

# 08/09

UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE



2008 – 09 FACT BOOK

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Cover photo by Annie O'Neill

## OVERVIEW

■ The goal of the University of Pittsburgh School of Medicine is to educate physicians who are science-based, skilled, and compassionate clinicians prepared to meet the challenges of practicing medicine in the 21st century and to conduct cutting-edge biomedical research that is focused on bettering the human condition and advancing the fundamental understanding of medical science.

■ In the only truly objective metric by which the overall stature of research-focused institutions can be assessed in a nationally competitive context, the University of Pittsburgh moved into the top 10 list of recipients of National Institutes of Health funding in 1997 and has maintained its position, steadily climbing within this enviable echelon, ever since. In fiscal year 2006, out of more than 3,400 institutions nationwide, Pitt (together with Children's Hospital of Pittsburgh of UPMC, Magee-Womens Research Institute, and its other affiliates) ranked sixth among educational institutions and affiliates in NIH funding and fourth in the number of individual NIH grants received that year. Final data for 2007 have not yet been released.

■ Medical schools are periodically subject to full accreditation review by the Liaison Committee on Medical Education (LCME), the accrediting authority for MD degree programs in the United States and Canada. The process of meeting and maintaining accreditation requires a medical school to comply with a long list of rigorous national standards. After its most recent review here, the LCME survey team reported it had found numerous areas of strength and not a single area of weakness, which essentially meant the School of Medicine had achieved a perfect "score."

- Pitt medical students consistently perform well on the United States Medical Licensing Examination (USMLE), which consists of a basic sciences test at the end of their second year (Step 1) and tests for clinical knowledge and clinical skills during their fourth year (Step 2CK and Step 2CS). Our students regularly score above the national mean on these tests and almost always have a higher pass rate than the corresponding national average.
- Each year, the National Resident Matching Program consistently pairs Pitt's fourth-year medical students with some of the nation's top residency programs in virtually all specialty areas. In 2008, 59 percent of our graduates matched to residencies in one of the country's 20 most prestigious (and, therefore, most coveted and competitive) academic medical centers, including Johns Hopkins Hospital; Brigham and Women's Hospital; UCLA Medical Center; University of California, San Francisco Medical Center; University of Washington Affiliated Hospitals; Massachusetts General Hospital; the Hospital of the University of Pennsylvania; and the University of Pittsburgh Medical Center. Among our most recent graduates, 41 percent chose primary care specialties, 10 percent general surgery and surgical specialties, and 33 percent hospital-based specialties.

FOR MORE INFORMATION: [WWW.MEDSCHOOL.PITT.EDU/ADMIS/PDIFS/RESIDENCY-MATCH08.PDF](http://WWW.MEDSCHOOL.PITT.EDU/ADMIS/PDIFS/RESIDENCY-MATCH08.PDF)

The School of Medicine began as the Western Pennsylvania Medical College and graduated its first class of physicians in 1887. In the 1890s, the medical college became affiliated with the Western University of Pennsylvania, which originated as the Pittsburgh Academy in 1787, making it one of the nation's oldest academic institutions. Western University of Pennsylvania was renamed the University of Pittsburgh in 1908.

### DEMOGRAPHICS

■ The School of Medicine has 577 MD students: 287 women (49.7 percent) and 290 men (50.3 percent). Of these students, 173 (30 percent) are Pennsylvania residents. The School of Medicine fosters an academic environment that encourages and supports a richness of diversity among students of various racial, ethnic, and cultural backgrounds. Approximately 15 percent of the students at the School of Medicine are from groups that are underrepresented within the medical profession.

■ In addition, for 2008–09, the medical school has 317 registrants in PhD programs (including those students in the Medical Scientist Training Program who selected one of the School of Medicine graduate programs for the PhD segment of their studies), plus

38 students in MS programs and 25 students in certificate programs. Not included in these numbers are students in cross-campus graduate programs who are registered through other schools.

■ As of July 1, 2008, the School of Medicine had 2,054 regular faculty members plus 1,952 volunteer faculty. Forty-nine faculty members from throughout the school are current members of the Academy of Master Educators, which was developed to recognize and reward excellence in medical education.

■ For 2008, the medical school received 5,400 applications for admission and interviewed 1,014 prospective students for the first-year class of 148 members.

FOR ADMISSIONS INFORMATION:  
[WWW.MEDSCHOOL.PITT.EDU/FUTURE/  
FUTURE\\_02\\_REQ.ASP](http://WWW.MEDSCHOOL.PITT.EDU/FUTURE/FUTURE_02_REQ.ASP)



■ The School of Medicine includes the following 29 departments: Anesthesiology; Biomedical Informatics; Cell Biology and Physiology; Computational Biology; Critical Care Medicine; Dermatology; Developmental Biology; Emergency Medicine; Family Medicine; Immunology; Medicine; Microbiology and Molecular Genetics; Neurobiology; Neurological Surgery; Neurology; Obstetrics, Gynecology, and Reproductive Sciences; Ophthalmology; Orthopaedic Surgery; Otolaryngology; Pathology; Pediatrics; Pharmacology and Chemical Biology; Physical Medicine and Rehabilitation; Psychiatry; Radiation Oncology; Radiology; Structural Biology; Surgery; and Urology. The newest of these departments—Biomedical Informatics, Computational Biology, Structural Biology, and Developmental Biology (which is now being established following its recent University approval)—reflect the school’s growing emphasis on integrating advanced technology with basic science in some of the most rapidly developing and leading-edge fields of medical research.

FOR MORE INFORMATION:

[WWW.MEDSCHOOL.PITT.EDU/DEPT/DEPT.ASP](http://WWW.MEDSCHOOL.PITT.EDU/DEPT/DEPT.ASP)

## CURRICULUM

### HIGHLIGHTS AND DISTINCTIONS

*Pitt’s medical school curriculum blends innovative teaching methods with tried-and-true techniques.*

*Here are some highlights:*

#### **Patient/Doctor Relationship**

In addition to the rigorous traditional study of the basic sciences in the first two years of medical school, Pitt offers courses from the very beginning of the medical school experience that deal with the human side of medicine. In these courses, students encounter real patients, learn how to establish a patient/doctor relationship, and develop patient interviewing skills as well as the techniques for conducting a physical examination. Starting in their first year, students are exposed to medicine being practiced in primary care ambulatory settings, including clinics and physicians’ offices.

#### **Problem-Based Learning**

In the early 1990s, Pitt was among the first medical schools to adopt a teaching method known as problem-based learning, or PBL, which engages small, faculty-mentored groups of first- and

second-year students in exercises of clinical diagnoses built from actual cases of graduated difficulty. PBL builds collaborative problem-solving skills and teaches students how to “mine” vast information resources and apply them to specific clinical cases. In PBL sessions, faculty members serve as facilitators rather than traditional instructors. Pertinent facts are presented in such a way that students must continuously analyze and re-evaluate them, seek supporting evidence, and focus their thinking to reach a differential diagnosis. This mode of instruction is an important component of our curriculum and catalyzes the development of cognitive skills in our students.



Graduation Day 2008

### **Integrated Life Science Program**

The fourth-year Integrated Life Science (ILS) Program includes a choice of courses that revisit some aspect of basic science after students have had several years of clinical experience. Because of the level of sophistication that students have developed by this stage in their medical education, they can better understand the relevance of basic science to clinical problems. Each student is required to complete one of the following ILS courses: Neoplasia and Neoplastic Disease; Neurosurgery; Clinical Pharmacology; Surgical Integrated Life Sciences; Infectious Disease in Obstetrics, Gynecology, and Reproductive Medicine; Molecular Medicine; or Science of Resuscitation.

### **Evidence-Based Medicine**

An important skill set for physicians today is being able to interpret and evaluate new findings reported in the medical literature and to apply these advances to real-life circumstances. For instance, the ability to understand and rapidly evaluate conflicting reports on a new or even a commonly used drug is increasingly important in daily patient care. Evidence-based medicine—an ongoing focus of our curriculum—teaches students how to critically evaluate the medical literature and to use



Match Day 2008

medical databases to make patient care decisions based on best-known practice.

### **Scholarly Project**

At the University of Pittsburgh, all medical students engage in a scholarly project. This program has been incorporated longitudinally throughout the curriculum as an indispensable component of medical education and has been broadly defined to provide a wide range of opportunities (including traditional laboratory-based or clinical research experiences as well as less obvious choices) to appeal to individual students' interests and aspirations. The intent is to expose students to the mechanics of scientific investigation; teach them how to develop a hypothesis and how to collect, analyze, and interpret data to support it; encourage them to pursue research opportunities;

and help them understand the structure of thought underlying the practice of medicine. Among the program's distinctive elements are thorough preparatory course work designed to foster the skills that students need to successfully conduct scholarly work, an emphasis on developing strong faculty mentors to ensure the program's ongoing success, and creative use of electronic technology to promote learning and mentorship. Many students initiate their scholarly project by participating in a summer research program, while others might take a year off to pursue an intensive research program at Pitt or elsewhere. Some students find the experience so rewarding that they consider a career as a physician-scientist. The goal in every case, however, is to enhance their ability to think independently, critically, and creatively and, thereby, become better equipped to practice medicine in the 21st century. The Class of 2008 was the first to complete the scholarly project experience. Their endeavors resulted in 13 fellowships, grants, or other national awards; 20 School of Medicine awards; co-authorship of 42 peer-reviewed papers; and more than 46 national presentations and abstracts.



Dr. John Mahoney

### **Teaching Methods**

Lectures are only one of the teaching methods used at the School of Medicine. In fact, in their first two years, students spend only about one-third of their time in lectures. Another third is spent in small-group sessions; the rest is devoted to a mix of activities, including self-directed learning, computer-based study, community visits, and clinical experiences, among others.

### **Simulation Training**

All Pitt medical students engage in comprehensive learning activities using whole-body simulators; two-thirds of them opt for additional elective time with these sophisticated training tools,

which provide the opportunity for students to develop resuscitation, defibrillation, auscultation, airway management, and other clinical skills. Task-specific models are used to develop proficiency in vascular access and suturing procedures, among others, and the proper techniques for conducting breast, pelvic, and prostate exams. Pitt's Peter M. Winter Institute for Simulation Education and Research (WISER) is considered one of the world's leading academic medical simulation training centers, featuring highly sophisticated and life-like computer-based simulation technology designed to enable students to learn, practice, and perfect clinical procedures before performing them on actual patients.

FOR MORE INFORMATION:  
[WWW.WISER.PITT.EDU](http://WWW.WISER.PITT.EDU)



## Standardized Patients

Throughout their medical education, students encounter standardized patients—people who are specially trained to present realistic and consistent behavior, symptoms, and medical histories in simulated doctor-patient interactions. These sessions are designed to help students develop their clinical skills and learn how to deal with unusual or unexpected circumstances in a safe and constructive environment. Students find that these experiences reinforce lessons they have learned through other components of the curriculum and, in a realistic way, make them relevant. The standardized patients themselves can contribute to the learning process by emerging from their role to offer feedback on the encounter and an assessment of the student's performance.

FOR MORE INFORMATION:

[WWW.OMED.PITT.EDU/STANDARDIZED](http://WWW.OMED.PITT.EDU/STANDARDIZED)

The University of Pittsburgh School of Medicine is the recipient of the American Medical Student Association's 2008 Paul R. Wright Award for Excellence in Medical Education. The emphasis of the 2008 award is revitalizing professionalism in medical education.

## TECHNOLOGY DEVELOPMENTS

*The School of Medicine is always upgrading its use of technology to optimize learning methods available to students and to remain at the forefront of medical education. Here's a summary of current features:*

- All 35 small-group classrooms are equipped with state-of-the-art computers and ceiling-mounted LCD projectors, which make it practical for everyone in the room to be engaged in computer-based learning activities.

- Lecture rooms regularly used by medical students feature multi-media presentation systems, including dual ceiling-mounted LCD projectors; video equipment that enables a professor to show live images (e.g., a rash on a patient's leg) to an entire class at one time; and a "smart" podium presentation system and integrated controls for the room's lights, sound, and video equipment.

- The medical school is expanding the use of Web-based applications of teaching materials. The curriculum Web site contains pertinent images for the study of body organs, self-test questions, prescreened links to appropriate

Web sites, and other value-added content for courses. For example, for the new Cellular and Pathologic Basis of Disease course, student instruction is facilitated by a Web-based pathobiology teaching program. Online content includes questions for students and mentored answers in which the program not only tells them whether or not their answers are correct but why. This computer-based mentoring approach is being expanded to other courses. Meanwhile, other applications of computer technology, such as a simulation of how the nephron (the functional unit of the kidney) works, are being incorporated into the repertoire of available resources.

- For all first- and second-year courses, syllabi, slides, and lecture materials are posted on the curriculum Web site. In addition, the school is continually exploring the use of innovative approaches for delivering curricular materials in ways that will suit students' individual learning styles. In a student-coordinated initiative, all basic science and organ system lectures are recorded and posted for podcasting and webcasting.

- "The Zone" is a one-stop, password-protected Web portal initiated by medical students and developed by them with administration support as a convenient way to access e-mail, schedules, student affairs and financial aid information, commonly used applications, and other electronic materials.

- The School of Medicine's Laboratory for Educational Technology (LET) serves as an incubator for new ideas and a means of fast-tracking the development of novel approaches to the use of technology applications in support of medical student learning.

- Use of an electronic audience response system to elicit real-time answers from students to interactive questions via a hand-held keypad has become a popular way to engage them in presentations or lectures.

- A wireless computer network serving the medical school can be accessed in Scaife Hall, including classrooms, the student lounge, library, and other areas commonly used by medical students. The University is nearly finished extending wireless Internet service to the entire Pittsburgh campus.

## CURRICULAR INNOVATIONS

*Following are some of the School of Medicine's most recent curricular innovations:*

- Because of the rapidity with which science and medicine are evolving and because of the intrinsically dynamic nature of a medical school curriculum, basic science courses have been reorganized to place greater emphasis on cell biology, molecular biology, structural biology, and genomics and to re-examine and update the integration of basic science material with organ system pathophysiology.
- The time period in which students must complete their required 12 months of clinical

clerkships has been expanded to approximately a year and a half, starting at the end of their second year, thereby giving them more choices and flexibility in scheduling research or electives relevant to their career paths. By starting their clerkships earlier, students also gain more time to experience various medical specialties before making post-graduate career decisions and applying for residency programs.

- Material already in the curriculum on bioterrorism is being focused on the theme of public health preparedness and expanded throughout the curriculum. Included are such topics as disaster preparedness;



Examining a standardized patient



A clinical rotation site in Honduras for students interested in global health

biological, chemical, and radiological terrorism; vaccines; drug-resistant organisms; outbreaks of infectious diseases; and related safety issues. Rather than being covered in a single course, these topics are being addressed longitudinally, where appropriate, in a variety of courses.

■ “The Basic Science of Care,” a novel course designed to be relevant to medical students as well as students from the University’s other five health sciences schools, focuses on timely issues like quality, safety, economics, and information technology; the workings of today’s health care system; and collaboration, problem-solving, and creativity in health care delivery. Students interact with faculty members from various departments throughout the health

sciences schools as well as with leading experts in relevant disciplines from outside the University.

■ A series of innovative mini-electives, especially designed for first- and second-year students, has been developed to enrich their medical education and enable them to explore areas of personal interest beyond the scope of the core curriculum. Course offerings include Advanced Pediatric Interviewing, Concepts in Human Motion, Medical Journalism, Medicine and Literature, Natural History of Medicine (presented in collaboration with the Carnegie Museum of Natural History), Nutrition and Medicine—Traditional and Complementary Aspects, Pandemic Preparedness and Response, The Healer’s Art: Awakening the Heart of Medicine, Medical Spanish, Vascular Surgery,

and Art and Medicine (in collaboration with the Carnegie Museum of Art). Additional course topics are being developed.

FOR MORE INFORMATION ABOUT THE SCHOOL OF MEDICINE CURRICULUM: [WWW.OMED.PITT.EDU](http://WWW.OMED.PITT.EDU) OR [WWW.MEDSCHOOL.PITT.EDU/EDUCATION/EDUCATION.ASP](http://WWW.MEDSCHOOL.PITT.EDU/EDUCATION/EDUCATION.ASP)

### **OPPORTUNITIES FOR IN-DEPTH STUDY**

The following programs provide medical students with a range of options for pursuing in-depth study as part of their medical school experience. In some cases, students will use these opportunities as the starting point or the venue in which they pursue their scholarly project, although they are not limited to these options. Likewise, students can pursue these opportunities independent of their scholarly project.

#### **Areas of Concentration**

Areas of Concentration (AOCs) enable students to pursue their enthusiasm for a particular aspect of medicine through hands-on experiences, faculty mentoring, research projects, and other activities. This voluntary program adds a thematic dimension to medical training throughout all four years. AOC topics include

disabilities medicine, medical humanities, geriatric medicine, women's health, health care to underserved populations, neuroscience, global health, and patient safety.

FOR MORE INFORMATION: [WWW.OMED.PITT.EDU/CURRICULUM/AREAS-OF-CONCENTRATION.PHP](http://WWW.OMED.PITT.EDU/CURRICULUM/AREAS-OF-CONCENTRATION.PHP)

#### **Global Health**

Students interested in global health can participate in a variety of clinical and research opportunities through summer placement, fourth-year electives, or the Area of Concentration in global health. Some of the countries in which students have been involved in recent years are Malawi, Kenya, Honduras, Brazil, India, China, Uganda, Zambia, Tanzania, and Italy. Over the past three years, four Pitt medical students have been chosen to participate in the International Clinical Research Scholars Program sponsored by the National Institutes of Health's Fogarty International Center.

#### **Medical Scientist Training Program**

The Medical Scientist Training Program (MSTP) provides medical students who wish to pursue a career in biomedical research the opportunity to undertake doctoral

work at either the University of Pittsburgh or Carnegie Mellon University in one of the participating programs in basic science, engineering, or public health and complete both degrees in an average of seven to eight years. Students begin with the first two years of medical school and then move into their PhD work; once that is completed, they finish their medical training. The program provides them with full tuition and a stipend each year. Currently, 91 students are enrolled in the MSTP, which is funded by a grant from the National Institutes of Health with support from the Office of the Dean. At any time, about half of the students are engaged in the MD segment of the program, while the others are involved in their PhD studies. If they did not enroll from the start, students can apply for transfer into the MSTP during their second year of medical school.

FOR MORE INFORMATION:  
[WWW.MDPHD.PITT.EDU](http://WWW.MDPHD.PITT.EDU)

### **Clinical Scientist Training Program**

The Clinical Scientist Training Program (CSTP) is designed for medical students with career aspirations in academic medicine and clinical investigation. This five-year program leading to an



Dr. Arthur Levine

MD degree along with either a certificate in clinical research or a master of science in clinical research (depending on how many additional credits the students choose to pursue) provides them with opportunities to learn clinical research skills during medical school and conduct substantive clinical and translational research. Those who are selected for the program receive full tuition for the certificate or MS degree plus a stipend in the research year. The program currently has 26 students. Those who did not apply for the CSTP at the outset of medical school may apply for the Doris Duke Clinical Research Fellowship program in their third year of medical school.

FOR MORE INFORMATION:  
[WWW.ICRE.PITT.EDU/CSTP-M/INDEX.ASPX](http://WWW.ICRE.PITT.EDU/CSTP-M/INDEX.ASPX)

### Physician Scientist Training Program

The Physician Scientist Training Program (PSTP) is a five-year program for exceptionally talented students who, in addition to the regular curriculum, undertake an additional year of laboratory-based research training and benefit from a range of special services and opportunities to prepare them for careers in academic medicine. Those who are selected for the program receive full tuition plus a stipend in the research year. The PSTP currently has 12 students. Students who have not applied for the PSTP at the outset of medical school can apply for the program in their



Scaife Hall, home of the School of Medicine

second or third year. By paralleling the school's other specialty training programs, the PSTP offers interested students the capability of efficiently transferring into either the MSTP or CSTP.

FOR MORE INFORMATION:  
[WWW.PSTP.PITT.EDU](http://WWW.PSTP.PITT.EDU)

### Other Research Opportunities

More than 60 percent of first-year students engage in a summer research program. In addition, some medical students take a year off at some point to earn a master's degree in public health, biomedical ethics, or a related field; others engage in a year-long program of specialized study or research available through various prestigious national fellowship programs.

### STUDENT ADVISORY SYSTEM

Providing a comprehensive, effective, and individualized student advisory system is one of our most important missions. Every first-year student is assigned to an advisory dean, who serves as an advocate, information resource, sounding board, and mentor for all four years about academics, extracurricular programs, career options, clerkship and elective scheduling,

residency choices, and other issues. Because of the intensity of the first-year transition, freshmen are also paired in small groups with several second-year mentors and a clinical faculty advisor in a program known as FAST—Faculty and Students Together. In addition, as students advance through medical school, they typically establish their own connections with scholarly project mentors, physicians involved in particular areas of interest, residency application advisors, and various other faculty members.

### GRADUATE STUDIES

*In addition to the M.D. degree, the School of Medicine offers academic degrees through the following graduate programs:*

#### **Interdisciplinary Biomedical Graduate Program (PhD)**

This program features a core curriculum followed by the opportunity to pursue research and dissertation work in one of these areas: biochemistry and molecular genetics, cell biology and molecular physiology, cellular and molecular pathology, immunology, molecular pharmacology, molecular virology and microbiology, or neuroscience.

FOR MORE INFORMATION:  
WWW.GRABBIOEMED.PITT.EDU

#### **Center for Neuroscience Graduate Training Program (PhD)**

Laboratory research in theory and practice is a major focus of this cross-campus program, which aims to develop general competence in neuroscience as well as expertise in one or more areas of specialization.

#### **Biomedical Informatics Training Program (PhD, MS, or certificate)**

Applying modern information technology to health care, education, and biomedical research is the focus of this program, which offers general or specialized courses of study through the Department of Biomedical Informatics.

#### **Joint Program in Computational Biology (PhD)**

This program, offered by the University of Pittsburgh and Carnegie Mellon University, is designed to develop expertise in the use of computational methods to identify and solve complex biological problems.

#### **Molecular Biophysics and Structural Biology Graduate Program (PhD)**

This interdisciplinary program trains students in the use of a broad range of cutting-edge technologies to study the function



of biological macromolecules in physical terms and covers a diversity of research topics in molecular biophysics and structural biology.

### **Program in Integrative Molecular Biology (PhD)**

Intensive training for students with a focused and developed interest in the structure and function of molecules that compose complex cellular pathways and systems is the intent of this cross-campus program. Focal areas of research include genomics, proteomics, and gene function as well as cellular and developmental dynamics.

FOR MORE INFORMATION ABOUT GRADUATE STUDIES: [WWW.SOMGRAD.PITT.EDU](http://WWW.SOMGRAD.PITT.EDU)

The following degrees and certificates are offered through Pitt's Institute for Clinical Research Education (ICRE).

### **Clinical and Translational Science (PhD or certificate)**

The PhD in clinical and translational science is a rigorous, multi-disciplinary program designed to train an elite group of scientists to conduct the highest quality clinical and translational research. A certificate is available to health sciences students already enrolled



Ms. Paula Davis and Dr. Steven Kanter

in doctoral programs who acquire additional training in clinical and translational science.

### **Clinical Research (MS or certificate)**

These programs are available for postdoctoral fellows and faculty who have a clinical degree but seek additional formal training in clinical research methodology. The curriculum focuses on the skills necessary to develop into a successful, extramurally funded clinical investigator.

### **Medical Education (MS or certificate)**

These offerings, which are designed for clinicians who seek formal training and experience in the teaching of medical students and residents, are among a select few programs in the country in medical education for medical educators.

FOR MORE INFORMATION ABOUT ICRE: [WWW.ICRE.PITT.EDU/](http://WWW.ICRE.PITT.EDU/)

## NIH FUNDING

■ Funding from the National Institutes of Health (NIH) is considered the benchmark of overall stature among research-intensive academic health centers. Since 1997, the University of Pittsburgh, led mainly by the School of Medicine and its affiliates, has ranked among the top 10 recipients of NIH funding. In fact, not only has Pitt maintained its position, but it has steadily climbed within this ranking. Out of more than 3,400 institutions nationwide, Pitt (together with Children's Hospital of Pittsburgh of UPMC, Magee-Womens Research Institute, and its other affiliates) ranked sixth among educational institutions and affiliates in NIH funding in 2006—one notch higher than the year before—and fourth in the number of individual grants received. Final data for 2007 have not yet been released.

■ The University and its affiliates received more than \$447 million in NIH support in fiscal year 2006. Almost 95 percent of this funding went to the six schools of the health sciences. The School of Medicine and its affiliates drew more than \$350 million of the



total amount. Preliminary data indicate the School of Medicine ranked sixth among the nation's medical schools that received NIH funding in fiscal year 2007.

■ Notable ranking shifts, such as Pitt has experienced in recent years, are rare because the competition for NIH dollars is fierce. Nevertheless, the University as a whole and the School of Medicine have both more than doubled their NIH support since 1998. As a result of its success, Pitt has invested significantly in new research infrastructure in disciplines like developmental, cellular, structural, and computational biology and in faculty recruitment.

■ It follows that a school that is strong in NIH support for its research program would also have strength in its faculty, its clinical care program, and its students. They all go together, and, at the University of Pittsburgh, that composite is seen as the true measure of success.

## RESEARCH

- The University of Pittsburgh spent approximately \$645 million for research of all kinds in fiscal year 2008; approximately 80 percent of this amount was for research in the health sciences.

- In fiscal year 2008, all sources of University research spending for the health sciences grew approximately 3.8 percent from the previous year.

- Areas of research emphasis for the School of Medicine include drug discovery and design; organ transplantation/immunology; stem cell therapy, tissue engineering, and regenerative medicine; artificial organ and medical device development; cancer diagnostics and therapy; cardiology; gene therapy; bioinformatics and computational biology; psychiatry, neuroscience, and neurological surgery; vaccine development; hemostasis and vascular biology; structural biology; developmental biology; and clinical trials management.

- The University's newest research facility, Biomedical Science Tower 3 (BST3), enhances the School of Medicine's capacity for exploring frontier areas like

structural biology, computational biology, developmental biology, neuroscience and neurodegenerative diseases, and drug discovery, including vaccine development. This 10-story, 331,000-square-foot structure, which has been called "the next generation of biomedical research building" because of its innovative use of space and laboratory design, also enhances the school's culture of collaboration among researchers from a variety of highly specialized fields.

- In addition, the six schools of the health sciences currently occupy approximately 3.6 million gross square feet of research, academic, and administrative space in various other buildings.

- Initiatives to further increase available research space include a new biomedical research facility in the early planning stages for the vicinity of UPMC Shadyside and a proposed biomedical research and biotechnology center near Palermo, Italy, which would be funded, in part, by the Italian government and jointly overseen by the School of Medicine and UPMC. On campus, a proposed research facility that would be built as an addition to Salk Hall is in the planning stages. The new Children's Hospital research tower in Lawrenceville is expected to be



Mini-elective course:  
Natural History of Medicine

commissioned in fall 2008. The recent completion of construction at the Magee-Womens Research Institute resulted in more than a doubling of research space there.

■ The Pittsburgh Life Sciences Greenhouse, a cooperative venture involving the shared strengths and resources of the University of Pittsburgh and Carnegie Mellon University and funded by the Commonwealth of Pennsylvania, is focusing on four strategic areas—regenerative medicine, neuroscience, drug design and development, and diagnostic and medical devices—as the basis for developing the region’s biotech industry.

■ Since 2004, Pitt, Carnegie Mellon, and UPMC have collaborated with Intel to develop one of Intel’s university research laboratories in Pittsburgh. The emphasis of the Pittsburgh lab is software for widely distributed storage systems. One current project involves application of novel software to medical problems to enhance the diagnosis of common diseases using radiologic imaging.

■ In 2000, the RAND Corporation founded a Pittsburgh branch, through which it developed the RAND–University of Pittsburgh Health Institute, a collaborative venture between the RAND Health division and Pitt’s schools of the health sciences. The emphasis is on shared activities in research, education, and training, with particular focal areas being research in women’s health, mental health, patient safety, global health research, and translation of research into evidence-based health care.

■ From 1999 through 2007, 56 companies were formed that were dependent upon the licensing of technology developed at the University of Pittsburgh. A majority of them were in the life sciences.

FOR MORE INFORMATION ABOUT RESEARCH:  
[WWW.OORHS.PITT.EDU](http://WWW.OORHS.PITT.EDU) OR  
[WWW.PITT.EDU/~OFFRES](http://WWW.PITT.EDU/~OFFRES)

## ACADEMIC CAREER DEVELOPMENT

■ One of the special resources available to medical and graduate students in the School of Medicine is the Office of Academic Career Development (OACD), Health Sciences. OACD offers a range of innovative career development services to help students acquire the professional skill sets needed to successfully advance their academic careers. Professional development programs and services also are available through OACD for postdoctoral fellows, residents and clinical fellows, and faculty members at all levels.

FOR MORE INFORMATION:  
WWW.OACD.HEALTH.PITT.EDU



Biomedical Science Tower 3

## ACHIEVEMENTS

*Following are some of the medical school's notable achievements since 1950:*

**1950: Philip S. Hench, MD**, a 1920 graduate of the School of Medicine, and two other scientists win the Nobel Prize in Physiology or Medicine for discoveries relating to the hormones of the adrenal cortex.

**1952:** A killed-virus polio vaccine is developed by **Jonas Salk, MD**, and a team of researchers. The introduction of the vaccine to the public in 1955, after nationwide clinical trials demonstrated that it was safe and effective, led to a rapid and dramatic drop in the incidence of this previously unpreventable disease.

**1958: Peter Safar, MD**, refines cardiopulmonary resuscitation (CPR) and extends it to cardiopulmonary-cerebral resuscitation, which he assembled as a sequence of basic, advanced, and prolonged life support.

**1961: Klaus Hofmann, PhD**, leads a team that develops a synthetic form of adrenocorticotropic hormone (ACTH) that performs all of the biological functions of the naturally occurring hormone.

**1962: Niels K. Jerne, MD,** undertakes landmark research on antigen-antibody interactions. Two articles produced during his time at the School of Medicine were among those later cited by the Nobel Committee as providing the basis for his prize-winning work.

**1963:** The Magovern-Cromie sutureless heart valve developed by **George J. Magovern, MD,** and others enhances the speed and efficiency of heart valve replacement surgery and improves the survival rate of patients.

**1964: Panayotis G. Katsoyannis, PhD,** performs the first chemical synthesis of a polypeptide hormone, insulin, and combines it with biologically active material, providing the means to explore and validate previous assumptions about the active amino acids in the insulin molecule.

**1964: Julius S. Youngner, ScD,** sheds new light on the cause of immune and inflammatory responses by discovering that nonviral agents as well as viral ones can trigger interferon induction.

**1972: Youngner** and others discover that certain viruses have mechanisms that can actually *inhibit* the action of interferons.

**1980:** Investigators isolate and cultivate *Legionella micdadei* (Pittsburgh pneumonia agent) from human lung tissue. A team led by **A. William Pasculle, ScD,** goes on to delineate the microbiology, epidemiology, clinical syndrome, and environmental ecology of this organism, which is the second-leading cause of legionella-based pneumonia.

**1984: Thomas E. Starzl, MD, PhD,** performs the world's first double transplant operation (simultaneous heart and liver) on a 6½-year-old girl from Texas.

**1985: Bernard Fisher, MD,** and team are the first to recognize the systemic pattern of breast cancer development, leading to the conclusion that lumpectomy combined with radiation therapy is as effective as mastectomy in treating breast cancer. Fisher's group went on to show the effectiveness of chemotherapy and hormonal therapy (tamoxifen) in preventing recurrence.

**1991:** Following his earlier work in establishing the clinical utility of the immunosuppressants cyclosporine and tacrolimus (FK506), **Starzl** explores the theory of chimerism as a means of boosting

transplant organ tolerance and reducing dependence on immunosuppressive drugs by proving that cells from donor organs intermingle with a transplant patient's own tissues.

**1992:** A team led by **Geoffrey D. Block, MD**, produces the first sustained, proliferative growth of normal liver cells in the laboratory, laying the groundwork for development of artificial liver devices, possible treatments for acute liver failure, and gene therapy strategies.

**1996:** Investigators led by **John W. Mellors, MD**, discover that plasma HIV load plays the critical role in determining the prognosis of AIDS patients.

**1998:** Studies led by **Fisher** demonstrate that the drug tamoxifen can substantially reduce the risk of breast cancer in high-risk women who have not yet developed the disease.

**2000:** Researchers led by **Bora E. Baysal, MD, PhD**, and **Bernard Devlin, PhD**, discover that a mitochondrial gene mutation is the cause of hereditary paraganglioma. This study is the first to link the structure of mitochondrial DNA to tumor development.

**2004:** In collaboration with colleagues in Sweden, researchers complete the first human study of a radioactive dye called Pittsburgh Compound B (PiB) developed by **William E. Klunk, MD, PhD**, and **Chester A. Mathis, PhD**, to detect, using PET scanning, the beta-amyloid deposits that are believed to signal Alzheimer's disease. Subsequent research correlates detection results in living patients with their later autopsy results to confirm the effectiveness of PiB in signaling the presence of beta-amyloid deposits.

**2005:** **Amin Kassam, MD**, **Carl Snyderman, MD**, and **Ricardo Carrau, MD**, pioneer endoscopic transnasal brain surgery, a revolutionary technique that uses the nose and nasal sinuses to gain access to hard-to-reach brain and spinal cord tumors previously considered to be inoperable.

**2006:** A multi-institutional research team led by **Yifan Dai, MD, PhD**, reports the development of transgenic pigs engineered to produce heart-healthy omega-3 fatty acids, providing vast new opportunities to study their influence on cardiovascular function and the risk of heart disease—and perhaps even a source of healthy bacon someday.



**2007: Gary A. Silverman, MD, PhD,** and **Cliff J. Luke, PhD,** overturn the long-held view of necrosis as a chaotic, irreversible process by showing it to be part of a regulated response to stress by SRP-6, a powerful protein known as a serpin that they believe might be harnessed to either target or spare cells as a way to better manage cancer, heart disease, stroke, or neurological conditions.

**2008:** Researchers led by **Yuan Chang, MD,** and **Patrick S. Moore, MD, MPH,** the husband and wife team who previously identified the Kaposi's sarcoma-associated herpesvirus, use novel sequencing technology to identify a previously unknown polyomavirus that is strongly linked with a rare but deadly skin cancer called Merkel cell carcinoma.

**2008: Massimo M. Trucco, MD,** and **Nick Giannoukakis, PhD,** report that a novel vaccine with a microsphere molecule delivery system can prevent and even reverse the onset of type 1 diabetes in animal models.

**2008: Andrew B. Schwartz, PhD,** demonstrates how brain-machine interface technology involving a monkey that uses brain signals and a robotic arm to feed itself could advance the development of prosthetics for people with paralyzing spinal cord injuries and neurological conditions.



## UNIVERSITY OF PITTSBURGH MEDICAL CENTER (UPMC)

- Through its affiliation with UPMC, the School of Medicine offers students opportunities for clinical training, educational experiences, and research in virtually any medical specialty. Although legally separate and distinct entities, the School of Medicine and UPMC share mutual interdependence and a synergy that is reflected in a common commitment to excellence in education, research, and clinical care.
- As one of the nation's leading academic health care systems with nearly \$7 billion in revenue, UPMC encompasses 48,000 employees; 4,700 affiliated physicians, including 2,475 employed by the health system; and 20 tertiary care, specialty, and community hospitals serving 29 counties throughout western Pennsylvania, as well as specialized outpatient facilities, cancer centers, rehabilitation facilities, senior living facilities, imaging services, doctors' offices, and a major insurance plan in the same region.
- As of August 1, 2008, the UPMC Medical Education Program had 1,053 medical residents and 325 clinical fellows in programs approved by the Accreditation

Council for Graduate Medical Education plus 54 clinical fellows in other programs.

- For the ninth time in the last 10 years, UPMC appears on the *U.S. News & World Report* Honor Roll of "America's Best Hospitals" for 2008. Out of 5,453 eligible medical centers, only 19 made the list, and UPMC ranks 14th this year. In addition, UPMC is recognized for excellence in 15 of the 16 medical specialties included in the magazine's survey—the only local hospital to rank in any category. The specialties for which UPMC is recognized include: ear, nose, and throat; gynecology; geriatrics; orthopaedics; psychiatry; rheumatology; respiratory disorders; kidney disease; neurology and neurosurgery; rehabilitation; gastrointestinal disorders; cancer; endocrinology; urology; and heart and heart surgery.
- UPMC also has more clinical transplantation experience than any other center in the world, with more than 12,000 organ transplants in the last 20 years.
- The core of the health system is located in the Oakland and Shadyside sections of Pittsburgh, where the following health care facilities are interwoven with

University of Pittsburgh facilities: UPMC Presbyterian, UPMC Montefiore, Eye and Ear Institute, Children's Hospital of Pittsburgh of UPMC, Magee-Womens Hospital of UPMC, Western Psychiatric Institute and Clinic, UPMC Shady-side, and Hillman Cancer Center.

- Hillman Cancer Center is the flagship facility in the UPMC Cancer Centers network of more than 40 clinical care facilities throughout the region and home of the University of Pittsburgh Cancer Institute, one of only 41 facilities in the nation (and the only one in western Pennsylvania) designated by the National Cancer Institute as a Comprehensive Cancer Center for cancer treatment, research, education, and prevention.

- UPMC's clinical programs have earned international recognition, drawing patients from around the world. In addition, the medical center is now transporting its expertise to other countries, including Italy (where it manages the Mediterranean Institute for Transplantation and Advanced Specialized Therapies in Palermo) as well as ventures in Ireland, the United Kingdom, and Qatar.

FOR MORE INFORMATION ABOUT UPMC:  
WWW.UPMC.COM

## CITY OF PITTSBURGH

- The city of Pittsburgh is home to three rivers (the Allegheny and Monongahela converge here to form the Ohio), an estimated 720 bridges, nine colleges and universities, a number of Fortune 500 companies, and the remnants of Fort Duquesne, which was built in the 1750s and later renamed Fort Pitt.

- While approximately 313,000 people call the city of Pittsburgh home, the population of the 10-county region is approximately 2.6 million. The city is vibrant, safe, and affordable; it features the amenities of a large city with small-town civility.

- Pittsburgh has a variety of museums, three of which—the Carnegie Museum of Art, Carnegie Museum of Natural History, and Carnegie Science Center—bear the name of 19th-century industrialist Andrew Carnegie, who made his fortune in steel here. The city also has the Senator John Heinz Pittsburgh Regional History Center; the Mattress Factory, one of America's leading museums for site-specific installation art; the Pittsburgh Children's Museum; and the Andy Warhol Museum, one of the most comprehensive single-artist museums in the world.



The Andy Warhol Museum

■ If it's culture one craves, the choices include the Pittsburgh Ballet Theatre, Pittsburgh Opera, Pittsburgh Symphony Orchestra, and Pittsburgh Civic Light Opera (musical theater), all of which perform in Downtown's revitalized Cultural District. The Manchester Craftsmen's Guild, a multi-

disciplinary, minority-directed arts and learning center (and home of a leading series of jazz concerts), is another of the city's cultural features.

■ Stage presentations in Pittsburgh can be found at the Pittsburgh Public Theater, which makes its home in the O'Reilly Theater; the City Theatre; Pitt's Kuntu Repertory Theatre, celebrated for its productions of works by African-American playwrights; the Quantum Theatre, which is known for presenting site-specific productions in uncommon settings; the Pittsburgh Irish and Classical Theatre; and the Prime Stage Theatre, which focuses on young audiences.





■ Other amenities the city offers include the National Aviary; Phipps Conservatory and Botanical Gardens; Kennywood, one of the country's grand old amusement parks; the Duquesne Incline and the Monongahela Incline; the Pittsburgh Zoo and PPG Aquarium; annual festivals celebrating jazz, art, and folk culture; the Pittsburgh Vintage Grand Prix; and much more.

■ All or part of 63 motion pictures, including *The Mothman Prophecies*, *Wonder Boys*, *Inspector Gadget*, *Hoffa*, *Lorenzo's Oil*, *Silence of the Lambs*, and *Flashdance*, were filmed in the Pittsburgh area.

■ For sports enthusiasts, Pittsburgh's professional teams—the Steelers (winners of Super Bowl XL), Pirates, Penguins, and, most recently, the Riverhounds—provide plenty of reasons to cheer, or jeer, depending on the year. In addition, the University is home to a full range of varsity men's and women's sports teams, the Pitt Panthers, which typically offer some of the finest performances in college athletics.

■ Prominent people from Pittsburgh and nearby communities include musicians Stephen Collins Foster (honored by Pitt's Stephen Foster Memorial,



which houses the world's largest collection of Foster materials), George Benson, Henry Mancini, Billy Eckstine, Oscar Levant, and Earl Wild; authors Gertrude Stein, Rachel Carson, August Wilson, Robinson Jeffers (who studied at Pitt), and David McCullough; entertainers Gene Kelly (a Pitt graduate), Fred Rogers (who did graduate studies in child development here), Shirley Jones, Michael Keaton, Jeff Goldblum, Dennis Miller, Perry Como, Sharon Stone, Bobby Vinton, and Christina Aguilera; and sports legends Joe Montana, Arnold Palmer, Joe Namath, and Pitt graduates Tony Dorsett, Dan Marino, and Mike Ditka. Pulitzer

Prize-winning author Michael Chabon and famed conductor Lorin Maazel weren't born here, but they graduated from Pitt, as did Bebe Moore Campbell, a celebrated novelist who served on the University's Board of Trustees until her death in late 2006. Likewise, the city embraces some of its sports heroes, including Mario Lemieux and the late Roberto Clemente and Willie Stargell, as being among its own.

- Oakland, the neighborhood in which Pitt is located, is unquestionably the intellectual center of the community. In the heart of Pitt's campus is the 42-story Cathedral of Learning,



the nation's tallest education building and home to more than two dozen Nationality Rooms styled to reflect the culture of the faraway places to which many Pittsburghers can trace their roots.

■ From the East End to the West and the North Side to the South, Pittsburgh is home to 88 neighborhoods, many of them tacked onto hillsides or tucked into valleys and embracing distinct ethnic and cultural flavor plus traces of Old World attitudes and culture.

■ The city's most famous neighborhood of all, *Mister Rogers' Neighborhood*, the children's television show that was broadcast from here for 33 years, reflected in its own simple and charming way a nice place to be, which is, perhaps, the best way to describe Pittsburgh.

FOR MORE INFORMATION ABOUT  
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