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University of Minnesota Mission Statement

The University of Minnesota, founded in the belief that all people are enriched by understanding, is dedicated to the advancement of learning and the search for truth; to the sharing of this knowledge through education for a diverse community; and to the application of this knowledge to benefit the people of the state, the nation, and the world.

The University's mission, carried out on multiple campuses and throughout the state, is threefold:

- Research and Discovery—Generate and preserve knowledge, understanding, and creativity by conducting high-quality research, scholarship, and artistic activity that benefit students, scholars, and communities across the state, the nation, and the world.
- Teaching and Learning—Share that knowledge, understanding, and creativity by providing a broad range of educational programs in a strong and diverse community of learners and teachers, and prepare graduate, professional, and undergraduate students, as well as non-degree-seeking students interested in continuing education and lifelong learning, for active roles in a multiracial and multicultural world.
- Outreach and Public Service—Extend, apply, and exchange knowledge between the University and society by applying scholarly expertise to community problems, by helping organizations and individuals respond to their changing environments, and by making the knowledge and resources created and preserved at the University accessible to the citizens of the state, the nation, and the world.

In all of its activities, the University strives to sustain an open exchange of ideas in an environment that embodies the values of academic freedom, responsibility, integrity, and cooperation; that provides an atmosphere of mutual respect, free from racism, sexism, and other forms of prejudice and intolerance; that assists individuals, institutions, and communities in responding to a continuously changing world; that is conscious of and responsive to the needs of the many communities it is committed to serving; that creates and supports partnerships within the University, with other educational systems and institutions, and with communities to achieve common goals; and that inspires, sets high expectations for, and empowers the individuals within its community.

Medical School Mission

The mission of the Medical School is to be a leader in enhancing the health of people through the education of skilled, compassionate, and socially responsible physicians. With two campuses serving diverse populations in rural and urban Minnesota, the Medical School is dedicated to preeminence in primary care medicine, exemplary specialty care, and innovative research.

Medical School Goals

- Provide undergraduate, graduate, postgraduate, professional, and educational programs of the highest quality and relevance in order to attract outstanding faculty and develop the highest-quality students.
- Conduct well-funded and excellent biomedical research that will improve the health of people, heighten the school's attractiveness to faculty and students, strengthen its national academic recognition, and enhance its value to the state.
- Strengthen the school's faculty and the financial resource base.
- Develop strong interdisciplinary programs that link areas of strength and enhance the school's competitiveness in research and clinical practice.
- Promote public awareness of the school's mission.

History

The University of Minnesota included medicine among its five original disciplines at its founding in 1851. In 1888, the University Board of Regents established the College of Medicine and Surgery, later called the Medical School.

Today, the University has four campuses: Twin Cities, Duluth, Morris, and Crookston. In addition, the University has a collaborative center in Rochester. The University's main campus is located in the Twin Cities of Minneapolis and St. Paul, a metropolitan area of more than 2.6 million people. The University is both a land grant and a major research institution. In 2001 and 2002, an annual study conducted by the University of
Florida named the University of Minnesota among the top three public research universities.

In the late 1960s, the decision to begin a two-year medical school on the Duluth campus of the University of Minnesota was made by the Minnesota legislature to increase the number of physicians who would serve Greater Minnesota. In 1998, it was determined that the School of Medicine Duluth would no longer be separately accredited; the unique character and mission of the campus is now maintained administratively within the larger Medical School.

The Medical School's primary clinical partner is Fairview Health Services. Fairview–University Medical Center is its primary teaching hospital. The school's other major educational affiliates are the Veterans Administration Medical Center, Regions Hospital, Hennepin County Medical Center, and Children's Hospitals and Clinics in both Minneapolis and St. Paul. The Duluth campus has established agreements with St. Mary's Hospital–Duluth Clinic and St. Luke's Hospital of Duluth.

The University of Minnesota is one of the most comprehensive public higher education institutions in the country, encompassing a range of disciplines, including six health disciplines in the Academic Health Center. Access to faculty throughout the University provides the Medical School with a significant range of expertise, interdisciplinary research, and collaboration. In educating the physicians of the future, the University's Medical School builds upon its strong heritage and continues to fulfill its reputation for breakthroughs in medicine. The school educates the primary care physicians who serve the citizens of the state. Also the school is a primary research institution, discovering and delivering new treatments and cures while educating specialists and sub-specialists to serve the nation. Through the work of dedicated faculty at both campuses, the school is dedicated to educating physicians with the clinical skills and professional attitudes necessary and appropriate for the 21st century.

Research

The Medical School has a commitment to and a tradition of excellence in biomedical research. The school's major firsts in research applications include open-heart surgery in the 1950s and 1960s, solid organ transplantation in the 1970s and 1980s, and innovations in bone marrow transplantation in the 1990s. More recent breakthroughs include stem cell research, defining the molecular genetics of the spinocerebellar ataxias, advanced fMRI studies of cognition and motor control, and development of animal models for Alzheimer's disease.

The Medical School's investigators substantially contribute to the vital medical device community in Minnesota. The school's biomedical researchers garner more than $100 million in competitive research awards each year. These efforts represent both investigation into basic science topics such as genomics and structural analysis as well as the translation of these basic science observations, by a process of progressively more clinically oriented investigation, into therapeutic applications. The majority of the full-time faculty are engaged in research, including more than 2,500 clinical research protocols actively conducted by full-time and affiliated faculty members. These clinical studies are facilitated by the staff of the General Clinical Research Center (which has been supported by the National Institute of Health for more than 25 years).

“...The administration, staff, and faculty are extremely invested and interested in all aspects of the student experience at the Medical School. This is seen in small ways, like the staff knowing your name. This institutional value also resonates in more far-reaching ways—from the eagerness of faculty to continue teaching beyond the classroom, to designated ‘days off’ from clerkships to discuss issues salient to the medical student experience.”

Laura Blaisdell, M.P.H.
Class of 2005

Research is organized in a variety of structures. Each of the 26 departments has a research mission. A number of extra-departmental centers or institutes conduct research with a thematic focus; the membership of these centers is selected from a range of Medical School departments or University colleges. The school's research efforts are integrated through the Research Council, which serves in an advisory and policy development role.

The principal centers and institutes include the Biomedical Engineering Institute, Cancer Center, Center for Immunology, Center for Magnetic Resonance Research, Clinical Outcomes Research Center, Developmental Biology Center, Diabetes Institute for Immunology and Transplantation, General Clinical Research Center, Institute of Human Genetics, Lillehei Heart Institute, and Stem Cell Institute.

The Medical School has identified research priorities that cross departmental boundaries and bring together basic and clinical scientists with similar interests from all areas in the school, thereby promoting programmatic integration and scientific advances. The priority areas are aging, cancer, development biology and child/adolescent health, cardiovascular/pulmonary disease, genetics and genomics, immunology and infectious diseases, neuroscience, and stem cell biology.

Introduction 3
Faculty research efforts are organized into these interdisciplinary programs to study the root causes of human diseases and develop therapies. These priorities do not neglect worthy investigation into specific disease entities, but rather provide a framework to link and facilitate collaborations between the Medical School, clinical affiliates, and University faculties.

To maintain individual responsibility for ethical research behavior, the Medical School community participates in a University-wide education program. Everyone involved in research is required to attend sessions each year that cover areas such as history and values relating to research and scholarship, social responsibility and reporting scientific fraud/misconduct, authorship, plagiarism and peer review, research data management, funding and fiscal management, intellectual property, conflict of interest, environmental health and safety, animal subjects, and human subjects.

Further information on research may be found at www.med.umn.edu.

Admissions

Medical Student Education Mission
The mission of medical student education at the Medical School is to graduate physicians who serve the health needs of people in Minnesota, the nation, and around the world, through excellence in clinical medicine, research, education, and health-care leadership.

Medical Student Education Vision
This mission is accomplished by matriculating a diverse and accomplished student body into outstanding, forward-looking, and integrated educational programs at the University and in the community—programs that stimulate students to excel. These programs, implemented by preeminent educators in state-of-the-art facilities, prepare future primary care providers, clinical sub-specialists, researchers, educators, and health care leaders. Graduates become caring physicians who demonstrate mastery by their:

• knowledge of basic and clinical sciences, ethics, humanities pertinent to medicine, and the social and community dimensions of health;
• skill in patient care and problem solving;
• acceptance of responsibility for improving the evidence-based practice of medicine; and
• commitment to lifelong learning

Duluth Campus Mission
The mission of the University of Minnesota Medical School Duluth Campus is to educate students who will practice family medicine and other primary care specialties in rural Minnesota and American Indian communities; to provide high-quality academic and clinical education programs for professional, graduate, and undergraduate students; and to create distinguished research programs that advance knowledge in the health sciences, including rural and American Indian issues.

Preparing for M.D. Program
Prospective applicants, faculty, and advisers are encouraged to access Admissions information from the Medical School Admissions Web site at www.med.umn.edu/admissions/index.htm. Admissions staff members respond to telephone, in-person or e-mail requests for information on the Medical School admissions process. Medical School Admission Requirements (MSAR), updated and published annually by the Association of American Medical Colleges (AAMC), is a useful reference that provides general information about applying to medical schools and summarizes the admissions requirements of each of the medical schools in the United States and Canada. For a personal copy, go to the AAMC publications Web site at www.aamc.org/publications/start.htm. MSAR is also available in most college reference libraries.
Admissions Requirements

Although academic excellence is necessary to complete studies in the Medical School, neither high grades alone nor in combination with high MCAT scores are sufficient to gain admission. In selecting applicants, the Admissions Committee emphasizes those qualities of motivation, intellect, and character essential to the physician. Because physicians must be able to offer care to those who are sick, applicants should give evidence of their capacity to deal effectively with those who may be ill. They must also be able to demonstrate ability to organize their activities, set priorities, accept responsibility, function under stress, and communicate effectively. The Admissions Committee takes into account an applicant’s potential contribution to the diversity of the Medical School student body and/or an applicant’s commitment to serving the health needs of a diverse society.

The undergraduate years provide a unique educational opportunity, and those who are planning a career in medicine are encouraged to choose courses and independent study according to their interests. The Admissions Committee has no preference regarding the area of concentration, whether it is in the natural sciences, social and behavioral sciences, humanities, or the arts. Students should approach their chosen major(s) in a scholarly fashion and demonstrate excellence in whatever course of study they pursue.

Medicine depends on scientific knowledge. Therefore, applicants must be capable of and comfortable with working in the sciences and be familiar with the basic principles of biology, chemistry, physics, and mathematics. Because physicians have an increasing responsibility to understand and deal with social, cultural, and psychological forces that may adversely affect their patients, studies in the humanities, social and behavioral sciences, and English language and literature (in addition to preparation in the physical and biological sciences) are required for admission.

Applicants must have competence in writing, speaking, and reading the English language such that they have the ability to write intelligent, expository prose that is clearly organized and free of major errors in grammar, punctuation, and spelling. They should be able to present material orally with appropriate fluency and be able to read critically and appraise general and technical writing. It is expected that each applicant is proficient in the basic operation of computers and able to use a browser to access the Internet, create documents using a word processor, and send and receive messages using electronic mail (e-mail). These are necessary skills not only for effective learning in Medical School, but also for the practice of medicine in all areas.

Because physicians take on special responsibilities as community leaders, applicants should acquire an education that leads to continuing lifelong learning—not only in their professional field, but also in those areas that will assure well-informed contributions to the general society in which we live.

Prerequisite Coursework

The MCAT and a bachelor’s degree from an accredited U.S. or Canadian college or university are required. The course requirements table lists minimum course and credit requirements that must be completed prior to matriculation. Students complete additional courses and credits, depending on their own special interests, baccalaureate degree or the other college requirements, and the counsel of their college advisers. Those students with special interests in basic science, research, or careers in academic medicine are encouraged to complete advanced-level coursework in the sciences.

<table>
<thead>
<tr>
<th>Course Requirements</th>
<th>Semester Credits</th>
<th>Quarter Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>General Biology (with lab)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>General Chemistry or Inorganic Chemistry (with lab)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Organic Chemistry (with lab)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>General Physics (with lab)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Calculus/Statistics*</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>English*</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Social, Behavioral Sciences, and Humanities*</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

One course in psychology, remaining coursework in at least two of the following areas: history, sociology, anthropology, philosophy, comparative studies, music, or art.

Coursework in genetics and statistics is strongly recommended.

The above course requirements may not be met with CLEP credits.


Note: Course requirements may be subject to change without notice.
“The University of Minnesota has a unique curriculum; unlike other programs, the integration of clinical experience into the first year really reinforces the basic sciences. The pass-fail system promotes collaboration, which encourages teamwork and cooperative learning.”

Carrie Link
Class of 2007

Technical Standards for Admission
Because of the Medical School’s obligation to ensure patients receive the best medical care possible, candidates for admission and the M.D. degree must meet the following technical standards.

Candidates for the M.D. degree must have abilities and skills of five varieties, including observation; communication; motor; intellectual, conceptual, integrative, and quantitative; and behavioral and social. Technological compensation can be made for some handicaps in some of these areas, but candidates should be able to perform in a reasonably independent manner. The use of a trained intermediary means that a candidate’s judgment must be mediated by someone else’s power of selection and observation.

I. Observation: Candidates must be able to observe demonstrations and experiments in the basic sciences, including but not limited to physiologic demonstrations, microbiologic cultures, and microscopic studies of microorganisms and tissues in normal and pathologic states. Candidates must be able to observe a patient accurately at a distance and close at hand. Observation necessitates the functional use of vision and somatic sensation. It is enhanced by the functional use of smell.

II. Communication: This skill includes speech, reading, and writing. Candidates should be able to speak, hear, and observe patients in order to elicit information; describe changes in mood, activity, and posture; and perceive nonverbal communications. Candidates must be able to communicate effectively and sensitively with patients and communicate with all members of the health care team in both oral and written form.

III. Motor: Candidates should have sufficient motor function to elicit information from patients by palpation, auscultation, percussion, and other diagnostic maneuvers. Candidates should be able to do basic laboratory tests (e.g., urinalysis, CBC), carry out diagnostic procedures (e.g., proctoscopy, paracentesis), and read EKGs and X-rays. Candidates should be able to execute motor movements reasonably required to provide general care and emergency treatment to patients. Examples of emergency treatment reasonably required of physicians are cardiopulmonary resuscitation, administration of pressure to stop bleeding, opening obstructed airways, suturing simple wounds, and the performance of simple obstetrical maneuvers. Such actions require coordination of both gross and fine muscular movements, equilibrium, and functional use of touch and vision.

IV. Intellectual, Conceptual, Integrative, and Quantitative: These abilities include measurement, calculation, reasoning analysis, and synthesis. Problem solving, the critical skill demanded of physicians, requires all of these intellectual abilities. In addition, candidates should be able to comprehend three-dimensional relationships and to understand the spatial relationships of structures.

V. Behavioral and Social: Candidates must possess the emotional health required for full use of their intellectual abilities, the exercise of good judgment, the prompt completion of all responsibilities attendant to the diagnosis and care of patients, and the development of mature, sensitive, and effective relationships with patients. Candidates must be able to tolerate physically taxing workloads and function effectively under stress. They must be able to adapt to changing environments, display flexibility, and learn to function in the face of uncertainties inherent in the clinical problems of many patients. Compassion, integrity, concern for others, interpersonal skills, interest, and motivation are all personal qualities that are assessed during the admissions and education processes.

Background Study Requirement
Minnesota law requires that all students who provide services involving unsupervised direct contact with patients or residents at hospitals, nursing homes, or other health care facilities licensed by the Minnesota Department of Health have a background study conducted by the state. The study covers a range of criminal convictions and civil agency findings related to the maltreatment of children or vulnerable adults. Students disqualified from having direct patient contact as a result of the background study, and whose disqualification is not waived by the commissioner of health, may not be permitted to participate in a clinical placement in these licensed health care facilities. Failure to pass the background study is grounds for revocation of admission or dismissal from the program.

All applicants who are accepted and matriculate into the Medical School must undergo the background study. If students fail to undergo the check or are disqualified, they are not allowed to continue.

Admissions
Selection Factors

The Twin Cities Medical School gives preference for admissions to legal residents of Minnesota, but applicants from other states are encouraged to apply if they can demonstrate high-level academic performance, have attained MCAT scores above the national mean, and demonstrate strength in personal qualities and attitudes. The Admissions Committee seeks candidates who demonstrate the greatest promise of becoming excellent physicians. Evidence of personal integrity, maturity, compassion, intellectual curiosity, problem-solving abilities, motivation for medicine, the ability to work cooperatively with others, cultural sensitivity, and a sense of dedication in service to others are evaluated. The Admissions Committee takes into account an applicant’s potential contribution to the diversity of the Medical School student body and/or an applicant’s commitment to serving the health needs of a diverse society. These qualities and attitudes are assessed through letters of recommendation, the scope and nature of post-secondary experiences, the breadth of undergraduate education, responses to committee questions on the supplemental application, and on-site interviews. Transfer students are rarely accepted due to limits on clinical training sites.

In keeping with the mandated goals of the Minnesota legislature for the Medical School Duluth campus, the Admissions Committee seeks persons with qualities as listed above, but also with personal and background traits that indicate a high potential for becoming a family physician or other primary care specialist in a small town or rural setting. Priority consideration is given to in-state applicants who demonstrate a high potential and motivation for practicing in Minnesota. Out-of-state applicants who demonstrate interest in practicing in Minnesota are also considered for admission. Applicants must be U.S. citizens or have permanent resident status. Transfer students are not admitted.

Student Body Diversity

Consistent with the Medical Student Education Mission, the Medical School seeks to matriculate a diverse student body. Diversity benefits the education of all students and supports the Medical School’s commitment to graduate physicians who will serve the health needs of a diverse society. In evaluating an applicant’s potential contribution to diversity in the Medical School, the Admissions Committee considers disadvantaged background, race and ethnicity, evidence of outstanding leadership, creativity, unique work or service experience, community involvement, non-traditional educational progression, and demonstrated commitment to working with diverse populations.

Application Procedures

The Medical School participates in the American Medical College Application Service (AMCAS), which is sponsored by the Association of American Medical Colleges. All applications to the Medical School for the entering first-year class must be processed through AMCAS, 2450 N Street N.W., Washington, DC 20037-1123. Web-applications with detailed instructions can be accessed at www.aamc.org/students/amcas. Applications should be completed and submitted to AMCAS between June 1 and November 15 of the calendar year before the student plans to enter the Medical School. Since all first-year students begin the course of study in August, the application is thus made a little more than a year before matriculation. Requests for additional information are sent to applicants after the completed AMCAS application has been received from AMCAS and has been reviewed by the Admissions Committee. There is a fee of $75 for applicants invited to complete a Supplemental Application.

All applicants are required to take the Medical College Admission Test (MCAT). The test measures candidates’ factual knowledge of the sciences, reading skills, and ability to solve problems. It also helps the Admissions Committee learn more about candidates’ aptitudes and suitability for a career in medicine.

Premedical students must make their own arrangements to take the Medical College Admission Test. Information on application deadlines, test dates, sample questions, and testing centers can be obtained from the MCAT Program Office, PO Box 4056, Iowa City, IA 52243-4056 (319-337-1357), [www.aamc.org](http://www.aamc.org/students/mcat/start.htm). This information is also available from college premedical advisers. The test is given throughout the country at many colleges in April and August of each year. It is strongly suggested that applicants take the MCAT in the spring before submitting their applications for admission. The test results are sent to the student. There is an examination fee, which entitles the student to have the scores sent to medical schools.
It is so refreshing to feel like your fellow classmates are working with you and not against you. While the academics are competitive, they are not antagonistic. It is easy to find someone to study with you, hang out with you, and comfort you after hard exams. The friends I’ve met in med school are the best part of being a student at the U of M.”

Alison Adams
Class of 2006

In accordance with the acceptance procedures approved by the Association of American Medical Colleges, applicants are notified of the Admissions Committee’s decision between October 15 and May 15 before matriculation. Applicants participating in the Early Decision Program are notified by October 1.

Early Decision Program
The Medical School participates in the Early Decision Program (EDP), sponsored by the Association of American Medical Colleges, in which early acceptance is granted to students choosing to apply only to this medical school. Both Minnesotans and nonresidents are encouraged to apply for EDP. Applicants must have exceptional academic and nonacademic qualifications, including a highly competitive grade point average (GPA), MCAT sum of 30 or higher, clear evidence of human service experience and exposure to medicine, excellent letters of recommendation, and adherence to the rules set forth for application to the program.

The AMCAS EDP Program application period is June 1 through August 1. Information about EDP application procedures is available from the American Medical College Application Service and the Medical School Office of Admissions.

Transfer Students
Transfers from four-year Liaison Committee on Medical Education-accredited medical schools in the United States are considered on a very limited basis and only after they have satisfactorily completed their first two years of medical school and Step 1 of the USMLE. Information for students requesting transfer can be accessed at www.meded.umn.edu/admissions/transfer.htm.

International Applicants*

1. To be eligible to apply to the Medical School, international applicants must:

   a. Hold a baccalaureate degree from a college or university in the country of origin, and two or more years of post-baccalaureate education in an accredited United States or Canadian college or university.

   –or–

   b. Hold a baccalaureate or graduate degree from an accredited college or university in the continental United States, Hawaii, Alaska, or Canada.

   c. Complete all prerequisite course requirements. At least half of the prerequisite courses must be taken at an accredited U.S. or Canadian college or university.

   d. Have taken the Medical College Admissions Test (MCAT).

   e. Be able to demonstrate proficiency (spoken and written) in English language.

2. International applicants may apply either through the Early Decision Program or the regular admission process.

3. International applicants are responsible for obtaining appropriate visa status in the United States.

4. International applicants are expected to assume total responsibility for financing their medical education. They should be prepared to present detailed financial plans of how they will meet expenses, including tuition at the nonresident rate.

* For the purpose of this policy, international applicants are defined as not having U.S. citizenship or permanent residence or other immigrant status.

Pre-Medical Scholars Program
The University of Minnesota Pre-Medical Scholars Program is a cooperative arrangement between the University of Minnesota-Twin Cities, the Medical School, and highly qualified undergraduates. Its goal is to attract top students to the Twin Cities campus by providing them with special opportunities that will enhance their ability to enter into and succeed in medical school and in a medical career. The program is exclusively for University of Minnesota-Twin Cities undergraduates.

Applicants must have completed two years of undergraduate coursework, with at least 48 credit hours of coursework overall (science and non-science credits included, with at least 12 credit hours in biological or physical science coursework). Students who are applying to Medical School in the current year are not eligible for the Pre-Medical Scholars Program.

Qualifications considered in selecting Pre-Medical Scholars include:

- Highly competitive academic record
- Positive personal attributes
- Strong letters of recommendation
- Demonstrated human service experiences
- Knowledge of the field of medicine
- Strong motivation for a career in medicine
Costs and Financial Aid

Tuition and Fees
Beginning in fall semester 2004, tuition rates for new matriculates are fixed for all four years through an innovative cost-of-degree tuition policy. Once determined, tuition will remain set until completion of the M.D. degree. The policy was prompted by concerns regarding the rising cost of medical education and the unpredictability of tuition costs at medical schools across the nation, and assures that unexpected student debt will not occur.

Books, instruments, and other necessary equipment must be provided by the student. Information about student fees, required items, and microscope rental is sent to all entering students the summer before medical school begins.

For up-to-date information on tuition and fees, contact the Medical School Financial Aid Office, B686 Mayo Memorial Building (612-625-4998 or www.med.umn.edu/financial/budget.htm).

Resident Classification
Because the University is a state institution, Minnesota residents pay lower tuition than nonresidents and, in many programs, receive priority consideration for admission. To qualify for resident status, students must reside in Minnesota for at least one calendar year before the first day of class attendance.

For more information, contact:
Resident Classification and Reciprocity Office
240 Williamson Hall
231 Pillsbury Drive S.E.
Minneapolis, MN 55455
612-625-6330

Resident Classification and Reciprocity Office Chair
139 Darland Administration Building
10 University Drive
Duluth, MN 55812
218-726-7849

Reciprocity
Residents of North Dakota and South Dakota who attend the University of Minnesota may apply for reciprocity privileges and pay a tuition rate comparable to the resident rate. Application for reciprocity is separate from the regular admission application. If you are eligible, you should obtain a reciprocity application form from your home state reciprocity program office. Processing of the form by your home state will take from four to six weeks. If you are a nonresident and have not applied or are not eligible for reciprocity, you will be charged nonresident tuition rates.

Applicants from these reciprocity states should contact the following offices:
North Dakota University System
10th Floor, State Capitol
600 East Boulevard Avenue, Dept. 215
Bismarck, ND 58504-0230
701-328-4113
www.ndus.nodak.edu/students/default.asp?ID=250

South Dakota Board of Regents
Reciprocity Program
Box 2201
Brookings, SD 57007
605-688-4497

Financial Aid
Financial aid is available to medical students in the form of federal, state, and institutional loan and grant programs. A number of scholarships are available to entering as well as continuing students based on merit or a combination of need and academic excellence. The Medical School Financial Aid Office and Office of Student Affairs at the Medical School Duluth campus coordinate the programs administered by the University’s Office of Student Financial Aid with those of the Minnesota Medical Foundation. For further information, call the Medical School Financial Aid Office (612-625-4998) or visit www.med.umn.edu/financial. For further information regarding the Duluth campus, contact the Office of Student Affairs (218-726-6548 or http://penguin.d.umn.edu/FinAid/default.asp).
Graduate Assistantships

Medical students may hold graduate assistantships in either research or teaching. Students working a 25 percent (or 195 hours per semester) assistantship are eligible for benefits. The first benefit reduces tuition costs to resident rates for nonresidents, the second reduces the remaining resident tuition rate by approximately 25 percent. If you receive an assistantship, read the Handbook for Graduate Assistants to ensure you know your rights and responsibilities under this job title. A copy may be obtained from your department or the Graduate Assistant Office, 100 Donhowe Building, 319 15th Avenue S.E., Minneapolis, MN 55455 (612-624-7070 or www1.umn.edu/ohr/gao).

Scholarships

University of Minnesota, Medical School, and Minnesota Medical Foundation scholarships and grants are available. Some are awarded at time of acceptance; others are applied for by submitting an annual Medical Student Scholarship Application. Additional information on scholarships is available through the Medical School Financial Aid Office (612-625-4998 or www.meded.umn.edu/financial/index.html).

A limited number of scholarships for the non-resident portion of tuition are offered. To attract students from a variety of geographic, social, economic, ethnic, and cultural backgrounds, the school finds it necessary to recruit students from beyond the borders of Minnesota and may award a limited number of scholarships, equivalent in amount to the whole or partial cost of the non-resident portion of medical school tuition, to high ability non-resident, non-reciprocity students. The following factors are considered in the scholarship review process for non-resident, non-reciprocity applicants:

- Academic achievement
- High academic potential
- Educational disadvantage
- Financial need
- Race and ethnicity
- Evidence of outstanding leadership
- Creativity
- Unique work or service experience
- Community involvement
- Special talents

Minnesota Medical Foundation

The Minnesota Medical Foundation (MMF) is a separately chartered organization that supports and encourages the University’s medical students through its scholarship, loan, research, award, and outreach programs.
Scholarships

MMF scholarships are awarded through the Medical School’s Financial Aid Office and are included in student financial aid packages. Committees in Twin Cities and Duluth review financial aid applications and select recipients on the basis of need, academic record, and additional criteria.

Student Loans

Long-term 6 percent loans are payable within five years of graduation and are awarded through the Financial Aid Office as part of individual financial aid packages. Short-term 8 percent loans of $600 or less, interest-free if repaid within 90 days, may be requested through the office.

Research Stipends

MMF offers grants to students who have a serious interest in biomedical research and academic medicine. Third- and fourth-year students may apply for a $4,000 award to conduct the equivalent of 12 weeks of research. First-year students may apply for a $3,000 award to conduct eight weeks of research during the summer after their first year.

Awards

To recognize and encourage high achievement, awards and honors are given to medical students for outstanding scholastic performance, leadership, community service, and research contributions. Awards are routinely publicized by MMF and are listed on its Web site.

Outreach

MMF promotes public understanding and support of medicine by sponsoring various events, including orientation for entering students, graduation, alumni reunions, mentoring, and other programs.

MMF is located in the McNamara Alumni Center, 200 Oak Street S.E., Suite 300, Minneapolis, MN 55455-2030 (612-625-1440). Visit [www.mmf.umn.edu](http://www.mmf.umn.edu) for more information.

Student Life

The following information is specific to the Medical School in the Twin Cities. For information pertaining to Student Life at the Duluth campus, please refer to the Duluth catalog, accessible at [www.catalogs.umn.edu](http://www.catalogs.umn.edu).

Health Services

Boynton Health Service provides medical care for full-time students and maintains outpatient clinic facilities close to the medical center. All students are entitled to certain outpatient services as part of their student services fee payment.

Housing

Housing & Residential Life (612-624-2994) assists students with on-campus or off-campus housing needs.

Medical Fraternities

All three of the primary, active medical fraternities at the University offer medical student housing. These organizations play a major role in the social life of many medical students.

- Nu Sigma Nu (NSN)—With housing for 21 male and female medical students, the house is a five-minute walk from the medical school. With six second-year medical students to provide support and advice, NSN accommodates first-year students with planned social activities, a food co-op, and a large, fully-equipped living room space.

- Phi Chi (FC)—The fraternity is a world-wide co-ed organization that was started by medical students to offer companionship and support during medical school. Located in a large, old, brick house situated across the street from the medical school, Phi Chi has housing for 17 students, most of whom have their own rooms, and has a meal co-op.

- Phi Rho Sigma (PRS)—Close to campus, the fraternity consists of four houses divided into one-, two- and three-bedroom apartments, each with kitchen, bathroom, and living room. Each student has a separate bedroom. The fraternity is co-ed by apartments. Also available are off-street parking, laundry facilities, wireless Internet access, and common areas for studying and meetings.

Student Resources

The Adytum

A center of medical student activities is the Medical Student Adytum. The word adytum is a transliteration of the Greek word meaning “an innermost sanctuary”; hence the Medical School Adytum is an area to be used only by medical students and their guests. This spacious, comfortable area is centrally located on the first floor of the Mayo Memorial Building. It is a place for students to eat and relax, and it has a quiet area for study. Funds for constructing and equipping the Adytum were donated by the Minnesota Medical Alumni Association. The facilities were dedicated in 1964 and recently remodeled. A center for medical students and Hospitalization insurance coverage is required for all students. Students desiring medical-surgical hospital insurance coverage through the University-sponsored Student Health Insurance Plan must purchase it each semester at registration. The cost is added to the fee statement. Supplementary health care benefits, including hospital coverage during term breaks, extended outpatient benefits, and family coverage, can be purchased at Boynton Health Service. For more information, contact Boynton Health Service (612-625-8400 or [www.bhs.umn.edu](http://www.bhs.umn.edu)).
other health sciences students is also located in Moos Health Sciences Tower, close to lockers, health sciences classrooms, and the cafeteria. Active exchange among students from a variety of health professions is fostered through the sharing of these facilities.

**Student Computer Laboratory**

The computer laboratory is open to all professional students in the Medical School, 24 hours a day, 365 days a year, using the U Card for access after hours. The lab houses 45 networked personal computers equipped with CD-ROM drives and headphones for audio playback. Also available are two Macs, two laser printers, and a flat-bed scanner. Network access jacks are provided for those who wish to bring their own laptop computer.

Software on each machine consists of the latest available suite of MS Office applications (Word, Excel, PowerPoint, etc.), Web browsers (both Internet Explorer and Netscape), RealAudio player for viewing Web casts, and links to useful sites. The lab is supported by a director and student assistants who are available for either consultation or assistance on any problems students encounter.

### “I was impressed by my classmates’ diversity of life experience from the very first week of class. In that short period of time, I met a former Peace Corps volunteer who had worked in Madagascar, a congressional lobbyist, a competitive Ironman triathlete, a practicing lawyer, and a Packers fan.”

*Lara Kierlin*  
*Class of 2006*

**Bio-Medical Library**

The Bio-Medical Library, one of five major libraries within the University Libraries system, offers substantial collections and staff and is committed to service and innovation. The infrastructure and capabilities afforded to the Bio-Medical Library within the University Libraries organization provide a robust network of technology services and content.

The Bio-Medical Library serves five professional schools, more than 20 multidisciplinary research institutes, and several graduate programs in the health sciences, including major university initiatives in molecular and cellular biology and biomedical genomics. It collects materials in the areas of medicine, nursing, dentistry, public health, pharmacy, mortuary science, allied health, and the basic life sciences.

The library’s collection contains more than 465,000 volumes, 3,200 current journal subscriptions, 1,800 electronic full-text journals, and 1,000 curriculum-related and instructional media and computer programs. More than 67,000 rare and historical books and journals dating from the 15th century to 1925 can be found in the Wangensteen Historical Library of Biology and Medicine. University Libraries’ total collections include more than 6 million volumes and 17,000 electronic journals, along with significant special collections and archives.

For more information, visit [www.biomed.lib.umn.edu](http://www.biomed.lib.umn.edu).

**AHC Learning Commons**

A partnership of the AHC Office of Education and the Bio-Medical Library, the AHC Learning Commons provides a friendly and informal place for faculty to learn about and develop new ways of teaching. For students and residents, it’s a place to practice problem-based learning, evidence-based practice, and clinical decision-making, using information acquisition skills and technology. More information is available at [www.learningcommons.umn.edu](http://www.learningcommons.umn.edu).

### Student Activities

**Medical Student Government**

The Medical Student Council, the student governing body, is composed of council officers and representatives from each class who are elected each year. Council members meet regularly to discuss problems common to members of the student body and to plan a variety of projects and service activities. The council represents the interests of the medical students to the administration and faculty. The medical students, through the council, have adopted an honor code.

Upon acceptance by the Medical School, students, after suitable briefing, sign a statement indicating that they are well acquainted with the honor code and agree to abide by it. The Peer Review Committee of the Medical Student Council is responsible for investigating reports of any suspected violations of the code.

**Student Organizations**

Many groups and organizations are available to medical students, and new ones form each year. These groups provide opportunities for support, socializing, community service, and exploring health issues from various perspectives. While by no means comprehensive, the following list illustrates the breadth and depth of student participation in extracurricular activities:

- **Alpha Omega Alpha (AOA)—**The University of Minnesota chapter of AOA selects one-sixth of academically high-ranking students for election to membership from each class. One-fourth are elected as juniors, and the remainder are elected during the senior year. Scholastic excellence in basic science and completed clinical courses and a high score on the USMLE examination are the primary selection criteria; however, integrity, compassion, leadership, and fairness are also considered. The group holds
Minority Student Information

The University of Minnesota is committed to the recruitment and education of students from groups underrepresented in medicine. The Medical School encourages members of educationally disadvantaged backgrounds, those with high ability, and minority group nonresidents to seek admission to its programs.

The Office of Minority Affairs and Diversity creates a welcoming and supportive environment for minority and underrepresented medical students and assists with recruitment of underrepresented minorities. The Office of Minority Affairs director works with admissions and scholarship committees, as well as with residencies, to enhance recruitment of diverse students to the Medical School.

For more information, contact Mary Tate, Director of Minority Affairs and Diversity, University of Minnesota.
Honors and Awards

Maxine Nelson-Alpha Epsilon Iota Foundations Awards—Recognize senior women medical students who best exemplify excellence in clinical performance, community service, scholarship, and leadership.

American Red Cross Transfusion Sciences Research Award—Recognizes exceptional research in transfusion medicine.

Wallace D. Armstrong Award—Recognizes outstanding achievement in first-year biochemistry.

Bacaner Awards—Recognize creative research by graduate students in the basic sciences.

Cyrus P. Barnum Memorial Teaching Fellowships—Recognize outstanding teaching by graduate students in biochemistry.

Leonard P. Burke Memorial Award—Honors an outstanding graduate resident in the Department of Family Medicine and Community Health.

Kenneth F. Ernst Award—Provides an annual award for research by an outstanding resident in anatomical pathology.

Richard C. Horns Memorial Award—Recognizes a senior medical student who has shown outstanding clinical promise.

J. Jacob Kaplan Research Award—On an annual rotating basis, recognizes the best research papers in cardiology, gastroenterology, and immunology in the diagnosis and treatment of cancer.

Lifson/Johnson Memorial Award—Recognizes outstanding teaching by a graduate student in the Department of Physiology.
J. Thomas Livermore Award—Recognizes outstanding original research, with a preference for hematology.

Jan Lunden Award—Recognizes outstanding research by a graduate, postgraduate, or medical student in the field of molecular hepatology.

Medical Student Achievement Awards—Minnesota Medical Foundation-funded awards that recognize graduating seniors who have excelled in student leadership, community service, academic achievement, and research.

Medical Student International Study Fellowships—Help medical students enrich their education through international clinical experiences.

Metropolitan-Mount Sinai Outstanding Medical Student Awards—Recognize students who show promise of becoming superior physicians and clinicians.

Mary Bizal Peterson Memorial Award—Recognizes neurology residents who have displayed excellence in patient care and clinical skills.

Undergraduate Research Awards—Minnesota Medical Foundation-funded awards that recognize meritorious research papers written by graduating seniors.

Veneziale-Steer Award—Recognizes outstanding basic scientific research by a graduate student or a medical student in the field of cellular growth regulation.

Cecil J. Watson Award—Recognizes outstanding research by a resident in clinical medicine.

Yussim Award—Recognizes outstanding basic scientific research by a graduate student or a medical student in the field of diabetes mellitus.

Policies

Immunization Policy
According to OSHA regulations, CDC guidelines, and Academic Health Center (AHC) policy, all Medical School and Graduate Medical Education students are required to have a health clearance as a condition of enrollment. Admitted students must complete the immunization information document to register for classes in the Academic Health Center.

For a description of requirements and a downloadable form, see

Evaluation and Grading Policy
Written examinations, objective structured clinical examinations (OSCEs), and other methods, both subjective and objective, are used to evaluate the performance of medical students. Students receive feedback regarding their performance. Students have an opportunity for personal review of clinical work with a faculty supervisor. Written evaluations of students’ clinical performance are submitted so that students may be informed of their educational progress and may take steps to improve areas in which deficiencies may exist.

All courses in year one and year two are graded on a P-N (pass-fail) system. Students in the top 20 percent of the class for each of these years are sent a letter and certificate indicating that they have completed the year with honors. At the discretion of the course director and faculty, individual year-one courses may choose to send letters to student whose performance placed them in the top 10 percent for that course. In years three and four, grades are reported as H (honors), E (excellent), S (satisfactory), N (no credit, fail), and I (incomplete).

On admission to the program in medicine, students sign and pledge to abide by provisions of an honor code, the Statement of Intellectual Responsibility. Because of the honor code’s provisions, the faculty does not monitor Medical School examinations, and students are strictly on their individual honor to maintain ethical personal conduct during examinations. The statement also is a guide to professional conduct for medical students in their years in Medical School and beyond.

Academic Standing Policy
Students who receive I or N grades in courses are reviewed by the Committee on Student Scholastic Standing. Opportunity for makeup work is one option that permits students to satisfy course requirements and continue their progress toward the M.D. degree.

Students may be dismissed from Medical School if, in the opinion of the Committee on Student Scholastic Standing, they have not performed at a satisfactory academic level in individual courses or if there are other factors, such as personality, attitude, or emotional instability, which would prevent the individual from responsibly undertaking the duties of a physician.

Graduation Requirements
Requirements for graduation and award of the M.D. degree include:

• Satisfactory performance in all courses in the year one and year two programs, plus satisfactory completion of the years three and four programs as approved by an adviser and faculty group

• Satisfactory demonstration of clinical skills, professional skills, and procedural skills as certified by course directors (see

   www.meded.umn.edu/students/competencies/index.html for further information)

• Passing scores on Step 1 and both parts of Step 2 (Clinical Knowledge and Clinical Skills) of the United States Medical Licensing Examination (USMLE)

Final review and approval by the Committee on Student Scholastic Standing must be obtained before a recommendation that the M.D. degree be granted by the Board of Regents.

Most students elect to graduate in May, just before beginning their specialty training. Students who wish to graduate in mid-year must make special arrangements through the Medical School Office of Student Affairs.
“Scheduling during the third and fourth year is extremely flexible. I was able to take a number of electives early in my third year, which exposed me to specialties other than the six or seven typical required courses. Now I’m going into a field that I hadn’t even considered before.”

Chris Choukalas
Class of 2005

M.D. Program

The educational mission of the Medical School is to train top-flight students for careers in medical practice (primary care and specialty care), research, education, and administration. We equip our students with the medical knowledge upon which these careers are predicated and also provide students with the skills needed for medical practice. The following educational objectives drive our entire curriculum and address facets of medical knowledge, medical practice, or both. All of our graduates fulfills each of the following ( ■ = objective addresses medical knowledge; □ = objective addresses medical practice):

■ Demonstrate mastery of key concepts and principles in the basic sciences and clinical disciplines that are the basis of current and future medical practice.

■ Demonstrate mastery of key concepts and principles of other sciences and humanities that apply to current and future medical practice, including epidemiology, biostatistics, health-care delivery and finance, ethics, human behavior, nutrition, preventive medicine, and the cultural contexts of medical care.

□ Competently gather and present in oral and written form relevant patient information through the performance of a complete history and physical examination.

■ Competently establish a doctor-patient relationship that facilitates patients’ abilities to effectively contribute to the decision-making and management of their own health maintenance and disease treatment.

■ Competently diagnose and manage common medical problems in patients.

□ Assist in the diagnosis and management of uncommon medical problems; and, through knowing the limits of her or his own knowledge, adequately determine the need for referral.

■ Begin to individualize care through integration of knowledge from the basic sciences, clinical disciplines, evidence-based medicine, and population-based medicine with specific information about the patient and patient’s life situation.

■ Demonstrate competence practicing in ambulatory and hospital settings, effectively working with other health professionals in a team approach toward integrative care.

■ Demonstrate basic understanding of medical care and how physicians can work effectively in health care organizations, including:
  • Use of electronic communication and database management for patient care
  • Quality assessment and improvement
  • Cost-effectiveness of health interventions
  • Assessment of patient satisfaction
  • Identification and alleviation of medical errors

■ Competently evaluate and manage medical information.

■ Uphold and demonstrate in action/practice basic precepts of the medical profession: altruism, respect, compassion, honesty, integrity, and confidentiality.

■ Exhibit the beginning of a pattern of continuous learning and self-care through self-directed learning and systematic reflection on experiences.

■ Demonstrate a basic understanding of the health-care needs of society and a commitment to contribute to society both in the medical field and in the broader contexts of society needs.

Our graduate medical education—the residency programs—use these same objectives as a template for their curricula as well.

The course of study for the M.D. degree requires completion of 152 weeks of academic work. The table below lists timelines for each year:

| Year One: 43 weeks; August–end of June |
| Year Two: 33 weeks; September–early May |
| Years Three and Four: 76 weeks; Mid-May–mid-May |

Year one includes coursework in basic medical sciences, behavioral science, and introductory experiences with patients. Year two consists of both departmental and integrated interdepartmental courses organized and taught along organ system and topical lines.
### Outline of Curriculum

#### Year One

<table>
<thead>
<tr>
<th>Fall – 17 weeks</th>
<th>Spring – 15 weeks</th>
<th>Summer – 5 weeks</th>
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<tbody>
<tr>
<td>Weeks 1–7</td>
<td>Weeks 8–17</td>
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<tr>
<td>Gross Anatomy</td>
<td>Histology</td>
<td>Microbiology</td>
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<td>Biochemistry</td>
<td>Neuroscience</td>
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<td>Molecular and</td>
<td>Human Sexuality</td>
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<td></td>
<td>Cellular Biology</td>
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<td>Nutrition</td>
<td>Physiology</td>
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<td></td>
<td>Human Genetics</td>
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<td>Physician and Society</td>
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<td>Pharmacology</td>
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#### Year Two

<table>
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<tr>
<th>29 weeks</th>
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<td>Pathology – Systemic</td>
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<td>Pharmacology</td>
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<th>ENT</th>
<th>BJCT</th>
<th>Endocrine</th>
<th>Renal Electrolytes</th>
<th>Gut</th>
<th>Lab Medicine</th>
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<th>Blood</th>
<th>Infectious Disease</th>
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<tbody>
<tr>
<td>Family Practice Tutorial</td>
<td>Medicine Tutorial</td>
<td>Pediatrics Tutorial</td>
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</table>

| Physician and Society |

#### Years 3 & 4

During years 3 and 4, students plan their own curriculum. Everyone must take nine required clerkships (52 weeks) and 24 weeks of electives. There are 23 weeks of unstructured time to pursue other scholarly (e.g., research or international rotation) or personal endeavors. What is shown here is only one example of many possibilities.

<table>
<thead>
<tr>
<th>3 week Inter-Session</th>
<th>12 Weeks (summer)</th>
<th>12 Weeks (fall)</th>
<th>12 Weeks (winter)</th>
<th>12 Weeks (spring)</th>
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<tbody>
<tr>
<td>4 wks</td>
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<td>Medicine</td>
<td>Ob/Gyn</td>
<td>Surgery</td>
<td>Elective</td>
<td>Pediatric</td>
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<td>Elective</td>
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<td>Advanced</td>
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<td>Surgical Spec</td>
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<table>
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<tr>
<th>8 Weeks</th>
<th>4 Weeks</th>
<th>12 Weeks</th>
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<tr>
<td>Primary Care</td>
<td>Free</td>
<td>Advanced Medicine</td>
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<tr>
<td></td>
<td>Free</td>
<td>Elective</td>
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<tr>
<td></td>
<td></td>
<td>Elective</td>
</tr>
</tbody>
</table>
“I decided to take a year between years two and three to do a post-sophomore fellowship in laboratory medicine and pathology. It has been an excellent opportunity to interact with residents and staff, do research, perform procedures, and learn a lot about disease pathophysiology, diagnosis, and treatment in preparation for third-year rotations.”

Andrew Wilson
Class of 2006

The Duluth campus offers a two-year curriculum of basic medical and clinical sciences, with clinical emphasis on rural family medicine and its interrelationships with other medical specialties. All students who successfully complete the two-year program at Duluth transfer to the Medical School in the Twin Cities to complete their M.D. degree requirements.

Students must pass Step 1 and both parts (clinical knowledge and clinical skills) of Step 2 of the United States Medical Licensing Examination (USMLE) as requirements for graduation and the M.D. degree. Students must schedule the USMLE Step 1 before starting clerkships and pass the USMLE Step 1 to continue full-time work in year three.

Year One—Twin Cities
Year one study is focused on structure and function of the human body and includes an introduction to the emotional and psychological development of the individual, as well as an introduction to clinical medicine and the start of a continuing course on the physician in society.

Instruction begins with normal structure in gross anatomy. This is followed by histology and an integrated course in biochemistry and molecular and cellular biology, which provides an in-depth study of modern concepts in this expanding field. Integrated with the course are courses on human genetics and nutrition.

In spring and summer terms, the focus shifts to the normal functions of body systems, reaction of the human organism to disease processes, and study of microorganisms and their relationships to humans and disease. These topics are presented in neuroscience, physiology, and microbiology courses. Year one also includes courses in human sexuality and human behavior.

Courses in pharmacology and pathology begin in the summer and continue through year two. The Physician and Society course, which addresses medical practice-related topics (e.g., professionalism, ethical issues, preventive medicine, cultural diversity, medical law, health care systems), begins in the fall term and continues into year two. In the Physician and Patient course, which begins in the spring term, students learn physical examination techniques and communication skills needed to obtain a medical history.

The required courses in year one are (term abbreviations follow in parentheses: f—fall, s—spring, su—summer):

- Biochemistry, Molecular and Cellular Biology (f)
- Gross Anatomy (f)
- Human Behavior (su)
- Human Genetics (f)
- Human Histology (f)
- Human Nutrition (f)
- Human Physiology (s)
- Human Sexuality (su)
- Microbiology (s)
- Neurosciences (s)
- Pathology (su)
- Pharmacology (su)
- Physician and Patient I (s)
- Physician and Society (f, s)

Year one begins with a white coat ceremony welcoming aspiring future physicians into the world of medical education. The white coats distributed in the ceremony are worn by the new students of medicine in their clinical rotations, increasing their awareness of their responsibilities as future physicians and reminding them that the patient should always come first.

Students can establish an informal adviser relationship with a faculty member or an upper-class student. The year one program ends in late June and is followed by a nine-week break before the year two program begins the following September. During this time, students are encouraged to participate in research, physician shadowing, or similar activities.

Year Two—Twin Cities
Year two begins in the fall and consists of organ system pathology, pharmacology, interdisciplinary courses in
pathophysiology, the continuing Physician and Society course, and the continuing Physician and Patient course. The pathophysiology course examines the basis of disease mechanisms, signs, and symptoms through lectures, small group discussions, and assigned readings. Problem-based learning exercises are included in some organ system courses. The topics in pharmacology and pathology run concurrently in sequence with organ system pathophysiology.

The Physician and Patient course continues with general principles of history taking and physical examination begun in year one. Also included are workshops on neurological and orthopaedic exams. This is followed by six-week tutorials in internal medicine, family practice, and pediatrics, in which students begin to learn the diagnostic skills used in these disciplines. During these tutorials, students spend a full day each week evaluating and discussing assigned patients with their tutors.

The required program in year two consists of the following:

- Laboratory Medicine
- Organ System Pathology
- Pathophysiology I
- Pathophysiology II
- Pharmacology
- Physician and Patient II
- Physician and Patient III
- Physician and Society

**Years One and Two—Duluth**

During this time students are exposed to the various basic, behavioral, and clinical sciences to prepare them for continuing their studies in the Twin Cities.

The first-year curriculum includes presentations in applied anatomy, clinical pathology conferences, an introduction to rural primary care medicine, coursework in the clinical and behavioral sciences, and the following integrated courses: principles of basic medical science, histopathology, hematopoiesis and host defenses, dermatology and the musculoskeletal system, and the nervous system. The coursework is correlated with the appropriate clinical examples and incorporates the latest features of computerized and laser disk instruction.

During the second year, clinical material is again correlated with the basic science presentations in the following integrated courses: the gastrointestinal hepatobiliary system, respiratory medicine, fluids and electrolytes, the cardiovascular system, the endocrine and reproductive systems, and integrated clinical medicine. Additional courses in the behavioral sciences are offered in the second year (behavioral medicine, medical social psychology, and psycho-social-spiritual aspects of life-threatening illness) as well as ongoing clinical pathology conferences and a medicine epidemiology and biometrics course. During the year, students spend more time in clinical settings and receive more intensive instruction in clinical medicine.

During both years of study, students participate in the Family Practice Preceptorship Program. In the first year, each student is assigned to a family practitioner within the immediate geographic area and is introduced to medicine as practiced in its actual setting. The preceptorship during the second year involves the student with physicians who practice in non-urban areas of northern Minnesota and Wisconsin.

The combination of classroom and clinical experiences throughout the two years enables students to acquire the necessary knowledge of the scientific basis for medical practice while at the same time reinforcing this knowledge by active participation in patient care. Students are assured of adequate preparation for continuing their studies.

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See [http://penguin.d.umn.edu/Education/](http://penguin.d.umn.edu/Education/) for more information on the two-year curriculum at the Duluth campus.

**Years Three and Four**

Year two ends with Transition Day, created to prepare entering year three students for patient care activities. The day is filled with workshops, presentations, and discussions focused on professionalism, confidentiality, ethics, how to survive surgery, how to determine who’s the sickest, and how to approach oral presentations and written medical records.

In years three and four, students extend their knowledge of medicine through full-time clinical care of patients. Students participate as a team caring for patients in hospitals, clinics, and office practice settings. Most major hospitals in the Minneapolis–St. Paul area are affiliated with the Medical School. Clinical rotations are held at sites that include Fairview-University Medical Center (University and Riverside campuses), Fairview Southdale, Abbott Northwestern Hospital, Hennepin
It’s easy to get involved with research projects. Any faculty member can be contacted to ask about research in their lab. They all encourage it. I searched the faculty biographies, identified one whose research interested me, and contacted him to see if there was anything in his lab that I could work on. This led to writing a grant proposal and receiving funding from the Minnesota Medical Foundation.  

Jessica Babari Kashani  
Class of 2007

The academic program in years three and four includes a total of 76 weeks — 52 weeks of required courses and 24 weeks of electives. (The curriculum outline depicts one of many possible arrangements of the years three and four portions of the program.) The schedule thus provides for 26 weeks of free time during those two years, which students may arrange as needed. Planning the sequence of courses for the wisest possible uses of free time while progressing toward long-term career goals is an important activity. It requires students to work closely with a faculty adviser, faculty in administrative positions in the dean’s office, and other faculty.

The required courses in years three and four are as follows:

- Internal Medicine Clerkship I (6 weeks)
- Internal Medicine Clerkship II (6 weeks)
- Neurology (4 weeks)
- Obstetrics and Gynecology Clerkship (6 weeks)
- Pediatrics Clerkship (6 weeks)
- Primary Care Clerkship (8 weeks)
- Psychiatry Clerkship (6 weeks)
- Subspecialties (4 weeks minimum—one subspecialty for 4 weeks or two subspecialties for 2 weeks): Neurosurgery, Orthopaedic Surgery, Otolaryngology, Urology
- Surgery Clerkship (6 weeks)

The 24 weeks of elective clinical work are individualized, relating specifically to personal interests and career goals. Courses are selected from a list of more than 200 offered. With permission, students may take up to 12 weeks in elective work at other medical schools in this country or abroad. As part of the total program, at least 12 weeks of full-time elective clinical work must be spent in caring for patients in affiliated hospitals and clinics located in the Twin Cities, Duluth, or greater Minnesota. The flexibility of the elective program provides an opportunity for students to pursue creative interests and to further their professional growth through diverse experiences. Elective clinical experiences in urban community ambulatory medicine (UCAM), in rural medicine through the Rural Physician Associate Program (RPAP), or in clinics serving culturally diverse patient populations are among the many clinical opportunities available.

Students are eligible to begin the program in years three and four upon completion of work in year two and after scheduling Step 1 of the USMLE. Students with any remaining academic deficiencies or those who do not pass Step 1 are reviewed by the Committee on Student Scholastic Standing for a decision regarding arrangement of their remaining academic program. Each student's years three and four program is subject to review and approval by a student-selected adviser, who operates under general policy guidelines developed by the Curriculum Committee and approved by the Education Council.

Rural Physician Associate Program

Each year, up to 40 third-year medical students are selected to participate in the Rural Physician Associate Program (RPAP) of the Medical School. Each participant studies family practice, surgery, and other specialties in a Minnesota community under the supervision of community physicians, RPAP staff, and Medical School faculty.

These selected students work closely with community health care professionals from mid-October through mid-July. Through daily experiences, they learn the values, systems, and environments of the patient care and medical practice in non-metropolitan settings throughout Minnesota. Since the inception of RPAP in 1971, more than 1,000 medical students have participated in the program in 107 communities.

The RPAP office may be reached via phone (612-624-3111), e-mail (rpapumn@umn.edu), or online at www.rpap.umn.edu.

International Medical Education and Research

The mission of the International Medical Education and Research (IMER) Program is to promote an exchange of international education, research, and other scholarly opportunities for medical and graduate students and faculty.

IMER coordinates the many initiatives related to international health, ensuring that medical students
and faculty are positioned to address the multiple issues of globalization. A primary objective of IMER is to provide third- and fourth-year medical students the opportunity to experience clinical practice and research abroad. Scholarships supporting international experiences provide critical financial support for the growing number of medical students wishing to participate in international health.

IMER also coordinates educational experiences for international medical students at the University and formal exchange programs with eight international medical schools and institutions. For more information, contact IMER (612-625-7933, e-mail imer@umn.edu, or online at www.meded.umn.edu/IMER).

**Combined M.D. Programs**

**Combined M.D./Ph.D. Training Program**

The program is one of 41 national programs funded by a Medical Scientist Training Program grant from the National Institutes of Health. The program combines, in about eight years, coursework, fundamental biomedical research, and clinical training culminating in a dissertation, a Ph.D. degree, and an M.D. degree. Students accepted into the program receive a yearly stipend in addition to tuition and fees paid for by the program throughout the training period. The program trains future academic physician-scientists.

Please note that a separate application is required and that interviews are coordinated by the Combined M.D./Ph.D. Training Program. For more information or an application, contact the program via phone (612-625-3680), e-mail (shurs002@umn.edu), or online at www.mdphd.med.umn.edu.

**M.D./M.P.H. Dual Degree**

The Masters in Public Health is available to medical students who wish to pursue study in the University’s nationally recognized School of Public Health. After completion of the two-year preclinical curriculum and having received a passing score on the Step 1 USMLE, students accepted into the program spend one year taking courses in the School of Public Health and beginning work on their graduate project. Following that year, they return to the Medical School curriculum, during which they complete their graduate project. At the end of the five-year program, students receive both the M.D. and the M.P.H. degrees. Students may apply to enter the program before matriculation or during their first or second year in Medical School. The deadline for applications is generally January or February.

See the Medical School Education Web site (www.meded.umn.edu) or contact the School of Public Health (www.sph.umn.edu) for up-to-date information.
M.D./M.H.I Program
The Masters in Health Informatics provides a single year in addition to the four years of training for the medical degree to prepare medical students to understand the applications of information technology in medicine and prepare them for leadership positions in the area. It is designed for and limited to University medical students who are interested in pursuing the program of study after their second or third year of medical school. The program is intended to be completed by enrolling for the fall and following spring semesters. If students choose to enroll in the fall following their second year, they complete at least two clerkship rotations before beginning the program and resume clerkships after the end of classes in the spring. Visit www.hinf.umn.edu/MHI/MD-MHI.htm for more information.

M.D./M.B.A. Dual Degree
The M.D./M.B.A. dual degree was developed for students enrolled in the Medical School. The program serves students who wish to earn an M.B.A degree as well as their M.D. degree from the University. Students enrolled in the Medical School in good academic standing apply to the M.B.A. program during year three in Medical School and are admitted to begin the M.B.A. program in the fourth year. Depending upon previous backgrounds, students will need between 48 and 57 credits to complete the program. For more information, go to www.med.usn.edu/admissions/MD-MBA.htm.

J.D./M.D. Dual Degree
Students interested in pursuing the J.D./M.D. dual degree must be admitted separately to the Law School and Medical School. After completing the two preclinical years, students spend the next five semesters enrolled in the Law School. After returning to medical school to complete the clinical curriculum, students return to the Law School for the final phase of the program. Both degrees are completed over a period of six years.

More information on the J.D./M.D. dual degree can be found at www.jointdegree.umn.edu/degree_programs.

Graduate Medical Education
The Medical School is committed to graduate medical education, which emphasizes education and training of physicians to meet the health-care needs of our region, advancement of knowledge, and leadership in biomedical sciences and in academic medicine. With a long tradition of postgraduate training in nearly all of the medical and surgical specialties and subspecialties, the Medical School sponsors more than 60 residency and fellowship programs at nearly every hospital in Minneapolis-St. Paul and numerous urban and rural clinics and hospitals in Minnesota. All residents and fellows are enrolled as graduate students in the University and entitled to all rights and privileges of students at the University. Further information regarding graduate medical education is located at www.med.umn.edu/gme.

Continuing Medical Education
Earning a degree in any profession is only one milestone in a continuum of education. Physicians faced with rapid advances in medical science and applied clinical knowledge are obliged to continue as students of medicine for the duration of their professional careers. Recognition of this important educational need led, in 1936, to the opening of the Center for Continuation Study. In 1937, the nation’s first organized Department of Continuing Medical Education was founded to regularly offer a recurring program of short postgraduate courses for physicians.

Today the Office of Continuing Medical Education serves the educational needs of physicians and lifelong students of medicine through its annual series of programs taught by faculty in various disciplines in the Academic Health Center and by guest faculty from around the world.

Each year, about 150 individual courses are conducted for more than 15,000 physicians. Two-thirds of attendees are physicians, and many courses attract national or international audiences. Instructional methods include lectures, workshops, laboratories, live cases, panels, seminars, and individual instruction. Distance learning opportunities employ audiotapes, videotapes, journal supplements, CD-ROMs, and Internet-based instruction. The emphasis is on high-quality education and practical, up-to-date content. Close liaison with other medical organizations and health care facilities in the state and region allows the Medical School to offer a program that is well-rounded, robust, and complementary to other continuing education opportunities so that physicians may select those most appropriate to their own educational goals. For more information, contact the Office of Continuing Medical Education via phone (612-626-7600, toll free 1-800-776-8636) or online at www.med.umn.edu/cme.
Departments and Faculty

Anesthesiology (Anes)
Kumar G. Belani, M.B.B.S., Professor and Interim Head

Professor Emeriti
Joseph J. Buckley, M.D.
James F. Cumming, M.D.
Russell H. Larsen, M.D.

Professor
Kumar G. Belani, M.B.B.S.
Richard J. Palahniuk, M.D.

Associate Professor
David S. Beebe, M.D.
Chris H. Kehler, M.D.
Michael F. Sweeney, M.D.

Assistant Professor
Krasimir G. Bojanov, M.D.
Ann E. Buttermann, M.D.
Barbara S. Gold, M.D.
Douglas E. Koehntop, M.D.

The anesthesiology department offers instruction in a wide range of surgical and obstetric anesthetic techniques. Because of its unique role in a diverse spectrum of medical care, it also encompasses intensive care and acute and chronic pain management. Patients with an array of complex medical and surgical disorders offer challenges in the management of these conditions as well as in their possible interactions with the stress of surgery and anesthesia.

The department’s educational programs reflect the diversity of involvement in various modes of patient care. The programs emphasize basic sciences such as physiology, pharmacology, and anatomy, as well as clinical sciences related to organ system pathophysiology, respiratory care, cardiac disease, and many other medical, surgical, pediatric, and obstetric subspecialties.

Operating room anesthesia and involvement with life support systems offers students opportunities for active involvement in airway management, ventilatory and cardiopulmonary care, and invasive monitoring. Skills for providing non-operating room anesthesia and anesthesia for interventional MRI can also be mastered in the department. The department is active in surgical intensive care, pediatric intensive care, and pain management, and provides a 24-hour emergency service in the hospital.

Visit www.anesthesiology.umn.edu for more information.

Biochemistry, Molecular Biology, and Biophysics (BioC)
David A. Bernlohr, Ph.D., Professor and Head

Professor
John S. Anderson, Ph.D.

Biochemistry is the scientific foundation for the biological sciences. Biochemistry courses establish that foundation by describing the structure, function, and regulation of biological molecules within the context of the tissues and the body.

The major themes of the courses explore how chemistry has been adapted by our bodies to build a multitude of functional molecules through the required expenditure of energy. Much of fundamental biochemistry is combined with molecular and cell biology to show how the architecture of macromolecules and the intricacies of metabolic transformations provide cells with the ability to divide and to differentiate for the purpose of carrying out such specialized functions as muscle contraction, nerve conduction, digestive secretion, and hormonal signaling.

Accompanying the lecture portion of the courses are class periods devoted to discussions of particular diseases of which the understanding and treatment
have been advanced by biochemistry. Students emerging from the courses have a basic knowledge of biochemistry that serves as a basis for their understanding of pathophysiology presented in the second year of the medical curriculum. Students may increase their understanding of biochemistry by pursuing advanced courses or by participating in the research efforts of the department during the summer between year one and year two.

Visit [www.biosci.cbs.umn.edu/BMBB](http://www.biosci.cbs.umn.edu/BMBB) for more information.

**Dermatology (Derm)**

Maria Hordinsky, M.D., Professor and Head

*Professor*

Bruce J. Bart, M.D.
Mitchell Bender, M.D.
John Fenyk, M.D.
Lynn Glesne, M.D.
Irving Katz, M.D.
Cindy Olson, M.D.
Steven Prawer, M.D.
David Swanson, M.D.
Carol Souter, M.D.

*Associate Professor*

Garrett Bayrd, M.D.
Kenneth Bloom, M.D.
Kimberly Bohjanen, M.D.
Charles Crutchfield, M.D.
Cindy Firkins Smith, M.D.
Frederick Fish, M.D.
Neal Foman, M.D.
Stephen Holmes, M.D.
Vlada Kaye, M.D.
Steven E. Kempers, M.D.
Jane Lindholm, M.D.
Ann Norland, M.D.
Ellen B. Rest, M.D.
Judith Shank, M.D.
J. Corwin Vance, M.D.
Erin Warshaw, M.D.

*Assistant Professor*

Michelle Blaeser, M.D.
Mireille Chae, M.D.
Karen Chen, M.D.
Marna Ericson, Ph.D.
David Groth, M.D.
Alison Lang, M.D.
Peter Lee, M.D.
Bertha Lin, M.D.
Michael Marc Macaulay, M.D.
Ann McGinn, M.D.
Mary Meighan, M.D.
Jane B. Moore, M.D.
Louis Rusin, M.D.
Jack Scott, M.D.
Victoria Van Roy, M.D.
Brian Zelickson, M.D.

Instructor

Insley Puma, M.D.
Alison Schini, M.D.

The elective program in the clinics of the major hospitals in the Twin Cities offers students an opportunity to acquire diagnostic skills and to learn medical and surgical techniques for treatment of diseases of the skin.

Visit [www.dermatology.umn.edu](http://www.dermatology.umn.edu) for more information.

**Emergency Medicine (DEM)**

Joseph E. Clinton, M.D., Professor and Head

*Professor Emeritus*

Ernest Ruiz, M.D.

*Professor*

Michelle H. Biros, M.D.
David J. Dries, M.D.
Robert K. Knopp, M.D.
G. Patrick Lilja, M.D.
Louis J. Ling, M.D.

*Associate Professor*

Cheryl D. Adkinson, M.D.
Douglas D. Brunette, M.D.
Keith G. Hurte, M.D.
Brian D. Mahoney, M.D.
David W. Plummer, M.D.
Robert A. Rusnak, M.D.
Steven P. Sterner, M.D.

*Assistant Professor*

Stephen K. Anderson, M.D.
Felix K. Ankel, M.D.
Brent R. Asplin, M.D.
Brian K. Bergeron, M.D.
Alfred G. Campo, M.D.
Mary E. Carr, M.D.
Eric G. Christianson, M.D.
Won G. Chung, M.D.
Robert E. Collier, M.D.
Thomas J. Combs, M.D.
Robert D. Dahms, M.D.
David M. Dvorak, M.D.
Carole L. Erlendson, M.D.
Ralph J. Frascone, M.D.
Anthony L. Genia, M.D.
Mark L. Gilberstadt, M.D.
Richard O. Gray, M.D.
David L. Guibrud, M.D.
Theresa M. Gunnarson, M.D.
Paul R. Haller, M.D.
Carson R. Harris, M.D.
Wayne F. Hass, M.D.
William G. Heegaard, M.D.
Cullen B. Hegarty, M.D.
Bradley S. Hernandez, M.D.
Seikei Hibino, M.D.
John L. Hick, M.D.
Jeffrey D. Ho, M.D.
The Department of Emergency Medicine is committed to the education of medical students, residents, practicing physicians, health-care teams, allied health professionals, and the public in all aspects of emergency medical care. The department supports the vision of universal access to and availability of excellent emergency care at all times, to everyone in need both within the emergency department and in the greater community. The department will advance the quality of emergency care everywhere by contributing new knowledge and skills obtained through active biomedical research and innovation in the practice of emergency medicine. Collaboration and communication with medical specialty, health-care, public health and safety, and related governmental organizations are essential activities, integral to this mission.

Our pledge to our medical students is to initiate them in the fundamentals of the specialty of Emergency Medicine (EM) through a variety of experiences working alongside dedicated practitioners.

During the first year, students are taught basic life support procedures including CPR, use of the Automated External Defibrillator (AED), and vein puncture. Students are invited to join the Emergency Medicine Interest Group (EMIG), through which additional activities are offered throughout the four years of training. Among the many activities are monthly lunch lectures, interaction with practicing emergency physicians during their monthly continuing education meetings, Minnesota Emergency Medical Foundation (MEMF), specific EM skills clinics, and community outreach activities.

Clinical research alongside our practicing EM physicians is a strong focus of the Department of Emergency Medicine. Students are encouraged to become part of our research teams, giving them an early opportunity to work in emergency departments and, when research is accepted to national meetings, to participate in the presentations. Many of our students have been published by the time of their graduation.

Year two continues with training for the more advanced clinical competencies required for graduation. This is accomplished through training simulations taught by practicing clinicians in a multidisciplinary environment. These skills are essential for successful clinical rotations.

During years three and four, students are offered clinical rotations at Hennepin County Medical Center (HCMO) and Regions Hospital, both level i trauma centers. Community education experiences at metro hospitals, and toxicology and research rotations, are available. Students are also encouraged to join faculty in international medical missions.


Family Medicine and Community Health (FPCH)
Macaran A. Baird, M.D., Professor and Head

Professor
Sharon S. Allen, M.D., Ph.D.
Carole J. Bland, Ph.D.
Edmond J. Coleman, Ph.D.
Dwenda K. Gjerdingen, M.D., M.S.
Joseph M. Keenan, M.D.
Daniel P. Kohen, M.D.
B.R. Simon Rosser, Ph.D., M.P.H.
Jean F. Wyman, Ph.D.

Associate Professor
Nancy J. Baker, M.D.
Daniel D. Buss, M.D.
Patricia Fontaine Conboy, M.D., M.S.
William Jacott, M.D.
Robert J. Johnson, M.D.
Departments and Faculty

Assistant Professor

Diane J. Madlon-Kay, Ph.D.
Catherine McKeegney, M.D.
David J. Mersy, M.D.
James T. Pacala, M.D., M.S.
Harley J. Racer, M.D.
William O. Roberts, M.D.
Beatrice E. Robinson, Ph.D.
Peter A. Setness, M.D.
Sheila M. Specker, M.D.

Assistant Professor

Patricia Adam, M.D.
Ava Adams-Morris, M.D.
Charles R. Anderson, M.D.
Jo E. Anderson, M.D.
Steven A. Anderson-Hermann, M.D.
Dana R. Barr, M.D.
Deanna L. Bass, M.D.
Dianne R. Berg, Ph.D.
Kent D. Bergh, M.D.
Linda O. Bergum, M.D.
Mark R. Bixby, M.D.
Walter O. Bockting, Ph.D.
Caryl E. Boehnert, Ph.D.
Ralph Bovard, M.D.
Bruce A. Center, Ph.D.
Eric Christianson, M.D.
Patricia M. Cole, M.D.
David Councilman, M.D.
Susan E. Crutchfield, M.D.
Kathleen Culhanne-Pera, M.D., M.A.
David C. Current, M.D.
Diana B. Cutts, M.D.
Susan E. Czapiewski, M.D.
Christine C. Danner, Ph.D.
Thomas W. Day, M.D.
James W. Dey, M.D.
Michael Dukinfield, M.D.
Paul F. Erickson, M.D.
Richard J. Feist, M.D.
Jamie Feldman, M.D., Ph.D.
Vivian G. Fischer, M.D.
Carroll M. Galvin, M.D.
Gregory J. Gepner, M.D.
Anthony J. Giefer, M.D.
Susan S. Haddow, M.D.
Gwen W. Halaas, M.D.
Jon S. Hallberg, M.D.
Peter G. Harper, M.D.
Teresa Harrell, Ph.D.
Thomas M. Hetzel, M.D.
David L. Hunter, M.D.
Manuel A. Idrogo, M.D.
Maria Kaefer, M.D.
Patrick A. Keenan, M.D.
Kenneth N. Kephart, M.D.
Steven L. Kind, M.D.
William H. Kloempken, M.D.
William D. Knopp, M.D.
Kimberly A. Lane, M.D.
Sandra J. Lauring, M.D.
Karen L. Lawson, M.D.
Barbara Leone, M.D.
James P. Lewis, M.D.
Michele S. London, M.D.
Lourdes A. Maglaya-Pira, M.D.
Daniel G. Mareck, M.D.
Casey S. Martin, M.D.
John C. McCabe, M.D.
Teresa C. McCarthy, M.D.
Michael P. McGrail, Jr., M.D.
Tai Mendenhall, Ph.D.
Mark R. Millis, M.D.
Sara Jane S. Mize, Ph.D.
Patrick J. Morris, M.D.
Nancy K. Newman, M.D.
Joseph R. Ofstedal, M.D.
David E. Olson, M.D.
James T. Parnell, M.D.
Ellen K. Perzinski, M.D.
Kimberly Peterson, M.D.
Kevin A. Peterson, M.D., Ph.D.
Robert T. Plouff, M.D.
Jerome F. Potts, M.D.
David V. Power, M.D., M.P.H.
Timothy J. J. Ramer, M.D.
Nancy C. Raymond, M.D.
Christopher J. Reif, M.D., M.P.H.
Lori A. Ricke, M.D.
Jill M. Robinson, M.D.
Timothy J. Ronneberg, M.D.
Jamie D. Santilli, M.D.
Himanshu S. Sharma, M.D.
Diane M. Shuck, M.D.
Joseph M. Sierra, M.D.
George F. Smith, M.D.
Stanley L. Smith, M.D.
Joseph J. Sockalosky, M.D.
Jeremy S. Springer, M.D.
Selma L. Sroka, M.D.
Lowell I. Stoltzfus, M.D.
Steven Stovitz, M.D.
Walter M. Swentko, M.D., M.S.
David M. Thompson, M.D.
James S. Van Vooren, M.D.
Christine A. Varga, Ph.D.
Mary D. Wagner, M.D.
David H. Wang, M.D.
Anne-Marie Weber-Main, Ph.D.
Jennifer L. Welsh, M.D.
Michael R. Wootten, M.D.
Mark W. Yeazel, M.D., M.P.H.

Instructor

Geoffrey Abbott, M.S.W.
Fozia A. Abrar, M.D., M.P.H.
George V. Baboila, M.S.W.
Samuel I. Jeon, M.H.A.
Roseanne M. Kassekert, M.S.W.
Abby Kirschner, Lic.S.W.
Anne McBean, M.S.
Karin Weiss, M.A.

26 Departments and Faculty
The Department of Family Medicine and Community Health introduces students to the fundamentals of continuing and comprehensive patient care within the context of the patient’s family and community. Consistent with the breadth of interests and responsibilities of the family physician, training in all basic areas of medical knowledge is emphasized. Preventive medicine and the behavioral science aspects of patient care also are emphasized.

During year one, the Department of Family Medicine and Community Health participates in directing, teaching, and providing clinical facilities for the Physician and Patient series (Physician and Patient I). Department faculty share responsibility for teaching the medical history taking, interviewing techniques, and physical diagnosis sections of the course. In addition, faculty serve as master tutors, conducting small group teaching for both the Physician Patient and Physician and Society courses.

In year two, faculty continues to direct and teach the Physician and Patient I1 and I11 courses. PAP I1 requires students to spend one day per week with a family physician caring for patients in the clinic and hospital. Through the experience, students gain firsthand knowledge of the role of the family physician in the health care system.

During years three and four, students have the opportunity to participate in a variety of family practice programs and courses. A four-week clerkship in family practice is required as part of the required Primary Care Clerkship, which is directed and largely taught by family medicine faculty. The Primary Care Clerkship consists of didactic teaching and a clinical preceptorship with family physicians in the community and at the residency programs. Students participate in patient care in the family medicine clinic, hospital, patient’s home, and other patient care facilities.

Before completing the M.D. requirements, students may elect to spend nine months with a rural family doctor as part of the Rural Physician Associate Program, a combined education and service program administered through the Department of Family Medicine and Community Health, that provides students hands-on rural family medicine experience. The department offers 19 electives, which are taken by approximately 125 students each year. These include a wide variety of family medicine-related topics, including an externship in full service family medicine, sports medicine, family medicine obstetrics, and opportunities for independent study.

The department sponsors a very active Family Medicine Interest Group (FMIG). FMIG meets approximately monthly, conducting procedural clinics attended by as many as 50 students and lunchtime lectures on a variety of primary care topics attended by up to 80 students per session. Each year, the department sponsors 40 students to attend the annual meeting of the National Conference of Medical Students of the American Academy of Family Practice in Kansas City.

The Department of Family Medicine and Community Health administers four family practice residency training programs in the Twin Cities (Fairview-University Medical Center Program/Smiley’s, Minneapolis; North Memorial Health Care, Minneapolis; St. John’s Hospital/Phalen Village, St. Paul; St. Joseph’s Hospital/Bethesda, St. Paul), and a rural family medicine residency in Waseca and Mankato, Minnesota. In addition to graduate education of residents, these sites also serve as classrooms for teaching continuing and comprehensive primary health care to medical students. Students may elect to participate in the ongoing care of patients in these model family medicine centers. Patients in the residency clinics are a diverse group, including families and individuals of all ages, ethnicities, and socioeconomic status.

The Program in Human Sexuality is an administrative and academic unit of the department. It conducts the human sexuality course in the year one core curriculum and offers elective courses in years three and four as well as advanced workshops, internships, and fellowships for residents and practicing physicians.

More information on the department and its programs can be found online at [www fp umn edu](http://www.fp.umn.edu).

**Departments and Faculty**

William J. Doherty, Ph.D.

The Department of Family Medicine and Community Health introduces students to the fundamentals of continuing and comprehensive patient care within the context of the patient’s family and community. Consistent with the breadth of interests and responsibilities of the family physician, training in all basic areas of medical knowledge is emphasized. Preventive medicine and the behavioral science aspects of patient care also are emphasized.

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More information on the department and its programs can be found online at [www fp umn edu](http://www.fp.umn.edu).

**Genetics, Cell Biology, and Development (GCD)**

Brian Van Ness, Ph.D., Professor and Head

**Professor Emeritus**

- William Cunningham, Ph.D.
- William Herman, Ph.D.
- Robert McKinnell, Ph.D.

**Professor**

- G. Eric Bauer, Ph.D.
- Judith Berman, Ph.D.
- Susan Berry, M.D.
- Robert Brooker, Ph.D.
- Stanley Erlandsen, Ph.D.
- David Fan, Ph.D.
- Stuart Goldstein, Ph.D.
- Perry Hackett, Ph.D.
- David Hamilton, Ph.D.
- Thomas Hays, Ph.D.
- Robert Herman, Ph.D.
- Ross Johnson, Ph.D.
- Richard King, M.D., Ph.D.
- Ryoko Kuriyama, Ph.D.
- Richard Linck, Ph.D.
- Michael O’Connor, Ph.D.
- Harry Orr, Ph.D.
- Laura Ranum, Ph.D.
- Scott Selleck, M.D., Ph.D.
- Judson Sheridan, Ph.D.
- Michael Simmons, Ph.D.
Departments and Faculty

Akhouri Sinha, Ph.D.
Robert Sorenson, Ph.D.
Clifford Steer, M.D.
Robin Wright, Ph.D.

Associate Professor
Vivian Bardwell, Ph.D.
Martin Blumenfeld, Ph.D.
Kathleen Conklin, Ph.D.
Betsy Hirsch, Ph.D.
Victoria Iwanij, Ph.D.
David Largaespada, Ph.D.
Bonnie LeRoy, M.S.
Mary Porter, Ph.D.
Ann Rougvie, Ph.D.
Jocelyn Shaw, Ph.D.
Jeffrey Simon, Ph.D.
Margaret Titus, Ph.D.
David Zarkower, Ph.D.

Assistant Professor
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Duncan Clarke, Ph.D.
Electra Coucouvanis, Ph.D.
David Kirkpatrick, Ph.D.
Deanna Koepp, Ph.D.
Paul Marker, Ph.D.
Jeffrey Miller, Ph.D.
Hiroshi Nakato, Ph.D.
Thomas Neufeld, Ph.D.
Jan Norrander, Ph.D.
William Oetting, Ph.D.
William Shawlot, Ph.D.
Nikunj Somia, Ph.D.
Wufan Tao, Ph.D.

For course information, contact the Genetics, Cell Biology, and Development Department Office (612-624-3110), 6-160 Jackson Hall, 321 Church St. S.E., University of Minnesota, Minneapolis, MN 55455. Visit www.gcd.med.umn.edu for more information.

History of Medicine (HMed)
John M. Eyler, Ph.D., Professor, Program Director, and Director of Graduate Studies

Professor
Claus Pierach, Ph.D.

Assistant Professor
Jennifer L. Gunn, Ph.D., Director of Undergraduate Studies
C. Carlyle Clawson, M.D.
Jole Shackelford, Ph.D.
Jon Harkness, Ph.D.
Sally Gregory Kohlstedt, Ph.D.
Elaine Tyler May, Ph.D.
David Rhees, Ph.D.

The history of medicine is essential to the understanding of the present state of medicine. It explores the sources of medical concepts, the development of the traditions of medical practice, the evolution of medical institutions, and the changing relationships of medicine and society. Knowledge of the history of medicine is valuable to a physician because it makes the physician aware of the foundations of medical knowledge and provides historical perspective on contemporary medical problems.

Department courses provide students with a broad survey of the history of medicine followed by courses and seminars dealing more intensively with select historical topics.

The department also sponsors a series of public lectures to acquaint both faculty and students with the interest and diversity of medical history.

Interdisciplinary Medicine (InMd)
Direct administrative responsibility for organ-system segments of the pathophysiology course is vested in the individual organ system coordinators; planning, teaching, and evaluation of the course and of student performance is carried out by interdepartmental committees.

Laboratory Medicine and Pathology (LaMP)
Leo Furcht, M.D., Allen-Pardee Professor and Head Director, Institute of Medical Biotechnology

Regents Professor
James G. White, M.D.

Professor
Khalil Ahmed, M.D.
Fred Apple, Ph.D.
Henry Balfour, M.D.
David Brown, M.D.
H. Brent Clark, M.D., Ph.D.
Donald P. Connelly, M.D., Ph.D.
John H. Eckfeldt, M.D., Ph.D.
Lynda B. Ellis, Ph.D.
Patricia Ferrieri, M.D.
Stanley M. Finkelstein, Ph.D.
Vincent Garry, M.D.
Lael C. Gatewood, Ph.D.
Erhard Haus, M.D., Ph.D.
Stephen Hecht, Ph.D.
Charles A. Horwitz, M.D.
Jose Jessurun, M.D.
John H. Kersey, M.D.
W. Tucker LeBien, Ph.D.
Danuta Malejka-Giganti, Ph.D.
J. Carlos Manivel, M.D.
James McCarthy, Ph.D.
Jeffrey McCullough, M.D.
Matthew Mescher, Ph.D.
Harry T. Orr, Ph.D.
Deborah E. Powell, M.D.
Ralph Powell, M.D.
Gundu H. R. Rao, Ph.D.
Yoji Shimizu, Ph.D.
Stuart Speedie, Ph.D.
Michael Steffes, M.D., Ph.D.
Michael Tsai, Ph.D.
Patrick J. Ward, M.D.
Pathology is the study of disease. An understanding of pathology is a prerequisite for and an integral aspect of the practice of medicine, regardless of the specialty. In the Tree of Medicine, the trunk is General Pathology; it draws from all basic sciences and divides into the many branches of special pathology or Systemic Pathology. Each one of these branches supports a specialized field of clinical medicine.

The required courses of general and systemic pathology (6101, 6102, 6103, 6104) offered by the Department of Laboratory Medicine and Pathology are an introduction to the processes that lead to clinical signs and symptoms.

The sequence of courses extends from the summer term of year one through the first three periods of year two.

In the summer term of year one, the general pathology segment introduces students to general principles, including cellular injury, inflammation and repair, immunopathologic processes, abnormal hemodynamics, metabolic diseases, and neoplasia. Examples of specific diseases are used to illustrate these principles. In year two, diseases are presented in the context of the organ systems; namely, cardiac, respiratory, renal, female and male reproductive, neurologic, hematologic, gastrointestinal, endocrine, and orthopaedic.

The morphologic alterations caused by disease are emphasized during laboratory sessions using gross specimens, microscopic slides, discussion of mini-cases, and videotapes. Appropriate use of laboratory tests also is discussed, often in conjunction with case studies.

Pathophysiology and pharmacology courses are taught in year two concurrently with pathology. The subject matter taught by the three disciplines is coordinated.

In years three and four, the Department of Laboratory Medicine and Pathology offers a variety of electives. Major areas of emphasis include surgical pathology, cytology, autopsy pathology, hematology (with coagulation), clinical chemistry, blood banking, microbiology, genetics, immunology, computer medicine, molecular diagnostics, and interpretation of laboratory data. These rotations provide the student an excellent basis for the clinical rotations. In addition, other specialized laboratory divisions and full-time research may be selected.

For information on the pathology course and autopsy rotation, contact Alan Rose (rosex031@umn.edu) for Clinical Pathology, Tony Killeen (kille001@umn.edu) for Surgical Pathology, Carlos Manivel (maniv001@umn.edu), and for research, James McCarthy (mccar001@umn.edu). Visit the department online at www.pathology.umn.edu.
Department of Medicine (Med)

**Professor Emeritus**

- David W. Allen, M.D.
- Jose Barbosa, M.D.
- Henry W. Blackburn, Jr., M.D.
- Frederick Goetz, M.D.
- Morrison Hodges, M.D.
- Harry S. Jacob, M.D.
- Maynard J. Jacobson, M.D.
- Manuel E. Kaplan, M.D.
- David Kiang, M.D.
- Constantinos Limas, M.D.
- M. John Murray, M.D.
- Jack Oppenheimer, M.D.
- Ardino Tuna, M.D.
- Yang Wang, M.D.
- Leonard G. Wilson, M.D.

**Professor**

- Inderjit Anand, M.D.
- Richard Ainger, M.D.
- Robert Bache, M.D.
- John Bantle, M.D.
- Timothy Behrens, M.D.
- David Benditt, M.D.
- Charles Billington, M.D.
- Peter B. Bitterman, M.D.
- Malcolm N. Blumenthal, M.D.
- John Bond, M.D.
- Jay N. Cohn, M.D.
- Alan Collins, M.D.
- Kent Crossley, M.D.
- Barbara Daniels, M.D.
- Scott Davies, M.D.
- William Duane, M.D.
- Kristine Ensrud, M.D.
- Arthur From, M.D.
- Roger Gebhard, M.D.
- Angiokki Georgopoulous, M.D.
- Steven Goldsmith, M.D.
- Richard Grimm, M.D.
- Ashley Haase, M.D.
- Robert Hebbel, M.D.
- Marshall Hertz, M.D.
- Jordan L. Holtzman, M.D.
- Thomas H. Hostetter, M.D.
- Robert B. Howe, M.D.
- David Inghar, M.D.
- Edward Janoff, M.D.
- Gerhard Johnson, M.D.
- James Johnson, M.D.
- Jeffery Kahn, Ph.D., M.P.H.
- Bertram Kasiske, M.D.
- Nigel Key, M.D.
- Richard King, M.D.
- John Lake, M.D.

**Associate Professor Emeritus**

- Earl Hill, M.D.
- James Lillehei, M.D.
- Gerald R. Onstad, M.D.
- Richard Pfohl, M.D.
- Pamela Shultz, M.D.
- Harold Schwartz, Ph.D.

**Associate Professor**

- Paul Abraham, M.D.
- Ronald Bach, Ph.D.
- Alan Bank, M.D.
- Michael Belzer, M.D.
- Lynn Burmeister, M.D.
Alain Broccard, M.D.  
Linda Burns, M.D.  
Oliver Cass, M.D.  
Y.S. Chandrashekar, M.D.  
Gladwin Das, M.D.  
Morris Davidman, M.D.  
Peter Duane, M.D.  
Alejo Erice, M.D.  
Greg Filice, M.D.  
Robert Foley, M.D., M.S.  
Martin Freeman, M.D.  
Mary Gannon, M.D.  
Elie Gertner, M.D.  
Charles Gornick, M.D.  
Pankaj Gupta, M.D.  
Dale Hammerschmidt, M.D.  
Craig Henke, M.D.  
Timothy Henry, M.D.  
William Keith Henry, M.D.  
Kenneth Hepburn, Ph.D.  
Charles Herzog, M.D.  
Samuel Ho, M.D.  
Conrad Iber, M.D.  
Anne Joseph, M.D.  
Robert Kratzke, M.D.  
Hollis Krug, M.D.  
Alex Lange, Ph.D., M.S.  
James Leatherman, M.D.  
Keith Lurie, M.D.  
Connie Manske, M.D.  
Karen Margolis, M.D.  
Robert McCollister, M.D.  
Vicki Morrison, M.D.  
Avi Nahum, M.D.  
Douglas Nelson, M.D.  
Connie Parenti, M.D.  
Robert Perri, M.D.  
Robert A. Petzel, M.D.  
Gordan Pietpoint, M.D.  
Gregory Plotnikoff, M.D.  
Edward Ratner, M.D.  
J. Bruce Redmond, M.D.  
Kathryn Rice, M.D.  
William Robiner, Ph.D.  
Craig Roth, M.D.  
Jeffrey Rubins, M.D.  
Scott Sakaguchi, M.D.  
Timothy Schacker, M.D.  
Anna Schorer, M.D.  
Barbara Segal, M.D.  
Arne Slungaard, M.D.  
Ronald D. Soltis, M.D.  
Suzanne Swan, M.D.  
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Dean Tsukayama, M.D.  
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Ahmet Adabaq, M.D.  

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Mukta Arora, M.D.  
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Bradley Bart, M.D.  
Karyn Baum, M.D.  
John Belcher, Ph.D.  
Bradley Benson, M.D.  
Alan Berger, M.D.  
Robert Berkseth, M.D.  
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Paul Bohjanen, M.D., Ph.D.  
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Benjamin Bornsztein, Ph.D.  
Andrew Boyle, M.D.  
Toni Bransford, M.D.  
Milton L. Bullock, M.D.  
Winston Cavert, M.D.  
Yingjie Chen, M.D.  
Maxim Cheeran, Ph.D.  
Elena Chiorean, M.D.  
Mihaela Chiorean, M.D.  
Ellen Coffey, M.D.  
Monica Colvin, M.D.  
Jeffrey Connaire, M.D.  
David Dahl, M.D.  
John Degelau, M.D.  
Moise Desvarieux, M.D., Ph.D.  
Susan Diem, M.D.  
Arkadiusz Dudek, M.D.  
Jordan Dunitz, M.D.  
Ken Engberg, M.D.  
Naciye Ercan-Fang, M.D.  
Kambiz Farbakhsh, M.D.  
Susan Ferron, M.D.  
Howard Fink, M.D.  
Kelly Frisch, M.D.  
Steven Fu, M.D.  
Patrick Gaffney, M.D.  
Craig Garrett, M.D.  
Genya Gekker, M.D.  
Jian-Guo Geng, M.D.  
Raymond Gensinger, M.D.  
Wayne Godfrey, M.D.  
Laxmana Godishala, M.D.  
Mari Goldner, M.D.  
Edward Greeno, M.D.  
David Griffin, M.D.  
Frank Grund, M.D.  
Marco Guerrero, M.D.  
Kalpna Gupta, Ph.D.  
Jennifer Hall, Ph.D.  
Kathleen Hall, M.D.
Samuel Hall, M.D.
Bruce Hanson, M.D.
Bernard Hering, M.D.
Gerald Hill, M.D.
Steven Hillson, M.D.
Keli Hippen, Ph.D.
Jeremy Holtzman, M.D.
John Hotchkiss, Jr., M.D.
Shuxian Hu, M.D.
Randolph Hurley, M.D.
Hassan Ibrahim, M.D.
Koho Iizuka, M.D.
Areef Ishani, M.D.
Duaine Jackola, Ph.D.
Pamala Jacobson, Pharm.D.
Jeffrey Jaffe, M.D.
Irshad Jafari, M.D.
Yuehua Jiang, M.D.
Edgar Jameis, M.D.
Balkrishna Janagirdar, F.M.D.
Jan Johnson, M.D.
Paul Johnson, M.D.
Sidney Jones, M.D.
Dan Kaufman, M.D., Ph.D.
Rudolph Keimowitz, M.D.
Susan Keirstead, Ph.D.
Robert Kempainen, M.D.
Lawrence Kerzner, M.D.
Alexander Khoruts, M.D.
Nobuaki Kikyo, M.D., Ph.D.
Hyun Joo Kim, M.D.
Keiko Kimura, M.D.
Susan Kline, M.D.
Floyd Knight, M.D.
William P. Korchik, M.D.
Rahul Koushik, M.D.
Mitchell Krathwohl, M.D.
Betsy Kren, Ph.D.
Rebecca Lai, M.D.
Kevin Larsen, M.D.
Janet Larson, M.D.
Carol Lange, Ph.D.
Mark LeSage, Ph.D.
Jian-Ming Li, M.D., Ph.D.
Juy Li, M.D.
Jane Little, M.D.
James Lokensgard, Ph.D.
Linda A. Long, M.D.
Fei Lu, M.D., Ph.D.
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King-Wai Ma, M.D.
Terrence Maag, M.D.
David Macomber, M.D., Ph.D.
K.P. Madhu, M.D.
Mobin Malik, M.B.B.S.
James Mallory, M.D.
William Marinelli, M.D.
Donald S. Masler, M.D.
Teresa McCarthy, M.D.
Charlene McEvoy, M.D.
Martha McCusker, M.D.
Peter Meier, M.D.
Roberta Meyers, M.D.
James Milavetz, M.D.
Liming Milbauer, Ph.D., M.S.
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Emil Missov, M.D.
Karen Moeller, M.D.
Kathy Moser, Ph.D.
Mohammed Murad, M.D., M.B.B.S.
Anne Murray, M.D.
Brian Neil, M.D.
Maureen Murdoch Nelson, M.D.
L. James Nixon, M.D.
Eileen O'Shaughnessy, M.D.
William Oetting, Ph.D.
Robert C. Olson, M.D.
Carmelo Panetta, M.D.
Craig Peine, M.D.
Anne Pereira, M.D.H.
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Erik Peterson, M.D., M.P.H.
Douglas Price, M.D.
Susan Raatz, Ph.D., M.S.
Huilin Qi, Ph.D.
Douglas Rausch, M.D.
Mark Reding, M.D.
David Rhude, M.D.
Paola Ricci, M.D.
Mohammad Rizvi, M.D.
Terry Rosborough, M.D.
Miguel Ruiz, M.D.
Meena Sahadevan, M.D.
Mandeep Sawhney, M.B.B.S.
Ronald Scamurra, Ph.D.
Peter Schlesinger, M.D.
Ronald Schut, M.D.
Yoav Segal, M.D., Ph.D.
Jonathan Sellman, M.D.
Robert Shapiro, M.D.
Robert Sheaff, Ph.D.
Wendy Shear, M.D.
Shalamar Sibley, M.D.
John Silkinsen, M.D.
Margaret Simpson, M.D.
Jasvinder Singh, M.B.B.S.
Charles Smith, M.D.
Anna Solovey, M.D., Ph.D.
John Song, M.D., M.P.H., M.A.T.
Scott Sorensen, M.D.
Mark Sprenkle, M.D.
Michael T. Spilane, M.D.
David Strike, M.D.
David A. Stuart, M.D.
Patricia Sullwold, M.D.
Patricia Tam, Ph.D.
Wufan Tao, Ph.D.
Karen-Sue Taussig, Ph.D.
Richard Taylor, M.D.
Heather Thompson, M.D.
Peter Toensing, M.D.
Jay Traverse, M.D.
Maryam Valapour, M.D.
Margaret Vanbree, Ph.D., M.H.A.
Microbiology (MicB)
Ashley T. Haase, M.D., Regents' Professor and Head

Regents' Professor Emeritus
Dennis W. Watson, Ph.D.

Professor Emeritus
Palmer Rogers, Ph.D.

Professor
Omelan A. Lukasewycz, Ph.D., Acting Head, UMD*
Dwight L. Anderson, Ph.D.
Judith G. Berman, Ph.D.
Russell Bey, Ph.D.
P. Patrick Cleary, Ph.D.
Gary Dunny, Ph.D.
Martin Dworkin, Ph.D.
Anthony J. Faras, Ph.D.
Gregory Germaine, Ph.D.
Anthony J. Faras, Ph.D.
Martin Dworkin, Ph.D.

Associate Professor
Ronald Jemmerson, Ph.D.
Leslie Schiff, Ph.D.

Assistant Professor
Sandra K. Armstrong, Ph.D.
P. Patrick Cleary, Ph.D.
Dana Davis, Ph.D.
Christian D. Mohr, Ph.D.

For information on the Department of Medicine, go to www.med.umn.edu.

Microbiology (MicB)

Microbiology for first-year medical students covers the principles and techniques necessary to understand host-parasite relationships and the pathogenesis of infectious diseases. The application of microbiology to medical diagnosis guides the future physician in the treatment and prevention of infectious diseases and in the use of chemotherapeutic and antibiotic agents. In the lecture portion of the course, basic principles in medical immunology, parasitology, mycology, bacteriology, and virology are reviewed. Through laboratory experience, the future clinician learns to interpret laboratory results as well as to appreciate the need for cooperation between the physician and the diagnostic laboratory.

Elective courses are offered to medical students during their second through fourth years of school. These courses present advanced studies and in-depth treatment of such topics as basic microbiology, immunobiology, molecular immunology, virology, microbial physiology, and mechanisms of pathogenicity.

Refer to the Department of Microbiology Web site, www.microbiology.med.umn.edu, to review departmental and course information and faculty research interests.

Neurology (Neur)

David C. Anderson, M.D., Professor and Head

Professor Emeritus
Kenneth F. Swaiman, M.D.
Fernando Torres, M.D.

Professor
H. Brent Clark, M.D., Ph.D.
Ronald E. Cranford, M.D.
Moris Jak Danon, M.D.
John Day, M.D., Ph.D.
Milton G. Ettinger, M.D.
Apostolos Georgopoulos, M.D.
Christopher Gomez, M.D.
Karen Hsiao Ashe, M.D., Ph.D.
William R. Kennedy, M.D.
Arthur C. Klassen, M.D.
Lawrence A. Lockman, M.D.
Mark W. Mahowald, M.D.
Gerald Moriarty, M.D.
John D. Parry, M.D.
David Rottenberg, M.D.
Elsa Shapiro, Ph.D.
Charles Truwit, M.D.

Associate Professor
James Ashe, M.D.
William David, M.D., Ph.D., Residency Program Director
Miguel Fiol, M.D.
Jurgen Konczak, Ph.D.
Robert Kriel, M.D.
Howard Pomeranz, M.D., Ph.D.
David E. Tupper, Ph.D.

Assistant Professor
Khalaf Bushara, M.D.
Scott Bundlie, M.D.
Lawrence Charnas, M.D., Ph.D.
Departments and Faculty

Desirée Czapansky-Beilman, M.D.
Rupert Exconde, M.D.
William H. Frey, M.D.
Davida Goldman, Ph.D.
Stephen Holloway, M.D., Ph.D.
Cathy Jordan, Ph.D.
Frederick M. Langendorf, M.D.
Scott Lewis, M.D., Ph.D.
J. Riley McCarten, M.D.
James A. Moriarty, M.D.
Mario Quinones, M.D.
Stephen Strother, Ph.D.
John W. Tulloch, M.D.
David Walk, M.D.
Richard Ziegler, Ph.D.

The Department of Neurology participates in an interdisciplinary course emphasizing the pathophysiologic basis for the clinical neurosciences. This course is intended primarily for medical students in year two. The department also offers externships in clinical neurology including supervised clinical experiences with inpatients and outpatients suffering from neurologic disorders. The elective courses are for students with special interests or educational requirements in a wide variety of clinical and laboratory settings.

Visit [www.neurology.umn.edu](http://www.neurology.umn.edu) for more information.

Neuroscience (NSc)

Timothy J. Ebner, M.D., Ph.D., Professor and Head

Professor

Marilyn E. Carroll, Ph.D.
Janet M. Dubinsky, Ph.D.
Robert P. Elde, Ph.D.
William Engeland, Ph.D.
Esam El-Fakahany, M.D.
S. Hossein Fatemi, M.D., Ph.D.
Martha Flanders, Ph.D.
Jonathan C. Gewirtz, Ph.D.
Apostolos P. Georgopoulos, M.D., Ph.D.
Glenn J. Giesler, Jr., Ph.D.
Alice A. Larson, Ph.D.
Paul C. Letourneau, Ph.D.
Allen S. Levine, Ph.D.
Patrick W. Mantyh, Ph.D.
Steven C. McLoon, Ph.D.
Robert F. Miller, M.D.
Eric A. Newman, Ph.D.
Richard E. Poppele, Ph.D.
Peter A. Santi, Ph.D.
Virginia S. Seybold, Ph.D.
John F. Soechting, Ph.D.
Peter W. Sorenson, Ph.D.
Sheldon B. Sparber, Ph.D.
Kamil Ugurbil, Ph.D.
George L. Wilcox, Ph.D.

Associate Professor

James Ashe, M.D.

Neuroscience is a relatively new field of scientific inquiry. The brain and nervous system are sufficiently complex and unique among biological systems as to require analytical approaches that cross the traditional boundaries of anatomy, behavioral biology, biochemistry, cell biology, genetics, pharmacology, physiology, and psychology. In some instances, neuroscientific inquiry also encompasses the disciplines of computer science, information processing, engineering, physics, and mathematics.

The first-year neuroscience courses use lectures and laboratories to provide a background in normal structure, function, and development of the nervous system. Topics span the structural function of single brain cells to sensory, motor, and cognitive processing. Pathophysiological concepts are introduced throughout the course. Students completing the course have a basic knowledge of neuroscience in preparation for second-year pathophysiology coursework.

Students may obtain in-depth understanding of topics of interest in neuroscience, and increase their understanding of neuroscience by pursuing advanced courses or by participating in the research efforts of the department.

Please visit the Department of Neuroscience online at [www.neurosci.umn.edu](http://www.neurosci.umn.edu) for specific course information.

Neurosurgery (NSu)

Stephen J. Haines, M.D., Professor and Head

Karen Hsiao Ashe, M.D., Ph.D.
W. Dale Branton, Ph.D.
Christopher M. Gomez, M.D., Ph.D.
Rolf Gruetter, Ph.D.
Christopher N. Honda, Ph.D.
Eric Javel, Ph.D.
Steven Juhn, M.D.
Karen A. Mesce, Ph.D.
Linda K. McLoon, Ph.D.
Giuseppe Pellizzer, Ph.D.
Donald A. Simone, Ph.D.
Martin W. Wessendorf, Ph.D.

Assistant Professor

Bagrat Amirikian, Ph.D.
Linda M. Boland, Ph.D.
Carolyn Fairbanks, Ph.D.
Geoffrey M. Ghose, Ph.D.
Dae-Shik Kim, Ph.D.
Paul Kofuji, Ph.D.
Lorene M. Lanier, Ph.D.
Arthur Leuthold, Ph.D.
Dezhi Liao, Ph.D.
Paul G. Mermelstein, Ph.D.
Yasushi Nakagawa, Ph.D.
Teresa A. Nick, Ph.D.
A. David Redish, Ph.D.
Mark J. Thomas, Ph.D.
Lance Zirpel, Ph.D.

Assistant Professor

Bagrat Amirikian, Ph.D.
Linda M. Boland, Ph.D.
Carolyn Fairbanks, Ph.D.
Geoffrey M. Ghose, Ph.D.
Dae-Shik Kim, Ph.D.
Paul Kofuji, Ph.D.
Lorene M. Lanier, Ph.D.
Arthur Leuthold, Ph.D.
Dezhi Liao, Ph.D.
Paul G. Mermelstein, Ph.D.
Yasushi Nakagawa, Ph.D.
Teresa A. Nick, Ph.D.
A. David Redish, Ph.D.
Mark J. Thomas, Ph.D.
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Please visit the Department of Neurology online at [www.neurology.umn.edu](http://www.neurology.umn.edu) for specific course information.
Departments and Faculty

**Professor Emeritus**
Donald L. Erickson, M.D.
Lyle A. French, M.D., Ph.D.

**Professor**
Walter A. Hall, M.D.
Walter C. Low, Ph.D.
Robert Maxwell, M.D., Ph.D.
Gaylan L. Rockswold, M.D., Ph.D.

**Assistant Professor**
Thomas A. Bergman, M.D.
Cornelius H. Lam, M.D.

The courses in neurological surgery introduce medical students to the theory, philosophy, and treatment of surgical diseases of the nervous system. The primary emphasis is on the recognition of neurological problems, with special emphasis on the broad scope of methodology used in diagnosis. Experience in methods of treatment is obtained through a close working relationship with the staff. The program provides a broad base of experience for the individual interested in general medicine but may, in certain instances, be adapted for the individual specifically interested in the neurological sciences.

Visit [www.neuro.umn.edu](http://www.neuro.umn.edu) for more information.

**Obstetrics, Gynecology, and Women's Health (Obst)**
Linda F. Carson, M.D., Professor and Head

**Professor Emeritus**
Leon L. Adock, M.D.
Harry Foreman, M.D.
Joseph Hamel, M.D.
Hardin Olson, M.D.
Konald A. Prem, M.D.
George E. Tlagatz, M.D.

**Professor**
Christopher DeJohn, Ph.D., M.P.H.
Emanuel Gaziano, M.D.
Benjamin S. Leung, Ph.D.
Takashi Okagaki, M.D., Ph.D., M.P.H.
Roger A. Potish, M.D.
Theodore R. Thompson, M.D.
Kenneth F. Trofatter, M.D.

**Associate Professor**
Charles H. Blomquist, Ph.D.
Doris C. Brooker, M.D.
Theodore C. Nagel, M.D.
Jon L. Pryor, M.D.
Sundaram Ramakrishnan, Ph.D.
Preston P. Williams, M.D.

**Assistant Professor**
Sarah B. Archer, M.D.
Barbara G. Assel, M.D.
Carol Ball, M.D.
Dennis B. Bealka, M.D.
Linda Burns, Ph.D.
David R. Burrus, M.D.

Steven E. Calvin, M.D.
Jennifer Choe, M.D.
Jonathan A. Cosin, M.D.
Laura L. Coultrip, M.D.
Robert J. Couser, M.D.
Lea A. Fairbanks, M.D.
Melvin J. Frisch, M.D.
Rise C. Hatten, M.D.
Robert Hildebrandt, M.D.
Erika Johnson, M.D.
Marilyn S. Joseph, M.D.
Patricia Judson, M.D.
Anil K. Kaul, Ph.D.
Rashmi Kaul, M.D.
Fredrick H. Kravitz, M.D.
June LaValleeur, M.D.
Virginia R. Lupo, M.D.
David I. Lynch-Salamon, M.D.
Patricia A. Mills, M.D.
Judith A. Ney, M.D.
Sharon Norling, M.D.
Sue V. Petzel, Ph.D.
Kathleen M. Pfleghaar, M.D.
Mark L. Tanz, M.D.
Jeffrey Warshaw, M.D.
David I. Wigren, M.D.
Donald D. Woth, M.D.

The mission of the Department of Obstetrics, Gynecology, and Women's Health is to lead an ethical, innovative, and efficient discovery and dissemination of knowledge to enhance the health and well-being of women. The faculty develops knowledge and teaching skills to provide a basic foundation in women's health issues. Programs enable students to develop knowledge of health challenges confronting women. The department offers a series of clinical and investigative courses to fit a variety of student's interests through the Reproductive Health and Infertility Center, Women's Cancer Center, Mature Women's Center, and the Birthplace and Perinatal Diagnostic Center, as well as with faculty at affiliated hospitals and clinics.

For more information, go to [www.med.umn.edu/obgyn](http://www.med.umn.edu/obgyn).

**Ophthalmology (Oph)**
Jay H. Krachmer, M.D., Professor and Chair

**Professor Emeritus**
William H. Knobloch, M.D.
Robert D. Letson, M.D.

**Professor**
Donald J. Doughman, M.D.
Dale S. Gregorson, Ph.D.
J. Daniel Nelson, M.D.
C. Gail Summers, M.D.
Jonathan D. Wirtschafter, M.D.

Associate Professor
Stephen P. Christiansen, M.D.
Andrew J. W. Huang, M.D., M.P.H.
Mary Lawrence, M.D., M.P.H.
Linda K. McLoon, Ph.D.
Aaron Nathenson, M.D.
Timothy W. Olsen, M.D.

Assistant Professor
Erick D. Bothun, M.D.
Deborah Ferrington, M.D.
Andrew R. Harrison, M.D.
Richard H. Johnston, M.D.
Howard D. Pomeranz, M.D., Ph.D.
Pamela R. Rath, M.D.
Eric R. Steuer, M.D., Ph.D.
Martha M. Wright, M.D.

The courses developed by the Department of Ophthalmology enable medical students to understand the pathophysiologic processes that affect the eye and vision, develop basic skills in examining and caring for patients with ophthalmologic disease processes, and participate in both basic science and clinical research projects related to ophthalmology.

Visit the Department of Ophthalmology online at www.ophthalmology.umn.edu.

Orthopaedic Surgery (OrSu)
Marc F. Swiontkowski, M.D., Professor and Head

Professor Emeritus
James H. House, M.D.

Professor
Gordon M. Aamoth, M.D.
Edward Y. Cheng, M.D.
James R. Gage, M.D.
Ramon B. Gustilo, M.D.
Richard F. Kyle, M.D.
Jack L. Lewis, Ph.D.
David W. Polly, M.D.
Richard Schmidt, M.D.
Roby C. Thompson, Jr., M.D.

Associate Professor Emeritus
Robert F. Premer, M.D.

Associate Professor
Elizabeth A. Arendt, M.D.
Daniel D. Buss, M.D.
Denis Clohisy, M.D.
Timothy A. Garvey, M.D.
Terence Gioe, M.D.
Steven E. Koop, M.D.
Robert F. LaPrade, M.D.
Tom Novacheck, M.D.
Rodney Peterson, M.D.
Matthew Putnam, M.D.
Deborah Quanbeck, M.D.
Andrew Schmidt, M.D.
Ensor E. Transfeldt, M.D.
Ann Van Heest, M.D.

Assistant Professor
Joan E. Bechtold, Ph.D.
Douglas Becker, M.D.
Gregory Brown, M.D.
J. Chris Coetzee, M.D.
Leo J. de Souza, M.D.
Douglas Drake, M.D.
Stephen England, M.D.
Michael Freehill, M.D.
James Larson, M.D.
Lael Luedtke, M.D.
Fernando A. Penz, M.D.
Joseph Perra, M.D.
Richard Reut, D.O.
Harry J. Robinson, Jr., M.D.
Edward Rutledge, M.D.
James Schwender, M.D.
John Stark, M.D.
Stephen Sundberg, M.D.
David C. Templeman, M.D.
Thomas F. Varecka, M.D.
Kevin Walker, M.D.
Robert Wengler, M.D.

The courses in orthopaedic surgery provide students with the foundation necessary for performing a basic neuromusculoskeletal examination of the patient, for correlating the clinical expressions of disease with basic science, and for recognizing those patient problems that require immediate appraisal and resolution. In a number of clinical electives, students have the option of participating in the diagnostic and therapeutic management of patients with orthopaedic and traumatic disabilities. This advanced experience provides an understanding of fundamental orthopaedic principles, the scope of orthopaedic surgery, and the opportunities for both clinical and basic investigation in orthopaedic surgery.

Visit www.ortho.umn.edu for more information.

Otolaryngology (Otol)
George L. Adams, M.D., Professor and Head

Professor Emeritus
Frank M. Lassman, Ph.D.

Professor
Khalil Ahmed, Ph.D.
S. K. Juhn, M.D.
Robert H. Maisel, M.D.
Robert H. Margolis, Ph.D.
David A. Nelson, Ph.D.
Peter A. Santi, Ph.D.

Associate Professor
John H. Anderson, M.D., Ph.D.
Kathleen A. Daly, M.P.H., Ph.D.
Richard P. DiFabio, Ph.D.
Markus Gapany, M.D.
Students are introduced to clinical otolaryngology through an introduction to common and serious problems, including epistaxis, emergency airways, otitis media, and sinusitis. During rotations with faculty at related facilities, students see and participate in caring for a full range of head and neck problems. The faculty emphasizes anatomic, physiologic, and pathologic changes in the ears, nose, and throat. Differential diagnosis and appropriate examination and evaluation are emphasized. Students have opportunities to experience surgical otolaryngology.

To learn more, visit online at [www.ahc.umn.edu](http://www.ahc.umn.edu)/colleges/medschool/departments/otolaryngology.

Pediatrics (Ped)

John Schreiber, M.P.H., M.D., Professor and Head

Regents' Professor Emeritus
Robert Gorlin, D.D.S., M.S.
Alfred Michael, M.D.
Paul Quie, M.D.

James White, M.D.

Professor Emeritus
Ray Anderson, M.D.
Barbara Burke, M.D.
C. Carlyle Clawson, M.D.
Robert O. Fisch, M.D.
Ernest Gray, Ph.D.
William Krivit, M.D., Ph.D.
Lawrence Lockman, M.D.
Mark E. Nesbit, Jr., M.D.
George Noren, M.D.
Richard Raile, M.D.
Norma Ramsay, M.D.
Krisha Saxena, M.D.
Harvey Sharp, M.D.
Robert Ulstrom, M.D.
Robert L. Vernier, M.D.

Professor
Henry Balfour, Jr., M.D.
Linda Bearinger, Ph.D., M.S., R.N.
Kumar Belani, M.D.
Susan Berry, M.D.
Bruce R. Blazar, M.D.
Robert Blum, M.D., Ph.D.
Malcolm Blumenthal, M.D.
David M. Brown, M.D.
Blanche Chavers, M.D.
Ann Dunnigan, M.D.
Patricia Ferrieri, M.D.
Alfred Fish, M.D.
Michael Georgiiff, M.D.
Harry Hull, M.D.
David Inghar, M.D.
Dana Johnson, M.D., Ph.D.
Edward Kaplan, M.D.
Clifford Kashtan, M.D.
John Kersey, M.D.
Youngki Kim, M.D.
Richard King, M.D., Ph.D.
Daniel Kohen, M.D.
Robert Kriel, M.D.
Mark Mammel, M.D.
S. Michael Mauer, M.D.
James Moller, M.D.
Joseph Neglia, M.D., M.P.H.
Charles Nelson, Ph.D.
Thomas Nevins, M.D.
Gary Remafedi, M.D., M.P.H.
Michael Resnick, Ph.D.
Les Robison, Ph.D.
Scott Selleck, M.D., Ph.D.
Elsa Shapiro, Ph.D., L.P.
Alan R. Sinaiko, M.D.
Mary Story, Ph.D., R.D.
C. Gail Summers, M.D.
Theodore R. Thompson, M.D.
Travis Thompson, Ph.D.
Charles Truwt, M.D.
John Wagner, M.D.
O. Douglas Wangensteen, Ph.D.
Warren Warwick, M.D.
Chester B. Whitley, Ph.D., M.D.

Associate Professor Emeritus
Rolf Engel, M.D.

Associate Professor
John Bass, M.D.
Bruce Bostrom, M.D.
Elizabeh Brautlin, M.D., Ph.D.
Pi-Nian Chang, Ph.D.
Wei Chen, M.D., Ph.D.
Stephen Christianson, M.D.
Amos Deinard, M.D.
B. Carl Elliott, M.D., Ph.D.
David Fisher, M.D.
Leo Fung, M.D.
James Gurney, Ph.D.
Imad Haddad, M.D.
Peter Hesslein, M.D.
Marjorie Hogan, M.D.
Mathur Kannan, B.V.Sc., Ph.D.
Samuel Levine, M.D.
Linda L. Lindeke, Ph.D., R.N., C.N.P.
Ann Mertens, Ph.D.
Antoinette Moran, M.D.
Dianne Neumark-Sztainer, Ph.D., M.P.H., R.D.
Charles Oberg, M.D.
Charles Peters, M.D.
Mary Ella Pierpont, M.D., Ph.D.
Gregory Plotnikoff, M.D., M.T.S.
Warren Regelmann, M.D.
Michael Reiff, M.D.
Gerald Rosen, M.D.
Julie Ross, Ph.D.
Leon Satran, M.D.
Sarah Jane Schwarzenberg, M.D.
Reene Sieving, R.N., Ph.D.
James Sidman, M.D.
Clark Smith II, M.D.
Julia Steinberger, M.D.
Marie Steiner, M.D.
Michael Sweeney, M.D.
Raymond Tervo, M.D.

Assistant Professor
Robert Acton, M.D.
U. Evren Akin, M.D.
Fiona Anderson, Ph.D.
Richard Andersen, M.D.
K. Scott Baker, M.D., M.S.
Jean Barton, M.D.
Catherine Bendel, M.D.
Michael Bendel-Stenzel, M.D.
Bradley Benson, M.D.
Iris Borowsky, M.D., Ph.D.
Kerri Boutelle, Ph.D.
Gail Brottman, M.D.
Lawrence Charnas, M.D., Ph.D.
Raul Cifuentes, M.D.
J. Michael Coleman, M.D.
Eileen Crespo, M.D.
Timothy Culbert, M.D.
Diana Cutts, M.D.
Desireé Czapansky-Beilman, M.D.
Sloan d’Autremont, M.D.
Ralph Faville, M.D.
Gary Fifield, M.D.
Cheryl Gale, M.D.
John Garcia, M.D.
Catherine Gatto, M.D.
Elizabeth Gilles, M.D.
Wayne Godfrey, M.D.
Davida Zelinsky Goldman, Ph.D.
Satkiran Grewal, M.D.
Sixto Guiang, M.D.
Julie Hauer, M.D.
Cynthia Herrington, M.D.
Laura Hoyt, M.D.
Steven Hughes, Ph.D.
Elizabeth Ingulli, M.D.
Catherine Jordan, Ph.D., L.P.
Julia Joseph-Di Caprio, M.D.
Deepak Kamat, M.D.
Anne Kelly, M.D., M.P.H.
Andrew Kiragu, M.D.
Peter Loewenson, M.D.

Jamie Lohr, M.D.
Sarah Lucken, M.D.
Richard Lussky, M.D.
Margaret MacMillan, M.D.
Stacene Maroushek, M.D.
Dawn Martin, M.D.
Clea McNeely, Ph.D.
Nancy Mendelsohn, M.D.
Carlos Mills, M.D.
Bradley Miller, M.D., Ph.D.
Rajaram Nagarajam, M.D.
L. James Nixon, M.D.
Paul Orchard, M.D.
Andrew Ozolins, M.D.
Angela Panoskalsitas-Mortari, Ph.D.
Anna Petryk, M.D.
Michael Potegal, Ph.D.
Lee Pyles, M.D.
Raghavendra Rao, M.D.
Teresa Reid, M.D.
David Rimell, M.D.
William Rosen, M.D.
Daniel A. Saltzman, M.D., Ph.D.
Kumud Sane, M.D.
Peter Scal, M.D.
Lisa Schimmenti, M.D.
Karen Scott, M.D.
Angela Sidler, M.D.
Nimi Singh, M.D.
Joseph Sockalsky, M.D.
Logan Spector, Ph.D.
Christine Ternand, M.D.
Jill Therian, M.D.
David Thompson, M.D.
Linda Thompson, M.D.
John D. Tobin, M.D.
Jakub Tolar, M.D., Ph.D.
Rachel Trockman, M.D.
Albert Tsai, M.D.
Anna Tsirka, M.D.
Richard K. Vehe, M.D.
R. Scott Velders, M.D.
Michael Verneris, M.D.
Michael Vespasiano, M.D.
Brenda Weigel, M.D.
Tonya White, M.D.
Laurel Wills, M.D.
Paul Zenker, M.D.
Bing Zhou, Ph.D.
Richard Ziegler, Ph.D.
Judith Zier, M.D.

Instructor
Arthur A. Beisang III, M.D.
Ellen Bendel-Stenzel, M.D.
Stephen Blythe, M.D.
Sharon Chen, M.D.
T. Bruce Ferrara, M.D.
Erik Hagen, M.D.
Nancy Kammer, M.D.
Khalid Khan, M.D.
Lydia Najera, M.D.
Pediatrics is concerned with the basic aspects of human developmental biology, both in the prenatal period and postnatal life. Knowledge of growth and development is very important to studying diseases in the interdisciplinary organ system courses offered during year two. Applying this knowledge to pediatric patients and acquiring skills in assessing growth and developmental aspects are learned through the Student as Physician tutorials. With a faculty tutor, students examine children with various pediatric conditions and problems.

In years three and four, students may choose several types of pediatric experience. They may participate in caring for children in the inpatient and outpatient services of University-affiliated hospitals. In these experiences, emphasis is on the diagnoses and management of pediatric disease and its effect on the child's growth and development. Students may choose to observe and participate in diagnostic and care programs concerned with specific aspects of pediatrics: the premature and newborn; development; endocrinology; allergy; cardiology; psychiatry; nephrology; and infectious diseases. Finally, students may elect a research experience or other opportunity in an area of special interest in selected basic areas of pediatrics.

To reinforce fundamental concepts in the clinical programs, courses emphasize applying basic knowledge in preventing, diagnosing, and managing diseases of infants and children.

Visit www.peds.umn.edu to learn more about the Department of Pediatrics.
Departments and Faculty

Rebecca Koerner, M.D.
Michael Koskiak, M.D.
Linda Krach, M.D.
Loren Leslie, M.D.
Cheryl Meyers, B.S.
Michael Mustonen, D.O.
John E. Quast, M.D.
Charlotte Roehr, M.D.
Barbara Sigford, M.D.
Erica Stern, B.S., M.S., Ph.D.
Marshall Taniguchi, M.D.
Juliann Thomas, B.S., M.H.E.
LaDora V. Thompson, Ph.D.
Ensor Transfeldt, M.D.
Bonnie L. Warhol, M.D.
Marilyn Weber, M.D.

Instructor
Diane Anderson
Cheryl Meyers, B.S.
LeAnn Snow, M.D.

Care of patients with physical disabilities or chronic diseases has become an important part of medical practice. Comprehensive medical management of such patients requires that the physician evaluate those abilities of each patient that may be used to restore the individual to useful function. Rehabilitation may require the use of multiple types of therapy. The allied health professions participate with the physician in a coordinated rehabilitation program. In the Rehabilitation Center, this multidisciplinary approach is used in the treatment of patients. Students learn about the comprehensive care of disabled patients and participate in the program of rehabilitation. By active involvement in the management of patients, students learn the methods of coordination of care, communication, leadership, and administration necessary for professional practice. There is also opportunity to participate in research related to neuromuscular and circulatory functions, techniques of therapy, programs for management of patients, and methods of education in the health professions.

To learn more, visit the department online at www.pmrc.umn.edu.

Physiology (Phsl)

O. Douglas Wagensteen, Ph.D., Professor and Interim Head

Professor Emeritus
Marvin Bacaner, M.D.
Joseph DiSalvo, Ph.D.
Richard L. Purple, Ph.D.

Professor
Robert J. Bache, M.D.
David N. Cornfield, M.D.
Paul A. Iaizzo, Ph.D.
David H. Ingbar, M.D.
David G. Levitt, M.D., Ph.D.
Walter C. Low, Ph.D.

Scott M. O'Grady, Ph.D.
John W. Osborn, Ph.D.
Doris A. Taylor, Ph.D.
E. Kenneth Weir, M.D.

Associate Professor
Jurgen F. Fohlmeister, Ph.D.
Stephen Katz, Ph.D.
LaDora V. Thompson, Ph.D.
Kathleen R. Zahs, Ph.D.

Assistant Professor
Vincent A. Barnett, Ph.D.
Susan A. Keirstead, Ph.D.
Kenneth P. Roberts, Ph.D.
Anthony J. Weinhaus, Ph.D.

Instructor
George Bloom, B.S.

Lecturer
Lisa Carney Anderson, Ph.D.

Physiology is the study of biological function at all levels of organization, including molecules, cells, tissues, organs, organ systems, and organisms. Areas of interest to the faculty range from cellular processes of ion transport and muscle protein function to the integrated activity of several tissues and organs as in the control of blood pressure. In addition to conducting their own research, department faculty collaborate with clinical and basic science colleagues on projects related to specific diseases and the broad field of functional genomics.

Department faculty members teach beginning and advanced courses in the College of Liberal Arts and several colleges of the Academic Health Center. The physiology course for first year medical students provides a background in normal function that is necessary to understand abnormal functions manifested in disease. The course covers muscle physiology and the cardiovascular, respiratory, gastrointestinal, and renal organ systems. It builds upon material from biochemistry, anatomy, and histology, and is integrated with organ system pathophysiology courses taught in the second year. Other lecture and tutorial courses are also available, including a series of week-long advanced courses designed for individuals working in the biomedical industry but also open to graduate students, residents, and fellows.

More information can be found at the Physiology Department online at http://physiology.med.umn.edu.

Psychiatry

S. Charles Schulz, M.D., Professor and Head

Adult Psychiatry (AdPy)

Professor
Marilyn Carroll, Ph.D.
Maurice Dysken, M.D.
Elke Eckert, M.D.
Esam El-Fakahany, Ph.D.

40 Departments and Faculty
Human Behavior is a 27-hour course taught in the latter part of the first year. This course focuses on growth and development; stress and coping; sleep physiology and behavior; the neurobiology of memory, language, emotion, and attention; medical sociology; and family systems.

Psyche, a 20-hour course on specific mental disorders, is given in the second year in conjunction with neurology, respiratory, cardiovascular topics, and the pharmacology of drugs affecting the central nervous system. The epidemiology, descriptive psychopathology, etiology, and prognosis of the major child and adult mental disorders are presented. The focus is on the chronic, severe mental disorders, such as schizophrenia, manic-depression, and alcoholism, which have an early onset and will affect as much as 20 percent of the population. Consideration of treatment is limited to elucidation of etiology. Six hours of the course are taught in a small-group format (12 to 15 students), which uses videotaped examples of psychopathology.

In the third year, students take a full-time six-week clerkship in psychiatry. The clerkship emphasizes inpatient care of adult patients. Attention is given to the psychiatric examination, diagnosis, and treatment. All students should be proficient at assessing depression, psychosis, suicidal potential, and cognitive function. Both somatic and psychosocial treatments are used, and students are expected to be knowledgeable about the dosages, side effects, and drug interactions of the classes of major psychotropic drugs. Students are instructed on the recognition and discussion of psychosocial factors in the genesis and continuation of psychiatric disorders, but are not trained in psychotherapy. Students will work up and follow specific patients and be responsible for designing and implementing a treatment plan and maintaining the medical record. Each clerkship site gives a series of lectures on diagnosis and treatment of the major mental disorders and a specific text is assigned during the clerkship.

Electives offered to fourth-year students include consultation-liaison psychiatry, child psychiatry, outpatient psychiatry, community psychiatry, chemical dependency, clinical psychopharmacology, neuropsychology, and geriatric psychiatry. Students may participate in psychiatric research projects as part of a formal elective for credit or in an informal manner through arrangement with a faculty member. Further information on the Psychiatry Department is online at [www.psychiatry.umn.edu](http://www.psychiatry.umn.edu).

Radiology (Rad)
Charles Dietz, M.D., Associate Professor and Chair
Professor Emeritus
Eugene Gedgaudas, M.D.
Departments and Faculty

**Professor**
- Carol Coleman-Steenson, M.D.
- Michael Garwood, Ph.D.
- Xiaoping Hu, Ph.D.
- David Hunter, M.D.
- John Kucharczyk, Ph.D.
- Donovan Reinke, M.D.
- David Rottenberg, M.D.
- E. Russell Ritenour, Ph.D.
- Charles Truwit, M.D.
- Kamil Ugurbil, Ph.D.

**Associate Professor**
- Gary Amundson, M.D.
- Quentin Anderson, M.D.
- Howard Ansel, M.D.
- Carroll Arnett, M.D.
- Wei Chen, Ph.D.
- Lenore Everson, M.D.
- Richard Geise, Ph.D.
- Marvin E. Goldberg, M.D.
- Rolf Gruetter, Ph.D.
- Bruce Hammer, Ph.D.
- Stephen Strother, M.D.
- Stephen Trenkner, M.D.
- J. Thomas Vaughan, Ph.D.
- Zeev Vlodaver, M.D.

**Assistant Professor**
- Earl Bender, M.D.
- Manferd Benson, M.D.
- Sean Caesey M.D.
- Namarta Chandra, M.D.
- Michael Cumming, M.D.
- Frank Grund, M.D.
- Bruce Hasselquist, Ph.D.
- John Hildebrandt, M.D.
- Jeremy Hollerman, M.D.
- Edward Juodis, M.D.
- Barbara Knoll, M.D.
- Wendy Kroll, M.D.
- Charlenz Krenzel, M.D.
- Bert Larson, M.D.
- Robert Miller, M.D.
- Michael Mungeon, M.D.
- Anthony Severt, M.D.
- Warren Stanchfield, M.D.
- Ying Wang, M.D.
- Neil Wasserman, M.D.
- Pamela Wymore, M.D.

**Division of Nuclear Medicine**

**Professor Emeritus**
- Merle Loken, M.D., Ph.D.

**Assistant Professor**
- Frank Grund, M.D.
- Bert Larson, M.D.

For information on the Department of Radiology, go to www.radiology.umn.edu.
Departments and Faculty

Zhiguang Guo, M.D., Ph.D.
Jennifer L. Gunn, Ph.D.
Ian K. Hasinoff, M.D.
Cynthia S. Herrington, M.D.
Abhinav Humar, M.D.
Donal M. Jacobs, M.D.
Raja Kandaswamy, M.D.
Rosemary F. Kelly, M.D.
Suneel Khetarpal, M.D.
Nicole Kirchhof, D.V.M.
Mary E. Knatterud, Ph.D.
George H. Landis, M.D.
Brett K. Levay-Young, Ph.D.
Dean E. Mann, M.D.
Michael McGonigal, M.D.
Todd J. Morris, M.D., Ph.D.
Arthur L. Ney, M.D.
Mark D Odland, M.D.
Daniel A. Saltzman, M.D., Ph.D.
Susan C. Seatter, M.D.
Timothy D. Sielaff, M.D.
Karen R. Wasiulik, Ph.D.
Seth I. Wolpert, M.D.
Joan M. Van Camp, M.D.
Joseph R. Van Camp, M.D.
Ricard T. Zera, M.D., Ph.D.

Instructor
Roger R. Denny, M.D.
James V. Harmon, Jr., M.D.
Khalid Khwaja, M.D.
Steven Paraskevas, M.D.
Thiagarajan Ramcharan, M.D.

The curriculum for Surg 7500, a required course for year three and four students, has been divided into 12 core areas of study, and there are lectures on each topic. The 12 core topics are taught at a highly clinical level, emphasizing patient management. The course is offered at seven academic and private hospitals and includes a surgical-skills laboratory and faculty weekly lectures, as well as an oral and written examination.

The Department of Surgery also offers an array of elective courses: advanced externship in general surgery; externship in outpatient/ambulatory surgery; and surgical research. Courses in the surgical specialties (burn, plastics, colorectal) are offered as well. These courses increase the scope of clinical exposure and allow students to participate in the care of patients in the operating room, in the hospital, and in the clinic.

For more information, visit the Department of Surgery online at www.surg.umn.edu.

Colon and Rectal Surgery
David Rothenberger, M.D., Professor and Director

Provides exposure to a wide variety of colorectal problems, including cancer, inflammatory bowel disease, diverticulitis, fissure-in-ano, perianal abscesses, and hemorrhoids.

Therapeutic Radiology-Radiation Oncology (TRad)

Kathryn E. Dusenbery, M.D., Associate Professor and Head

Professor
Chung Kyu Kim Lee, M.D.
Seymour H. Levitt, M.D.
Roger A. Potish, M.D.
Chang W. Song, Ph.D.
Daniel A. Vallera, Ph.D.

Associate Professor
Bruce Gerbi, Ph.D.
Gordon Grabo, M.D.
Patrick Higgins, Ph.D.

Assistant Professor
Parham Alaei, Ph.D.
Robert Griffin, Ph.D.
Susanta Hui, Ph.D.
Joaquin Silva, M.D.

Instructor
Jane Johnson, M.S.

The mission of the Department of Therapeutic Radiology–Radiation Oncology is to conduct high quality education, cutting-edge basic and clinical research, and provide excellent patient care. More information can be found at www.med.umn.edu/trad.

Urology (Urol)

Jon Pryor, M.D., Professor and Head

Professor
John Bischof, Ph.D.
Michael Pergament, M.D.
Gerald Timm, Ph.D.

Associate Professor
Eduardo Fernandes, M.D.
Leo Fong, M.D.
Kenneth Koeneman, M.D.
Manjo Monga, M.D.
J. Bruce Redmon, M.D.

Assistant Professor
Joe Lee, M.D.
Kenneth Roberts, Ph.D.
Joel Slaton, M.D.
Steven Schwartz, M.D.
Michael Tran, M.D.

The mission of the Department of Urologic Surgery is to train excellent urological surgeons and to provide high quality education to residents and medical students. The department provides outstanding clinical care to the community and furthers medical research and education in urology.

Visit the Department of Urology online at www.urology.umn.edu for more information.
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Patricia Simmons, Congressional District 1

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Roby C. Thompson, Jr., M.D., Senior Associate Dean for Clinical Affairs
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Helene M. Horwitz, Ph.D., Associate Dean for Student Affairs
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Carl Platou, Senior Adviser to Dean

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Richard G. Hoffman, Associate Dean for Education and Curriculum
Lillian A. Repesh, Associate Dean for Admissions and Student Affairs
George J. Trachte, Associate Dean for Research
Raymond Christensen, Assistant Dean for Rural Health

The Medical School is one of several health science units of the Academic Health Center. The other units are the School of Dentistry, School of Nursing, College of Pharmacy, School of Public Health, and the College of Veterinary Medicine. The chief administrative officer of the Medical School is the dean. The dean is assisted by several senior associate and associate deans and directors in carrying out the policies developed by the faculty to achieve the goals set forth in the Board of Regents Statement of the Mission of the Health Sciences, as it pertains to the Medical School.
University Information

Contact Information

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Center of American Indian and Minority Health
B-605 Mayo Memorial Building
420 Delaware St. S.E.
Minneapolis, MN 55455
612-626-0465
www.caimh.org
Child Care Center
1600 Rollins Ave. S.E.
Minneapolis, MN 55455
612-627-4014
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Counseling and Consulting Services
109 Eddy Hall
192 Pillsbury Dr. S.E.
Minneapolis, MN 55455
612-624-3323
www.ucs.umn.edu
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Minneapolis, MN 55455
612-626-1333, voice or TTY
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Health Careers Center
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515 Delaware St. S.E.
Minneapolis, MN 55455
612-624-6767
www.healthcareers.umn.edu
Housing & Residential Life
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Minneapolis, MN 55455
612-624-5194
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Financial Aid Office
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420 Delaware St. S.E.
Minneapolis, MN 55455
612-625-4998
www.memed.umn.edu/financial

Office of Diversity & Minority Affairs
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420 Delaware St. S.E.
Minneapolis, MN 55455
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www.meded.umn.edu/minority

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Counseling Services
104 Health Services
Duluth, MN 55812
218-726-8155
www.d.umn.edu/hlthserv

Financial Aid Office
1035 University Dr., Room 114
Duluth, MN 55812
218-726-5701
http://penguin.d.umn.edu/Admissions/finaid.htm

Health Services
104 Health Services
Duluth, MN 55812
218-726-8155
www.d.umn.edu/hlthserv

Kirby Student Center (Housing)
218-726-7170
www.d.umn.edu/kirby

UMD Information
218-726-8000
www.d.umn.edu
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In adhering to this policy, the University abides by the Minnesota Human Rights Act, Minnesota Statute Ch. 363; by the Federal Civil Rights Act, 42 U.S.C. 2000e; by the requirements of Title IX of the Education Amendments of 1972; by Sections 503 and 504 of the Rehabilitation Act of 1973; by the Americans With Disabilities Act of 1990; by Executive Order 11246, as amended; by 38 U.S.C. 2012, the Vietnam Era Veterans Readjustment Assistance Act of 1972, as amended; and by other applicable statutes and regulations relating to equality of opportunity.

Inquiries regarding compliance may be directed to Julie Sweitzer, Director, Office of Equal Opportunity and Affirmative Action, University of Minnesota, 419 Morrill Hall, 100 Church Street S.E., Minneapolis, MN 55455 (612-624-9547), or Mary Tate, Director of Minority Affairs and Diversity, Medical School, 8005 Mayo, 420 Delaware St. S.E., Minneapolis, MN 55455 (612-625-1494).

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In accordance with regents’ policy on access to student records, information about a student generally may not be released to a third party without the student’s permission. (Exceptions under the law include state and federal educational and financial aid institutions.) The policy also permits students to review their educational records and to challenge the contents of those records.

Some student information—name, address, electronic (e-mail) address, telephone number, dates of enrollment, enrollment status (full-time, part-time, not enrolled, withdrawn and date of withdrawal), college and class, major, adviser, academic awards and honors received, and degrees earned—is considered public or directory information. Students may prevent the release of public information. To do so, they must notify the records office on their campus.

Students have the right to review their educational records and to challenge the contents of those records. The regents’ policy is available for review on the Web at onestop.umn.edu/onestop/Grades_Transcripts/RecordsPolicy.html, at 200 Fraser Hall, Minneapolis, and at records offices on other campuses of the University. Questions may be directed to the Office of the Registrar, 200 Fraser Hall (612-625-5333).

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No extracurricular events requiring student participation may be scheduled from the beginning of study day to the end of finals week. Exceptions to this policy may be granted by the Senate Committee on Educational Policy. The Senate advises all faculty that any exemption granted pursuant to this policy shall be honored and that students who are unable to complete course requirements during finals week shall be provided an alternative and timely opportunity to do so.

Smoke-Free Campus Policy
Smoking is prohibited in all facilities of the University of Minnesota Twin Cities campus except for designated private residence hall rooms.

E-mail: the University’s Official Means of Communication
Students are responsible for all information sent via their University e-mail account. Students who forward their University e-mail account are still responsible for all information, including attachments, sent to the account.