aspects of Pediatrics. This course offers medical students the opportunity to study, as a part of an interdisciplinary team, the diagnosis and treatment of children and adolescents (ages two to twenty-one) with a variety of psychiatric problems. This may include anorexia nervosa, bulimia, enuresis, encopresis, school phobia, psychosomatic disorders, Tourette syndrome, suicidal and acting-out adolescents, chronically or terminally ill children, and child abuse and neglect cases. Students study principles of psychological development, psychoanalytic, and family systems theory. The student participates in child, parent, and family interviews as an integral part of the treatment team. There is opportunity to be involved in the inpatient and outpatient treatment process on pediatric and adolescent psychiatric wards. C-L: PED-227C. Credit: 2-6. McSwain-Kamran

PSC-240C. Subinternship in Psychiatry. This course is an intensive clinical experience in the diagnosis and treatment of severe and incapacitating psychiatric disorders. The student is given more clinical responsibility than the comparable second year inpatient rotation. Patient care responsibilities include management of ward milieu. Treatment approaches emphasizing psychotropic medication and individual, family, and group psychotherapy are part of the clinical experience. Participation at selected patient care conferences and didactic lectures is expected. The rotation is available at Duke with specialty program experience that can be structured to include a survey of the variety of residential treatments available in this area. If desired, a student can arrange for a special reading tutorial in related topics (e.g., schizophrenia). Credit: 4 or 8. Enrollment: max 1. VanMeter

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

PSC-251C. Community Psychiatry. The student develops a course based on selections from a variety of community and special population settings. These include the Durham Mental Health Center and its component units (children’s services, alcohol and drug abuse and dependency treatment programs, programs for the care and training of the mentally retarded, and adult psychiatry services), the Federal Corrections Center at Butner, and the psychiatric services and clinics at Duke and the Durham VA Hospital. Students interested in this elective must contact Dr. Marvin Swartz at least eight weeks

Courses of Instruction  111
prior to the term selected for this course in order to develop a program tailored to the student's interests. Credit: 4 or 8. Enrollment: max 2. Swartz

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

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

PSC-343C. Clinical Aspects of Alcohol and Drug Abuse. This course offers a part-time or full-time experience at the Duke Alcoholism and Addiction Program or the VA Hospital in the diagnosis and treatment for patients who abuse alcohol and/or drugs. The interrelations of substance abuse with personality disorder and major psychiatric disorder is emphasized. Students may also choose to rotate on an inpatient/outpatient substance abuse program at the Duke Alcoholism and Addictions Program, the VA Hospital, or the Alcohol and Drug Addictions Treatment Center at John Umstead Hospital. Students must contact Dr. Stein four weeks in advance to confirm availability. Credit: 4-8. Enrollment: min 1, max 2. Stein

RADIATION ONCOLOGY

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


Basic Science Electives

RON-227B. General Radiobiology. This course provides a comprehensive overview of radiation's interactions with cells and/or tissues and is oriented toward gaining an understanding of such interactions as they relate to the therapeutic use of radiation alone or in combination with chemotherapeutic drugs. Topics that are covered include carcinogenesis; radiation protection mutagenesis; DNA damage and repair; oncogene, suppressor gene and growth factor expression; methods for quantitating radiation dam-
age in vitro and in vivo; tumor and normal tissue models for radiation studies; solid tumor metabolism, microenvironment, and physiology; radiation sensitizers and protectors; effects at the tissue and whole organ and whole organism level; time, dose, and fractionation; low dose rate radiotherapy, including use of radio labelled monoclonal antibodies; hyperthermia; radiation/drug and heat/drug interactions. Credit: 2. Enrollment: max 10. DeWhirst

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

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

Clinical Science Elective

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

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

Assistant Research Professors: Gamal A. Al-Hneide, Ph.D. (Texas A&M, 1990); Alan H. Baudish, Ph.D. (Duke, 1994); James Bowsher, Ph.D. (North Carolina, 1989); Michael J. Campa, Ph.D. (Florida, 1999); Timothy DeSorbo, Ph.D. (Wisconsin at Madison, 1988); Edward Hsu, Ph.D. (Johns Hopkins, 1996); Joseph Lo, Ph.D. (Duke, 1993); Atsushi Takahashi, Ph.D. (McGill, 1995); Martin P. Tourani, Ph.D. (California-Los Angeles, 1997); Georgia Tourassi, Ph.D. (Duke, 1993); Timothy Turkington, Ph.D. (Duke, 1989); James Voyvodic, Ph.D. (Washington, 1988).


Fellows: Paul Balen, M.D. (California-San Diego, 1994); Dean Bushy, M.D. (Washington, 1995); Kevin Carrall, M.D. (Georgetown, 1990); Barry Charnick, M.D. (Boston, 1994); Eric Crooky, M.D., B.Ch., B.A.O. (University College-Cork, Ireland, 1990); Eric Farnsworth, M.D. (Tennessee, 1995); Alexander Guo, M.D. (Johns Hopkins, 1994); Alvan Hassankhani, M.D. (University of Medicine and Dentistry of New Jersey, 1994); Daniel Hatch, M.D. (Utah, 1994); Jeffrey Himan, M.D. (Wayne State, 1995); James Killius, M.D. (SUNY-Buffalo, 1996); John Lee, M.D. (Texas-Houston, 1995); Michael Miller, M.D. (Hahnmann, 1994); Jorge Ramirez, M.D. (Puerto Rico, 1994); Theodore Spielmann, M.D. (British Columbia, 1992); Marvin Tam, M.D. (Columbia, 1993); Thuan Tran, M.D. (Baylor, 1995); Thuy Vo, D.O. (University of Medicine and Dentistry of New Jersey, 1994); Joseph Wagner, M.D. (North Carolina, 1995); Kenneth Wong, M.D. (British Columbia, 1994); Michael Workman, M.D. (Iowa, 1994).

Basic Science Electives

RAD-250B. Research in Radiology. An individually arranged experience in which the student identifies with and participates in an established research program of a faculty member. Program should be arranged with DPA and proposed faculty member well in advance of starting date. Credit: 1-16. Enrollment: max 10.

Clinical Science Electives

RAD-210C. Pediatric Radiology. A specialized program of instruction and participation in the wide variety of radiographic examinations in the pediatric age group. Special correlation of these examinations to the problems of specific diagnosis and patient care is made. Prerequisite: must contact Dr. Miller prior to registration. Credit: 4 or 8. Enrollment: max 2. Miller and staff

RAD-211C. Clerkship in Neuroradiology. A specialized program of detailed instruction in neuroradiology. The program includes participation in many interdepartmental conferences and the performance and interpretation of a variety of examinations including cerebral angiography, computerized axial tomography, magnetic resonance images, and myelography. Prerequisites: must contact Dr. Provenzale prior to registration. Credit: 4 or 8. Enrollment: max 2. Provenzale and staff

RAD-220C. Basic Radiology Clerkship. This course is designed to provide an overview of the various imaging modalities of diagnostic radiology and their clinical utility. The elective consists of: (a) lectures and film interpretation sessions supplemented by student presentations; (b) assignment to a variety of diagnostic radiology services during which students observe the performance of diagnostic and interventional studies; and (c) use of a teaching file of radiographs and diagnostic images. One week is spent on the thoracic radiology service. Additional rotations may include the musculoskeletal, neuroradiology, mammography, vascular/interventional, pediatric, CT/abdominal...
imaging, ultrasound, nuclear medicine, gastrointestinal, and VA Hospital services. Credit: 4. Enrollment: min 4, max 9. Major and staff

**RAD-230C. Thoracic Imaging.** This course will provide the ability to interpret chest radiographs and increase the 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 breadth of modalities and interventional procedures conducted by the thoracic imaging division. Opportunities exist to become involved in research projects. During the course of one month, the student will have interpreted or observed the reading of more than 1,000 chest radiographs. Prerequisite: General Radiology elective preferred but not mandatory. Credit: 4. Enrollment: max 1. Goodman and staff

**SURGERY**


**DIVISION OF GENERAL SURGERY**


Associate Clinical Professor: Norbertus P. DeBrujin, M.D., M.Sc. (Gronigen, 1976).


Assistant Research Professors: Zeinab A. Abdel-Wahab, Ph.D. (Eastern Virginia, 1985), Experimental Surgery; Timothy L. Darrow, Ph.D. (SUNY, 1980); Yiping Deng, Ph.D. (Virginia Polytechnic Inst., 1991); Andrew P. Funeal, Ph.D. (North Carolina, 1993); Sanford C. Garner, Ph.D. (North Carolina, 1989); Michael L. Greenberg, Ph.D. (SUNY, 1984), Experimental Surgery; Yiwen Li, M.D. (Zhejiang Medical, 1986); Smita K. Nair, Ph.D. (Tennessee, 1993); Emmanuel C. Opara, Ph.D. (London, 1984); William R. Parker, Ph.D. (Nebraska, 1992); Janet E. Tuttle-Newhall, M.D. (Bowman Gray, 1988).


Assistant Research Professors: Zeinab A. Abdel-Wahab, Ph.D. (Eastern Virginia, 1985), Experimental Surgery; Timothy L. Darrow, Ph.D. (SUNY, 1980); Yiping Deng, Ph.D. (Virginia Polytechnic Inst., 1991); Andrew P. Futeal, Ph.D. (North Carolina, 1993); Sanford C. Garner, Ph.D. (North Carolina, 1989); Michael L. Greenberg, Ph.D. (SUNY, 1984), Experimental Surgery; Yiwen Li, M.D. (Zhejiang Medical, 1986); Smita K. Nair, Ph.D. (Tennessee, 1993); Emmanuel C. Opara, Ph.D. (London, 1984); William R. Parker, Ph.D. (Nebraska, 1992); Janet E. Tuttle-Newhall, M.D. (Bowman Gray, 1988).

Courses of Instruction 115


DIVISION OF THORACIC SURGERY

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


Associate Professors: Donald D. Glower, Jr., M.D. (Johns Hopkins, 1980); David H. Harpole, M.D. (Virginia, 1984).

Assistant Professors: Thomas A. D'Amico, M.D. (College of Physicians and Surgeons, 1987); Robert D. Davis, M.D. (California, 1984); James Jaggers, M.D. (Nebraska, 1988); Kevin P. Landolfo, M.D. (Manitoba, 1985); Carmelo Milano, M.D. (Chicago, 1990).


DIVISION OF ORAL SURGERY


DIVISION OF ORTHOPAEDIC SURGERY


Assistant Clinical Professors: George S. E. Aitken, M.D. (Case Western Reserve, 1982); Donald T. Kirkendall, Ph.D. (Ohio, 1979); Stephen N. Lang, M.D. (Illinois, 1965); Richard S. Moore, M.D. (North Carolina, 1993); Christopher Talley, M.D. (Virginia, 1991).


DIVISION OF OTOLARYNGOLOGY

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


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


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


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


DIVISION OF PEDIATRIC SURGERY

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

Assistant Professor: Henry E. Rice, M.D. (Yale, 1988).

DIVISION OF PLASTIC AND MAXILLOFACIAL SURGERY

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


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

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

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


Assistant Professor: Bruce M. Kiltzman, B.S.E. (Duke, 1974), Ph.D. (Virginia, 1979).

DIVISION OF UROLOGIC SURGERY

Professor David F. Paulson, M.D. (Duke, 1964), Chief.
Associate Professor: Cary N. Robertson, M.D. (Tulane, 1977).
Associate Research Professor: Pei Zhong, Ph.D. (Texas-Southwestern, 1992).
Associate Consulting Professor: John H. Grimes, M.D. (Northwestern, 1965).
Assistant Professors: Yehia Daaka, Ph.D. (Southern Florida, 1995); Craig F. Donnatucci, M.D. (Temple, 1979); David T. Price, M.D. (Louisiana State, 1989); John S. Wiener, M.D. (Tulane, 1988); Johannes Vieweg, M.D. (Munich Med. School, 1988).
Assistant Research Professors: John W. Day, Ph.D. (Iowa, 1972); Wendy Demark-Wahnefried, Ph.D. (Syracuse, 1988).
Clinical Associate: Steven H. Herman, Ph.D. (Duke, 1977).

DIVISION OF SPEECH PATHOLOGY AND AUDIOLOGY

Associate Clinical Professor Frank DeRuyter, Ph.D. (Washington, 1978), Chief.
Clinical Associates: Kevin Caves, B.S.M.E., A.T.P. (College of Engineering, Maryland, 1987); Gwendolyn O'Grady, Ph.D. (Kansas, 1999).

Required Course

SUR-205C. Surgery. The required course in surgery is given in the second year and consists of an eight week clinical clerkship. The primary goal is the presentation of those concepts and principles which characterize the discipline of surgery. The fundamental features which form the foundation of surgical practice are presented at seminars three times weekly. The subjects discussed include antisepsis, surgical bacteriology, wound healing, inflammation, fluid and electrolyte balance, shock, the metabolic response to trauma, biology of neoplastic disease, gastrointestinal physiology and its derangements, and blood coagulation, thrombosis, and embolism.

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

Electives

SUR 227C. Advanced Urologic Clerkship. The diagnosis, management, and surgical treatment of patients with urologic disorders are stressed. Students are afforded intimate association with the entire staff in the clinics, wards, and operating rooms, and participate in surgery. Cystoscopic and urographic diagnostic methods along with other techniques are taught. Credit: 4 or 8. Enrollment: max. 6. Paulson, Anderson, Wiener, Weinerth, Webster, Donnatucci, Walther, and Robertson

SUR-228C. Clerkship in Pediatric Urology. The course is designed to give an overview of urologic problems in the pediatric population. It includes patient contact and seminar material as well as ward and operating room experience in the diagnosis, treatment, and long-term follow-up of children with urologic disease. Credit: 4. Enrollment: min 1, max 2. Wiener
SUR-235C. Clinical Neurosurgery. The course is designed for those students with a career interest in one of the neurological sciences. Duties include the work up and care of inpatients, work up of clinic patients, assistance in the operating room, daily rounds, and night call. Weekly conferences are held in neurosurgery, neurology, neuropsychology, and neuroradiology. There are also special lectures. Prerequisites: student must have the approval of Dr. Wilkins to register for this course. Credit: 4 or 8. Enrollment: max 4. Wilkins, Cook, Friedman, Fuchs, Nashold, and Turner

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

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

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

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

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

SUR-246C. Clerkship in Plastic and Reconstructive Surgery. The student participates in evaluation and management of plastic surgery patients including preoperative assessment, surgical assistance, and postoperative follow-up in a private office and at Durham Regional Hospital. Daily seminars cover core topics such as skin and surgical techniques, wound healing, and scars. Prerequisite: permission of instructor. Credit: 4. Enrollment: max 1. Levin, Ruff, Georgiade, and Zenn

Courses of Instruction 119
SUR-247C. Plastic Surgery Research. Students are engaged in scholarly activities which are active, in-depth learning experiences related to microvascular, plastic, and/or reconstructive surgery. The students are expected to design, execute, and analyze data and to formulate hypotheses and draw conclusions from their projects. Credit: 1-8. Enrollment: max 4. Klitzman, Levin, and Brown

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

SUR-259C. General Principles of Orthopaedics. a full experience on the Orthopaedic Service with duties and responsibilities similar to a first year resident. Inpatient care, outpatient examination, and operating room experience are included. Conference attendance is required. Individual or group discussions are conducted each day with attending staff/residents. The purpose of the course is to present broad concepts of orthopaedics to students planning general practice, pediatrics, allied surgical specialties, or orthopaedics. Credit: 4 or 8. Enrollment: max 5 for 4 weeks. Urbaniak, Bassett, Harrelson, Hardaker, Unley, R. Goldner, Fitch, Lang, Richardson, Speer, Vail, Levin, Scully, Hey, Moore, Higgins, and Basamania

SUR-267C. Introductory Clinic Course in Children's Orthopaedics and Cerebral Palsy. This introductory clinic course is arranged for those interested in pediatric orthopaedic problems, neurological disease, and related fields. The course gives the student a working experience in the examination and evaluation of clinical out-patients, in-patients, and surgical patients. It demonstrates both the individual and multidisciplined group approach to the whole patient with complex orthopaedic and neurologic conditions as they affect growth, development, and rehabilitation. Credit: 2 or 4. Enrollment: max 2. Fitch and Lenox Baker Children’s Hospital staff

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

SUR-276C. Advanced Clerkship in Pediatric Surgery. This course is designed to familiarize the student with the whole range of surgical problems in children, but with emphasis on the pathophysiology of surgical and related problems in the newborn infant and the total care of the child with a malignancy. The student is encouraged to participate fully in the patient care aspects of the service and is considered an integral part of the patient care team. Although the course may be taken for the full eight weeks, it is felt that a four week experience is probably optimal for most students. It may be combined with other advanced surgical clerkships such as SUR-299C or with four weeks of neonatology (PED-225C) or other courses depending on the interests of the student. Credit: 4 or 8. Enrollment: max 2. Mahaffey

SUR-277C. Orthopaedic Research. Individual projects are assigned for completion during a limited period of time. A student works with an investigator in the orthopaedic laboratory either at Duke Medical Center or the Durham Veterans Affairs Hospital. Clinical investigation studies are also available at both institutions. Prerequisite: SUR-259C. Credit: 8. Enrollment: max 4. Urbaniak, orthopaedic senior staff, and house staff

SUR-280C. General Surgical Oncology. The course is designed for the student interested in surgical oncology. The students are involved in patient care with a specific surgeon but, in addition, are expected to attend multidisciplinary conferences related to gastrointestinal and breast carcinoma. These multidisciplinary conferences involve medical and radiation oncology as well as surgical oncology. The student is also expect-
ed to evaluate surgical patients in an outpatient setting as well as participating in inpa-
patient 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 con-
ferences involved in the molecular and cellular biology of human cancers is also expect-
ed. Permission of instructor is required. Credit: 4. Enrollment: min 1, max 2. Lyerly,
Iglehart, Leight, Segler, and Tyler

SUR-281C. Introduction to Fractures and Musculoskeletal Trauma. Students par-
ticipate in the emergency management of patients through the Duke or Durham Regional
Hospital Emergency Rooms. Principles of fractures and trauma are given during emergency
room assignment. Attendance at Fracture Conference is required on
Wednesdays and Saturdays at 7:30 a.m. in addition to two nights on call in the emergency
room. Seeing patients in the Out-Patient Clinic one day per week is required. Credit:
3. Enrollment: max 2. Urbaniak, Duke orthopaedics staff, and Durham Regional Hospital ortho-
apedics staff

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

SUR-299C. Advanced Surgical Clerkship. This course is structured to provide
the student with a comprehensive approach to surgical disorders. Each student works in the
clinics, on the wards, and in the operating rooms side by side with one senior surgeon to
be selected from the approved list below. Credit: 5 or 10. Pappas, Bollinger, Davis, D’Am-
ico, G. Georgiade, Glower, Grant, Harpole, Iglehart, Jones, Juggers, Landolfo, Leight, Lowe, Ly-
erly, McCann, Sebastian, Segler, Smith, Ungerleider, Vaslef, and Wolfe

SUR-301C. Emergency Department Surgical Care. Students desiring additional
experience working with care of emergency surgical patients are assigned to the Emer-
gency Department one night per week for each credit desired. They participate in the di-
agnosis and care of acute and traumatic surgical emergencies. Credit: 1-3. Enroll-
ment: max 8. Clem

SUR-302C. Family Practice/Traumatology. The student spends a portion of each
day in the ski clinic triaging acuteski injuries and seeing family practice type problems coincident
with a small community clinic. In addition, there is office practice in the phy-
sician’s offices contiguous with St. John’s Hospital, Jackson Hole, Wyoming under the
directorship of Dr. Richard Sugden and Dr. Kenneth Lambert. Both are board certified
in their specialties and hold university appointments. The unique opportunities of this travel
away experience are to see the excellence that can be accomplished in a setting of
this nature, to benefit from the mentorship of these outstanding individuals, and to add
to experience in both family practice and orthopaedic traumatology. Credit: 4. Enroll-
ment: min 1, max 1. Sugden and Lambert

SUR-303C. Trauma Service. This course is designed to provide students interested
in trauma care with further experience both in the Emergency Department and on the
Inpatient Trauma Service. The course emphasizes both triage and resuscitation for ma-
jor 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 experi-
ence 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 Emer-
gency Department, Inpatient Service, and Operating Room. Students work in conjunc-
tion with the attending staff and the residents on the Trauma Service. Credit: 4. Enroll-
ment: max 2. Vaslef, G. Georgiade, and Sebastian

SUR-304C. Nutrition in the Hospitalized Patient. This course is designed to ac-
quaint students with the techniques of nutritional assessment including somatic pro-
tein, visceral protein mass, body fat mass, immune competence, and metabolic balance studies. Students learn to determine basal energy expenditure and nitrogen requirements. The metabolic effects of acute and chronic starvation as well as stress and infection and the role played by these events in the hospital course of patients are studied. Emphasis is placed on techniques of nutritional support including routine and specialized hospital diets, routine and modular tube feeding diets, peripheral intravenous protein sparing and total parenteral nutrition. At the completion of the course, students have a thorough grasp of clinical nutrition and are able to apply specialized oral diets, tube feeding diets, and intravenous nutrition. If permitted by the instructor, this clinical science course can be audited. Credit: 1. Enrollment: min 3, max 8.

Special Interdisciplinary Study Programs

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

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

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

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

We encourage students to take Statistics as recommended by the MS3 Directors Committee. Additional courses in Advanced Diving Physiology and Medicine are available for interested students.

Students meet with the coordinating director to monitor progress in the laboratory. The course directors meet on a quarterly basis regarding course direction and the individual progress of students in the laboratories.


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, investigatory methodology used to examine human behavior and its neurobiological underpinnings, and the application of these findings to medicine. As an example, they are provided with the neuroanatomical, histochemical, neuroimmunological, neurophar-
macological, and neurobehavioral basis of prescribing anxiolytics, antidepressants, and other neurotropic drugs.

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

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

- PSC-360B Neuropharmacology
- PHR-372B Cellular Endocrinology
- NBI-270B Neurobiology
- PSC-213B Human Development I: Birth through Adolescence
- PSC-215B Comparative Personality Theory

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

**FACULTY:** James A. Blumenthal, Ph.D.; Sheila Collins, Ph.D.; Everett H. Ellinwood, Jr., M.D.; Jau-Shyong Hong, Ph.D.; K. Ranga Krishnan, M.B., Ch.B.; Andrew D. Krystal, M.D., M.S.; Cynthia M. Kuhn, Ph.D.; Edward D. Levin, Ph.D.; David J. Madden, Ph.D.; Roy J. Mathew, M.B.; Jed E. Rose, Ph.D.; Saul M. Schanberg, M.D., Ph.D.; Susan S. Schiffman, Ph.D.; Rochelle D. Schwartz-Bloom, Ph.D.; Andrew Sherwood, Ph.D.; Kamaraju S. Sundar, Ph.D.; Richard S. Suwit, Ph.D.; Marvin S. Swartz, M.D.; Richard D. Weiner, M.D., Ph.D.; Redford B. Williams, M.D.

**BIOMEDICAL ENGINEERING STUDY PROGRAM (BES)**

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

This interdepartmental study program is designed to provide third year students with an opportunity to perform basic science research in the broad area of biomedical engineering. The program is designed to provide research opportunities to students interested in the quantitative understanding of the physiology of organs and organ systems. The majority of the faculty have research laboratories which investigate these areas at the macroscopic level. The course of study usually emphasizes either the employment of whole animal models or in vitro simulation of disease states. The development and employment of new instrumentation may be a component of the research effort, but not its exclusive objective. Emphasis in the student experience is placed upon the teaching of the quantitative method of understanding biological systems. The student is expected to learn to formulate hypotheses regarding biologic systems, develop appropriate methods to test such hypotheses, and use statistical methods to resolve the information obtained. Each student selects a faculty preceptor in consultation with the program director(s) and an individual research plan is developed. Students who wish to enter this program are not required to have an engineering background.

BIOPHYSICS STUDY PROGRAM (BBP)

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

This interdepartmental program provides an opportunity for medical students in the elective year to participate in research areas of basic and clinical medicine where quantitative and engineering methods are employed. The range of subject material included in the program is broad, ranging from the development of instrumentation to theoretical studies on chemical and physical mechanisms in biomedical systems. Some example areas are the development and application of new imaging techniques and the application of computer simulation to the study of biochemical and physiological systems.

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

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


CANCER BIOLOGY STUDY PROGRAM (CBP)

PROGRAM DIRECTOR: Edward C. Halperin, M.D.

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

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


CARDIOVASCULAR STUDY PROGRAM (CVS)

PROGRAM DIRECTOR: Neil Freedman, M.D.

This interdepartmental study program is designed to provide third year medical students with an in-depth basic science research experience in one area of the broad discipline of cardiovascular science. The program is directed at those students potentially interested in a career in cardiovascular research. Faculty members in this study tract come from numerous departments including biochemistry, cell biology, immunology,
pathology, and pharmacology. Students who elect this study program undertake a re-
search project in a laboratory under the guidance of a faculty preceptor. In addition, stu-
dents 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 in-
dividually tailored by the faculty preceptor to the interests of the student.

FACULTY: Page A. W. Anderson, M.D.; G. Vann Bennett, M.D., Ph.D.; Marc G. Caron, Ph.D.; Neil
J. Freedman, M.D.; Augustus O. Grant, M.B., Ch.B.; Joseph C. Greenfield, Jr., M.D.; Barton F. Haynes,
M.D.; Bruce M. Kiltzmann, Ph.D.; Walter J. Koch, Ph.D.; Christopher D. Kontos, M.D.; William E. Kraus,
M.D.; Madan M. Kwatra, Ph.D.; Robert J. Lefkowitz, M.D.; Ann LeFurgey, Ph.D.; Anthony R. Means,
Ph.D.; Claude A. Plantadiso, M.D.; Keith A. Reimer, M.D., Ph.D.; Howard Rockman, M.D.; Debra A.
Schwinn, M.D.; Jonathan S. Stamler, M.D.; Doris A. Taylor, Ph.D.; Antonius M. J. VanDongen, Ph.D.;
Xiao-Fan Wang, Ph.D.; A. Richard Whorton, Ph.D.

CLINICAL RESEARCH STUDY PROGRAM (CRP)

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

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

During the fall term, students are required to take two courses: Fundamental
Concepts of Clinical Research (CRP-230) and Fundamental Concepts of Biostatistics
(CRP-240). Other courses may be taken with the approval of the student’s preceptors.

FACULTY: Robert M. Califf, M.D.; G. Ralph Corey, M.D.; Elizabeth R. DeLong, Ph.D.; Chris-
topher Granger, M.D.; Robert A. Harrington, M.D.; Victor Hasselblad, Ph.D.; James Jollis, M.D.; Kerry L.
Lee, Ph.D.; Daniel B. Mark, M.D.; David B. Matchar, M.D.; Lawrence H. Muhlbaier, Ph.D.; L. Kristin
Newby, M.D.; Eugene Z. Oddone, M.D.; E. Magnus Ohman, M.D.; Eric D. Peterson, M.D.; Gregory P.
Samsa, Ph.D.; Daniel J. Sexton, M.D.; Sandra S. Stinnett, Dr.P.H.; Barbara E. Tardiff, M.D.; Gail E.
Tudor, Ph.D.; William E. Wilkinson, Ph.D.

EPIDEMIOLOGY AND PUBLIC HEALTH STUDY PROGRAM (EPH)

PROGRAM DIRECTOR: Laurence G. Branch, Ph.D.

The Epidemiology and Public Health Study Program is designed to provide third
year Duke medical students with the knowledge regarding research tools to design clin-
cial trials and to analyze the resultant health services research data. Participants also
learn the essentials of research design, statistical analyses, health policy, and compara-
tive health systems so that they can be contributors to the improvement of the system of
health care, beginning with the improved health of the patient but extending to local,
state, and national issues. Each student selects a faculty preceptor in consultation with
the program director.

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

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

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

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


**HUMAN GENETICS STUDY PROGRAM (HGP)**

PROGRAM DIRECTORS: Marcy C. Speer, Ph.D. (Coordinating Director), Margaret Pericak-Vance, Ph.D., and Jeffrey M. Vance, M.D., Ph.D.

Our genetic makeup to a large extent dictates our health. The promise of the Human Genome Initiative is a greater understanding of the genetic components to health. Once the genetic contributions to common diseases like osteoarthritis, heart disease, and cancer are understood, the physician will have a powerful means at his or her disposal for identifying individual risk factors and offering lifestyle modifications. The study program in human genetics offers third year medical students an integrated program for understanding research in human genetics, its application to human genetic disease for risk assessment, genetic counseling, and potential therapeutics, and ethical and legal implications for this research on the patient, the family, and society. We anticipate that students in this program will follow one of several broad paths, utilizing either a molecular approach or a statistical approach to understanding and treating human genetic disease.

Research opportunities are available in laboratories studying such diverse topics as positional cloning of human disease genes, apoptosis, gene therapy, biochemical genetics, animal models of genetics and development, and genetic epidemiology. Students are expected to produce a written summary of their work at the end of the program, which may be a scientific manuscript.

In addition to the laboratory work, the program requirements include a 2 credit course Genetic Analysis for Human Disease offered in the fall semester and a year-long seminar series held weekly targeting current topics in human genetic research. Other elective courses may be taken with the permission of the program director and the student's preceptor.

**FACULTY:** Andrea Amliftano, D.O., Ph.D.; Rose-Mary Boustany, M.D.; Yuan-Tsong Chen, M.D., Ph.D.; John R. Gilbert, Ph.D.; John Klingensmith, Ph.D.; Virginia B. Kraus, M.D., Ph.D.; Douglas Marchuk, Ph.D.; Margaret Pericak-Vance, Ph.D.; Joellen Schildkraut, Ph.D.; Marcia C. Speer, Ph.D.; Bruce Sullenger, Ph.D.; Jeffrey M. Vance, M.D., Ph.D.; Fulton Wong, Ph.D.

**IMMUNOLOGY STUDY PROGRAM (ISP)**

PROGRAM DIRECTOR: Frances E. Ward, Ph.D.

This program is designed for students whose career goals lie in one of the many clinical specialties that interface broadly with immunology, allergy-immunology, infectious diseases, rheumatology, hematology, transplantation, and oncology. A basic but
thorough introduction to immunology is developed in IMM 291B, which also emphasizes critical discussion of original research papers. Each student chooses a faculty preceptor with whom to work on an original research project. It is encouraged that the student not merely be injected into the continuum of the preceptor’s research interests, but rather that an individual project be developed which can be completed during the study program. The primary goals of the program are to encourage and develop the student’s own creativity, to expose him or her to the research interests and philosophies of the entire Department of Immunology, and to help gain a useful personal perspective on current immunologic thought with an emphasis on clinical relevance. The student’s efforts and time are generally divided as follows:

Preceptorship. The major emphasis of the program during which the students function much as graduate students in the Department of Immunology. (30 hours or more per week).

Comprehensive Immunology (IMM 291B). An optional in-depth course in the basic concepts of immunology. Analysis of antigens and antibodies is followed by an emphasis on the organization and cellular and molecular aspects of the immune system, its regulation, and effector mechanisms. (3 hours per week, spring term).

Seminars for Research Progress. Throughout the year, fellows and students in the department present brief informal seminars on their ongoing research. The discussion that follows is of great help to the presenter and allows the student to observe and participate in critical analysis of research before it is at the publication or formal seminar stage. (1 hour per week).

Immunology Department Seminars. A series of formal seminars by department faculty and visiting scientists. (1-2 hours per week).

Additional Course Work. The student may elect to take any of several courses in immunology and related fields, but is generally discouraged from excessively diluting his laboratory experience.


INFECTIOUS DISEASES STUDY PROGRAM (IDP)

PROGRAM DIRECTOR: Kenneth Alexander, M.D., Ph.D.

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

Each student selects a faculty preceptor with whom to work on an original research project. The student is expected to develop her or his own project within the framework of the existing laboratory, but designs her or his own experiments, critically assesses the relevant literature, learns to evaluate data, and has the opportunity to solve the problems associated with the project. Appropriate guidance and assistance are provided by the faculty and others within the laboratory setting.
• Preceptorship. This is the major emphasis of the program with students functioning essentially as graduate students. 30 hours or more per week.

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

• Seminars. Students in the Infectious Diseases Study Program attend seminars in which faculty members, fellows, and students present their ongoing research. Such presentations enable the student to observe and participate in critical analysis of research before it reaches the publication stage.

• Additional Course Work. Although other basic science electives in microbiology and immunology may be taken upon approval by the program director, the student is discouraged from excessively diluting her or his laboratory experience.


NEUROBIOLOGY STUDY PROGRAM (NBP)

PROGRAM DIRECTORS: Dennis A. Turner, M.D. and Miquel Nicolelis, M.D., Ph.D.

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

• Research Experience. The basic component of the NBP Study Program is an in-depth research experience in a basic science laboratory under the supervision of one of the participating faculty. Involvement in the research process can be at several levels. Most students wish to work full-time in a laboratory pursuing an independent research project, including an analysis of experiments and communication of the results. Students in this category who wish to attend courses are usually advised to audit them. Other students may wish to combine a part-time research experience with extensive course work. The appropriate level for each student should be determined in consultation with the study program directors and the research mentor. All students are expected to prepare written statements of their goals for the year with a detailed plan for accomplishing these goals. This could take the form of stating the problem to be studied, the hypotheses, and an outline of the work to be done. A final report is required and may take the form of a research paper or literature review. Publication is not required, but many students have been successful in publishing a report with their preceptors.

• Seminar. Students enrolled in the program meet weekly with the program directors and mentors for an informal seminar. In the beginning of the fall term, seminars focus on the planned projects of each student. At the end of the spring semester, the seminar focuses on work accomplished as each student presents a report of her or his research. During the rest of the year, invited speakers are asked to address particular topics of interest to be decided upon by the group, and literature readings are discussed.

OPHTHALMOLOGY AND VISUAL SCIENCE STUDY PROGRAM (OVS)

PROGRAM DIRECTORS: David L. Epstein, M.D. and Fulton Wong, Ph.D.

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

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

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


PATHOLOGY STUDY PROGRAM (PSP)

PROGRAM DIRECTORS: William D. Bradford, M.D. (Coordinating Director), Keith A. Reimer, M.D., Ph.D., and Maureane R. Hoffman, M.D., Ph.D.

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

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

PSP Track I
Required Courses: Systemic pathology; didactic lectures (PTH 241B); student seminar
Elective Courses: None
Independent Study: Research with thesis/project report required
Advisor: Dr. Keith A. Reimer (684-3659)
Max number students: 4

PSP Track II
Required Courses: Systemic pathology; didactic lectures (PTH 241B); autopsy, surgical, or
Elective Courses: Limited
Independent Study: Thesis/ project report required
Advisor: Dr. Maureane R. Hoffman (684-6925)
Max number students: 4

PSP Track III
Required Courses: Systemic pathology; didactic lectures (PTH 241B); student seminars;
autopsy, surgical or cytopathology rotation (PTH 223B, PTH 348B, PTH 281B)
Elective Courses: A carefully planned selection of preceptorships, e.g., molecular pathol-
ogy, microbiology, surgical pathology, autopsy pathology, or transfu-
sion medicine selected with the advice of Dr. Bradford
Independent Study: Thesis/ project report required
Advisor: Dr. William Bradford (684-5112)
Max number students: 2

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

FA CULTY: Somal N. Abraham, Ph.D.; Rex C. Bentley, M.D.; Darell D. Bigner, M.D., Ph.D.; San-
dra H. Bigner, M.D.; Edward H. Bossen, M.D.; William D. Bradford, M.D.; Stephen J. Bredehoft,
M.D.; Dennis A. Clements, M.D., Ph.D.; Mark W. Dewhirst, D.V.M., Ph.D.; Marcia R. Gottfried,
M.D.; Charles S. Greenberg, M.D.; Laura P. Hale, M.D.; David H. Harpole, M.D.; Maureane R. Hoff-
man, M.D., Ph.D.; David Howel, M.D., Ph.D.; Randy L. Jirtle, Ph.D.; William H. Kane, M.D., Ph.D.;
Gordon Klintworth, M.D., Virginia B. Kraus, M.D., Ph.D.; Ph.D.; James E. Lowe, M.D.; Herbert K.
Lyerly, M.D.; Neil R. MacIntyre, M.D.; John F. Madden, M.D., Ph.D.; Sara E. Miller, Ph.D.; Salvatore V.
Pizzo, M.D., Ph.D.; Alan D. Proia, M.D., Ph.D.; L. Darryl Quares, M.D.; Keith A. Reimer, M.D., Ph.D.;
Frank Sedor, Ph.D.; Christopher Shea, M.D.; John D. Shelburne, M.D., Ph.D.; Charles Steenbergen,
M.D., Ph.D.; Timothy T. Stenzel, M.D., Ph.D.; John G. Toffaletti, Ph.D.; Robin T. Vollmer, M.D.; Philip J.
Walther, M.D., Ph.D.; J. Brice Weinberg, M.D.; Peter Zwadyk, Jr., Ph.D.

PHARMACOLOGY AND MOLECULAR THERAPEUTICS (PMT)
PROGRAM DIRECTORS: Robert Abraham, Ph.D., Patrick J. Casey, Ph.D., Anthony R. Means,
Ph.D.
The PMT program is based on utilization of the basic concepts of biology and chem-
istry 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 ef-
ects of drugs, as well as the development of new therapeutic agents. Participating fac-
culty 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 com-
plicated regulatory mechanisms that govern mammalian cell growth and differentiation,
how these mechanisms are perturbed in human diseases (such as cancer) and how our
knowledge of these regulatory mechanisms might lead to improved therapies. Current
research interests of the faculty include:
1. the mechanism of action of neuropeptides and neurotransmitters;
2. ontogeny of signaling pathways in nervous, cardiovascular and immune
tissue;
3. cellular signaling mechanisms, including the actions of calcium and cyclic
nucleotides on protein phosphorylation/ dephosphorylation;
4. receptor function and cell signaling mechanisms regulating cell growth,
proliferation and death;
5. the molecular basis of rational drug design.

The major emphasis of the PMT program is on student-generated independent study/research projects conducted in close association with a faculty preceptor. A course in Pharmacotherapy of Common Problems in Internal Medicine (MED 255/PHR 255) has been developed to enrich the research experience and is required for all students. In addition, a weekly seminar series, the Signal Transduction Colloquium, exposes participating students to a variety of topics presented by experts in the various relevant fields of research.

## Roster of Students

### Class of 2000

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<tr>
<th>Name</th>
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<td>Adlakha, Charu L.</td>
<td>Massachusetts Institute of Technology, Columbia</td>
<td>Maryland</td>
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<td>Agarwal, Swati</td>
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<td>Hollidaysburg, Pennsylvania</td>
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<td>Allen, Rodney K.</td>
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<td>Tallahassee, Florida</td>
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<td>Allen, Brandy M.</td>
<td>Kansas</td>
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<td>Asplin, Iain R.</td>
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<td>Charlottesville, Virginia</td>
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<td>Jonesboro, Georgia</td>
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<td>Baum, Monica J.</td>
<td>California at Los Angeles</td>
<td>Chapel Hill, North Carolina</td>
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<td>Bindal, Vishal</td>
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<td>McLean, Virginia</td>
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<td>Durham, North Carolina</td>
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<td>Greenfield, Massachusetts</td>
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<td>Fayetteville, North Carolina</td>
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<td>North Carolina at Chapel Hill</td>
<td>Hickory, North Carolina</td>
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<td>Thomasville, North Carolina</td>
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<td>Cole, Vanessa R.</td>
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<td>Albuquerque, New Mexico</td>
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<td>Corcoran, Ethan E.</td>
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<td>Pennington, New Jersey</td>
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<td>Davidson, Jesse A.</td>
<td>Yale</td>
<td>Washington, District of Columbia</td>
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<td>Davila, Marco L.</td>
<td>Texas Christian</td>
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<td>Asheville, North Carolina</td>
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<td>Aynor, South Carolina</td>
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<td>Forna, Fatu M.</td>
<td>Florida A &amp; M.</td>
<td>Tallahassee, Florida</td>
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<td>Franklin, Kendra M.</td>
<td>Ohio State</td>
<td>Gahanna, Ohio</td>
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<td>Gallop, Vernetta D.</td>
<td>Yale</td>
<td>Bronx, New York</td>
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<td>Dartmouth</td>
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<td>Hata, Angie-Marie</td>
<td>Wheaton</td>
<td>Elyria, Ohio</td>
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<td>North Carolina at Charlotte</td>
<td>Chapel Hill, North Carolina</td>
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<td>Ho, Janie A.</td>
<td>Harvard</td>
<td>Chapel Hill, North Carolina</td>
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<td>Duke</td>
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<td>Huang, Erich S.</td>
<td>Harvard</td>
<td>Durham, North Carolina</td>
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<td>Huang, Xuewei</td>
<td>Massachusetts Institute of Technology, Brookline</td>
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<td>Hueman, Matthew T.</td>
<td>United States Military Academy</td>
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<td>Jacobs, Michael K.</td>
<td>Vanderbilt</td>
<td>Stone Mountain, Georgia</td>
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<td>James-Rodriguez, Felice A.</td>
<td>Duke</td>
<td>Marion, South Carolina</td>
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<td>Duke</td>
<td>Whitehouse Station, New Jersey</td>
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<td>Fayetteville, North Carolina</td>
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<td>Buras, Louisiana</td>
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<td>Woodbury, New York</td>
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<td>Greensboro, North Carolina</td>
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<td>Duke</td>
<td>Cincinnati, Ohio</td>
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<td>Kendelhardt, Jason D.</td>
<td>Wake Forest</td>
<td>Matthews, North Carolina</td>
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<td>Stanford</td>
<td>Saratoga, California</td>
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<td>Kim, Eun Y.</td>
<td>Harvard</td>
<td>Bayside, New York</td>
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<td>Stanford</td>
<td>Fresno, California</td>
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<td>Dartmouth</td>
<td>Durham, North Carolina</td>
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<td>Lager, Patrick J.</td>
<td>Whitman</td>
<td>Shelby, Montana</td>
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<td>Lawson, William T.</td>
<td>Duke</td>
<td>Lakeland, Florida</td>
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<td>Le, Thuy (California</td>
<td>California at Los Angeles</td>
<td>Bakersfield, California</td>
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<td>Lindauer, Kelly R.</td>
<td>Colorado-Boulder</td>
<td>Denver, Colorado</td>
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<td>Mallette, Quinretol J.</td>
<td>Duke</td>
<td>Hartford, Connecticut</td>
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<td>Marcus, Stacy J.</td>
<td>Duke</td>
<td>Silver Spring, Maryland</td>
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<td>Martin, Jania C.</td>
<td>Duke</td>
<td>Berkeley, California</td>
</tr>
</tbody>
</table>

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1. Hometown does not denote legal residence.
Maurer, Carter J. (Duke), Ashland, Oregon
McCall, Shannon J. (North Carolina State), High Point, North Carolina
McDaniel, Benjamin B. (Duke), Grand Junction, Colorado
McIntire, Katherine N. (California at Los Angeles), Solana Beach, California
McMahon, Connette P. (Duke), Granite Quarry, North Carolina
McMurry, Michelle T. (Harvard), Oakland, California
McNamara, Bridget T. (North Carolina State), Burlington, North Carolina
McIntire, Katherine N. (California at Los Angeles), Solana Beach, California
Mitchell, Duane A. (Rutgers), Somerset, New Jersey
Moore, Frederick D. (United States Naval Academy), Durham, North Carolina
Mostaghel, Elahe A. (Harvard), Toledo, Ohio
Odom, Audrey R. (Duke), High Point, North Carolina
Olson, Michael R. (Harvey Mudd), East Greenwich, Rhode Island
Ormsbee, Susan M. (Yale), New Bern, North Carolina
Palestrant, Daniel (Johns Hopkins), Phoenix, Arizona
Patel, Prerana N. (William Marsh Rice), Hickory, North Carolina
Payne, Joseph R. (Georgia Institute of Technology), Greensville, North Carolina
Peake, Paula L. (Cincinnati), Fort Thomas, Kentucky
Peterson, Erica L. (Nebraska at Lincoln), Lincoln, Nebraska
Pond, Kyle K. (Duke), Cape Elizabeth, Maine
Posther, Katherine E. (Harvard), Fort Wayne, Indiana
Pradhan, Aditte A. (Duke), Des Moines, Iowa
Quan, Hai N. (Indiana at Bloomington), Indianapolis, Indiana
Quayle, John F., IV (Princeton), Charlottesville, Virginia
Rad, Ariel N. (Princeton), Holmdel, New Jersey
Radkowski, Christopher A. (Johns Hopkins), Greensburg, Pennsylvania
Ravin, Adam G. (Vanderbilt), Durham, North Carolina
Ravichandran, Maurice A. (Rensselaer Poly Institute), New York, New York
Reed, Rabb K. (Wake Forest), Durham, North Carolina
Rosen, Daniel T. (North Carolina at Chapel Hill), Nashville, North Carolina
Ruan, Daniel T. (Middleburg, Trumbull, Connecticut
Saldanha, Charles E. (Emory), Rochester, New York
Scholnick, Joshua D. (Yale), Williamsburg, Virginia
Shih, George L. (Duke), Lexington, Kentucky
Smith, Brian A. (Vanderbilt), St. Albans, West Virginia
Smith, Eric G. (Johns Hopkins), Durham, North Carolina
Snyder, Laurie D. (De Pauw), Westerville, Ohio
Soni, Sejal R. (Yale), Marietta, Georgia
Stohl, Bradley A. (Swarthmore), Sacramento, California
Sullivan, Michael D. (Harvard), River Ridge, Louisiana
Tai, Oliver S. (Harvard), Germantown, Tennessee
Tweedt, Damon S. (Maryland Baltimore County), Lanham, Maryland
Wang, Stephen L. (Kentucky), Lexington, Kentucky
Wehns, Melissa F. (Duke), Durham, North Carolina
White, Brent C. (Emory), Columbus, Georgia
Wilfert, Rachel A. (Amherst), Chapel Hill, North Carolina
Winkle, Brooke E. (Harvard), Palo Alto, California
Wong, Jimmy C. (Columbia University), Monterey Park, California
Wong, Stephen (California Institute of Technology), Los Angeles, California
Wu, Joy Yee-Jia (Stanford), Voorhees, New Jersey
Wu, Zhengqin (Franklin and Marshall), Durham, North Carolina
Wurtz, Kathleen E. (North Carolina at Chapel Hill), Bethlehem, Pennsylvania
Yacoubian, Talene A. (Harvard), Chattanooga, Tennessee
Yoo, David R. (Duke), Spring, Texas
Yowell, Charles W. (Duke), Durham, North Carolina
Yuan, Shan (Oberlin), Millpitas, California
Zamah, Alberuni M. (William Marsh Rice), Kansas City, Missouri
Zaref, Jeffrey D. (Harvard), Haworth, New Jersey
Zhang, Ming M. (California-Berkeley), Durham, North Carolina
Zomorodi, Ali R. (Duke), Winter Haven, Florida

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Altman, Jennifer J. (Tulane), Somerville, New Jersey

Roster of Students 133
Quinn, Michele T. (North Carolina at Chapel Hill), Charlotte, North Carolina
Qureshi, Jawad A. (Duke), Denton, Texas
Raetz, Jaqueline G. (Yale), Rougemont, North Carolina
Richardson, William E. (Cornell), Orange, Connecticut
Richmond, Marc E. (Pennsylvania), Franklin Square, New York
Rouf, Rosanne (Massachusetts Institute of Technology), Glen Carbon, Illinois
Sachdev, Molly (Duke), East Amherst, New York
Sarvis, Sarah S. (Massachusetts Institute of Technology), Rockville, Maryland
Schoenicker, Jonathan G. (Middlebury), St. Louis, Missouri
Schofield, Kelly A. (Utah), Logan, Utah
Self, Annie L. (Davidson), Greenwood, South Carolina
Shah, Amrit N. (Middlebury), North Carolina
Shah, Bimal R. (North Carolina at Chapel Hill), Winston-Salem, North Carolina
Sheppard-Sawyer, Christine (Harvard), Falmouth, Maine
Shin, Eun J. (Harvard), Baltimore, Maryland
Sinnar, Shamim A. (Maryland at College Park), Columbia, Maryland
Stevens, Keisha C. (Duke), Goldsboro, North Carolina
Sudarshan, Sharon (Hartford), Wichita Falls, Texas
Tebbit, Christopher L. (North Carolina at Chapel Hill), Greensboro, North Carolina
Tillen, Elizabeth J. (Michigan-Ann Arbor), Jackson Heights, New York
Walton, Kelly A. (North Carolina at Chapel Hill), Charlotte, North Carolina
War, Mark A. (North Carolina State), Raleigh, North Carolina
Way, Michael S. (Bucknell), Durham, North Carolina
Weiss, Stefan C. (Yale), Hollywood, Florida
Weng, Hailing (Duke), Taipei, Taiwan ROC
Winklefield, Karen M. (SUNY at Binghamton), Binghamton, New York
Woel, Roxanne T. (Yale), Baltimore, Maryland
Wu, Chen-Sen (Stanford), Federal Way, Washington
You, Sang P. (Stanford), Potomac, Maryland
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Zhang, Qingfei J. (Davidson), Asheville, North Carolina
Zlogar, Daniel F. (Duke), Arlington Heights, Illinois

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Atchison, Fawn W. (Minnesota), Duluth, Minnesota
Atchison, Fawn W. (Minnesota), Duluth, Minnesota
Athar, Nishath (North Carolina at Chapel Hill), Mount Airy, North Carolina
Barnett, Andy S. (Harvard), North Brunswick, New Jersey
Bass, Adam J. (Amherst), Bethesda, Maryland
Berg, Sigrid E. (Harvard), Arlington, Virginia
Biggers, Lindsay F. (Duke), Central, South Carolina
Bordeaux, Jeremy S. (North Carolina State), Castle Hayne, North Carolina
Bowman, Michael K. (Dartmouth), Atlanta, Georgia
Brown, Kimberly E. (Howard), Temple Hills, Maryland
Buschmann, Robert (North Carolina at Chapel Hill), Gold River, California
Cabrala, Yessica E. (Massachusetts Institute of Technology), North Miami, Florida
Cancud, Quinton V. (Washington), Florissant, Missouri
Casal, Suzette E. (Duke), Coral Gables, Florida
Changizi, Barbara K. (Virginia), Newtown, Pennsylvania
Chen, Carol C. (North Carolina at Chapel Hill), Raleigh, North Carolina
Chen, Jarvis C. (Washington), Linocn, Nebraska
Chen, June (Harvard), Pine Brook, New Jersey
Choy, Catherine (Yale), San Francisco, California
Daniels, Shannon L. (Duke), Durham, North Carolina
Dave, Jennifer T. (Duke), Marietta, Georgia
Edgell, Benji Z. (North Carolina at Chapel Hill), Brooklyn, New York
Elidef, Bassem M. (Emory), Roswell, Georgia
Ellis, Matthew J. (Davidson), Albuquerque, New Mexico
Feldman, Zachary W. (Virginia), Dunwoody, Georgia
Ficklin, Mary B. (Stanford), San Mateo, California
Fields, Ryan C. (Michigan), Bloomfield Hills, Michigan
Finn, Alexander J. (Brown), San Francisco, California
Freidinger, Brad A. (North Carolina at Chapel Hill), Winston-Salem, North Carolina
Gaillard, Stephanie (Virginia), Chicago, Illinois
Givens, Raymond C. (Georgia), Stone Mountain, Georgia
Grossi, Peter M. (Amherst), McLean, Virginia
Hall, Allison H. (Stanford), Denver, Colorado
Hawkins, Yolanda C. (Florida A&M), Des Moines, Iowa
Higgins, Steven P. (Duke), Centreville, Virginia
Hirsch, Dana L. (Duke), Mount Kisco, New York
Howard, Brandon A. (Swarthmore), Lovettsville, Virginia
Hsu, Michael C. (Harvard), Burr Ridge, Illinois
Hwang, Eugene I. (William Marsh Rice), College Station, Texas
Jenkins, Jarrod D. (Morehouse), Madison, Tennessee
Jones, Kermit L. (Clark Atlanta), Marietta, Georgia
Kelly, Bridget B. (Williams), Scranton, Pennsylvania
Khurana, Rahul (Stanford), Monte Sereno, California
Kim, Soo H. (Duke), St. Louis, Missouri
Knab, Brian R. (Virginia), Great Falls, Virginia
Kuniholm, Erin F. (Brown), Durham, North Carolina
Lee, Edward (North Carolina at Chapel Hill), Burlington, North Carolina
Lee, Shelly T. (Harvard), Yucaipa, California
Lighvani, Arash (Massachusetts Institute of Technology), Rockville, Maryland
Lima, Brian (Cornell), Kearny, New Jersey
Linden, Diane C. (Middlebury), Los Angeles, California
Lo, Wayne R. (Yale), Tucker, Georgia
Lynn, Stephanie D. (Princeton), Boston, Massachusetts
Maercks, Rian A. (Florida), Miami, Florida
Mavropoulos, John C. (Chicago), Atlantic City, New Jersey
McCoy, Allison N. (Duke), Durham, North Carolina
McGirt, Matthew J. (Duke), Charlotte, North Carolina
Miksad, Rachel E. (Duke), Charlottesville, Virginia
Molin, Arlene C. (Northwestern), Chicago, Illinois
Morgan, Katherine S. (Yale), Maysville, North Carolina
Morgan, Marcello A. (Harvard), Upper Nyack, New York
Mummery, Heather J. (Rochester), Alden, New York
Nimjee, Shahid M. (Yale), Brampton, Ontario, Canada
Norris, Regina D. (Duke), Gaffney, South Carolina
O’Halloran, Elizabeth K. (Chicago), Spokane, Washington
Odunze, Millicent J. (Harvard), Orem, Utah
Parker, Rodney D. (Harvard), Durham, North Carolina
Pasquale, Sara K. (Michigan), Ann Arbor, Michigan
Pickering, Trevor R. (California at Berkeley), Durham, North Carolina
Rohatgi, Anand D. (Duke), Durham, North Carolina
Rovak, Jason M. (Michigan), Ann Arbor, Michigan
Sabo, Gregory J. (Notre Dame), Colorado Springs, Colorado
Sanchez, Carlos D. (Dartmouth), Highland Park, New Jersey
Sandifer, Aaron J. (Yale), Gaithersburg, Maryland
Schweigler, Lisa M. (Harvard), Bethesda, Maryland
Scott, Lisa M. (William & Mary), Richmond, Virginia
Serlin, Scott B. (Texas A&M), Bowie, Maryland
Sharp, Stephanie K. (Hampton), Columbia, Maryland
Sheetz, Jonathan P. (North Carolina at Chapel Hill), Durham, North Carolina
Simpson, Amanda E. (Cornell), Latham, New York
Singh, Rakesh K. (Cornell), Coram, New York
Smith, Monica L. (North Carolina at Chapel Hill), Durham, North Carolina
Sufka, Susan A. (St. Mary’s), St. Cloud, Minnesota
Swies, Ranya N. (Wheaton), Carol Stream, Illinois
To, Binh K. (California at San Diego), Alhambra, California
Trinh, Jane V. (Rice), Lake Charles, Louisiana
Van de Ven, Thomas J. (Canisius), Grand Island, New York
Walton, Geoffrey B. (North Carolina State), Raleigh, North Carolina
Wang, Alice M. (Duke), Chester Spring, Pennsylvania
Wang, Emily A. (Harvard), Houston, Texas
Wang, George T. (Rice), Sugar Land, Texas
Wang, Gin R. (Oklahoma), Apex, North Carolina
Wellman, Samuel S. (North Carolina at Chapel Hill), Raleigh, North Carolina
West, Jesse L., IV (North Carolina at Chapel Hill), Asheville, North Carolina
Wickham, Michael Q. (Duke), Raleigh, North Carolina
Wirik, Shaheen A. (Duke), Beaver Creek, Ohio
Woo, Joan S. (California at Berkeley), Glendale, California
Wood, William A., Jr. (Harvard), Newport Beach, California
Ye, Qing B. (Fudan, China), Chicago, Illinois
Yesus, Ambushie (Yale), Columbia, Missouri

Class of 2003

Alexander, Thomas (Arizona), San Diego, California
Alpert, Eryn (Brown), Charlotte, North Carolina
Anthony, Kara (Duke), Dayton, New Jersey
Asomugha, Chiwaraokwu (Stanford), Lawndale, California
Bernstein, Michael (Duke), Durham, North Carolina
Boiman, Erica (Yale), Lake Bluff, Illinois
Bourque, Jamie (Virginia), Bethesda, Maryland
Bush, Errol (Emory), Decatur, Georgia
Carter, Khalil (Florida), San Jose, California
Chang, Wendy (Princeton), Potomac, Maryland
Cho, Patricia (Harvard), Cincinnati, Ohio
Chung, Edward (Massachusetts Institute of Technology), Los Angeles, California
Chi, Sulene (Princeton), Potomac, Maryland
Chien, James (Creighton), Omaha, Nebraska
Chien, Lynn (Duke), Chapel Hill, North Carolina
Crotty, Laura (Duke), Durham, North Carolina
Edwards, David (New Mexico), Albuquerque, New Mexico
Edwards, Marianne (Stanford), Baltimore, Maryland
Ekuro, Wesley (California at Berkeley), Fremont, California
Feldman, Zachary W. (Virginia), Dunwoody, Georgia
Gardner, Kim (Florida State), Gainesville, Florida
Gilbert, Brett (Illinois at Urbana), Buffalo Grove, Illinois
Gillespie, Heather (Brown), Rochester, New York
Gupta, Sumit (Pennsylvania), Durham, North Carolina
Hatfield, Ann (Notre Dame), Cedar Rapids, Iowa
Hervey, Sheleka (Stanford), Duncanville, Texas
Hofer, Karen (Virginia), Annandale, Virginia
Hu, Patrick (California at Berkeley), Durham, North Carolina
Ibom, Valerie (Ohio), Columbus, Ohio
Jan, Farhana (Massachusetts Institute of Technology), Exton, Pennsylvania
Jones, Kermit L. (Clark Atlanta), Marietta, Georgia
Kao, James (Duke), Loveland, Ohio
Kawamoto, Kansaku (Harvard), Durham, North Carolina
Kelly, Patrick (Notre Dame), Stonington, Connecticut
Khalatbari, Dana (Vanderbilt), Kingwood, Texas
Khan, Farah (New Jersey), Holmdel, New Jersey
Kim, Hyung (Harvard), Somerville, New Jersey
Kim, Luke (Johns Hopkins), Columbia, Maryland
Kotloski, Robert (Wisconsin-Madison), Berlin, Wisconsin
Lai, Kenny (Harvard), Cranbury, New Jersey
Lhamon, Margie (Richmond), Lima, Ohio
Louie, Gregory (Stanford), W. Vancouver BC, Canada
McDade, Henry (North Carolina State), Hillsborough, North Carolina
McDaid, Adrienne (Maryland at Baltimore County), Bowie, Maryland
McIntosh, Belinda (Harvard), Miami, Florida
McCoy, Theresa (North Carolina Central), Durham, North Carolina
McLean, Kira (Stanford), Silver Spring, Maryland
Meade, William (Duke), Martinsville, Virginia
Melgiri, Ryan (Rice), Sugar Land, Texas
Merchant, Faisal (Emory), Lawrenceville, Georgia
Meyer, Laura (Harvard), Washington, District of Columbia
Miller, Aaron (Duke), Norfolk, Virginia
Mobley, Victoria (Duke), Fairfax, Virginia
Moeller, Benjamin (Massachusetts Institute of Technology), Omaha, Nebraska
Moore, Karen (Middlebury), Durham, North Carolina
Murphy, Michael (Notre Dame), Schenectady, New York
Nicholas, Jennifer (Miami), Durham, North Carolina
Nielsen, Nathan (Stanford), Titusville, New Jersey
Obembe, Olufolajimi (California at Los Angeles), Los Angeles, California
Onyewu, Chiatogu (Maryland at Baltimore County), Olney, Maryland
Palker, Todd (Virginia), Kings Park, New York
Patel, Yogin (Duke), Salisbury, North Carolina
Pernell, Chris (Princeton), East Orange, New Jersey
Phelps, B. Ryan (Texas at Austin), Denison, Texas
Phillips, Katie (Michigan-Ann Arbor), Midland, Michigan
Powell, Tiffany (Michigan-Ann Arbor), West Bloomfield, Michigan
Prempeh, Maxwell (Duke), Maplewood, New Jersey
Purves, Harriett (Macalester), Chapel Hill, North Carolina
Raja, Ali (Rice), Katy, Texas
Rauscher, Frederic (Indiana at Bloomington), Griffith, Indiana
Reynolds, Christopher (Duke), Durham, North Carolina
Rine, Bobbie (Rochester), Fayetteville, North Carolina
Rineer, Craig (Pennsylvania), Mount Joy, Pennsylvania
Ro, Richard (Oklahoma-Norman), Stillwater, Oklahoma
Robinson, Barnett (Morehouse), Dayton, Ohio
Ruiz-de-Luzuriaga, Brian (Ohio), West Chester, Ohio
Saharia, Kapil (Johns Hopkins), Rockville Centre, New York
Sair, Haris (Duke), Cary, North Carolina
Silver, Rebecca (Wellesley), Durham, North Carolina
Stewart, Laura (Vanderbilt), Knoxville, Tennessee
Taylor, Jesse (Duke), North Granby, Connecticut
Young, Laura (Duke), Durham, North Carolina
### Key
- **Student**, **Name**, **Hometown**, **Internship Institution and Discipline (if applicable)**, **City and State**, **Residency Institution and Discipline, City and State**, **Ultimate Career Choice**

<table>
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<th>Name</th>
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<tr>
<td>Allen, Leigh M.</td>
<td>Lexington, Kentucky</td>
<td>Vanderbilt University - University of California, San Francisco, California</td>
<td>Internal Medicine</td>
<td>Duke University Medical Center, Durham, North Carolina</td>
<td>Internal Medicine</td>
<td>Doctor of Medicine Program</td>
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<tr>
<td>Bethel, Mary Angelyn</td>
<td>Marietta, Georgia</td>
<td>Duke University - Duke University Medical Center</td>
<td>Durham, North Carolina, Internal Medicine</td>
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<td>Binder, Devin K.</td>
<td>Berkeley, California</td>
<td>Harvard University - University of California, San Francisco, California</td>
<td>Surgery, University of California, San Francisco, California</td>
<td>Neurosurgery</td>
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<td>Blazer, III, Dan G.</td>
<td>Cary, North Carolina</td>
<td>Duke University - University of Michigan Hospitals, Ann Arbor, Michigan</td>
<td>Surgery</td>
<td>Duke University Medical Center, Durham, North Carolina</td>
<td>Surgery</td>
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<td>Bleich, Karen Beth</td>
<td>New York, New York</td>
<td>Wesleyan University - Mount Sinai School of Medicine</td>
<td>Office of Medicine</td>
<td>University of Michigan Hospitals, Ann Arbor, Michigan</td>
<td>Surgery</td>
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<td>Bethel, Mary Angelyn</td>
<td>Marietta, Georgia</td>
<td>Duke University - Duke University Medical Center</td>
<td>Durham, North Carolina, Internal Medicine</td>
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<td>Binder, Devin K.</td>
<td>Berkeley, California</td>
<td>Harvard University - University of California, San Francisco, California</td>
<td>Surgery, University of California, San Francisco, California</td>
<td>Neurosurgery</td>
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<td>Cary, North Carolina</td>
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<td>Duke University Medical Center, Durham, North Carolina</td>
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Ophthalmology
Garg, Rahul (Miami, Florida) Massachusetts Institute of Technology - Johns Hopkins University School of Medicine, Baltimore, Maryland - Internal Medicine
Gartner, Anne Elizabeth (Edina, Minnesota) Stanford University - Stanford University, Stanford, California - Psychiatry

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Class of 2000 with Postgraduate Year One Appointment  143