UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE 2012/13 FACT BOOK

DEMOGRAPHICS / CURRICULUM / IN-DEPTH STUDY / GRADUATE STUDIES / STUDENT ADVISORY SYSTEM / NIH FUNDING / RESEARCH / ACADEMIC CAREER DEVELOPMENT / ACHIEVEMENTS / UPMC / CITY OF PITTSBURGH

University of Pittsburgh
School of Medicine

CONTENTS

HISTORY

In 2012, the School of Medicine celebrated its 125th anniversary. The Western Pennsylvania Medical College, as it was originally known, 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. One of the nation's oldest academic institutions, the Western University of Pennsylvania was renamed the University of Pittsburgh in 1908.

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 (NIH) funding in 1997 and has remained within this enviable echelon ever since. In a recent five-year analysis, the University of Pittsburgh and its affiliates rank fifth in number of awards received. In 2011, the School of Medicine was ranked fifth, up from seventh in fiscal year 2009, with total funding of more than $352 million.

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, including an environment that encourages student and faculty engagement in research; a high level of faculty collaboration that has facilitated the development of a well-integrated curriculum with a high degree of synergy among courses; and unusually strong support to the student body in library and information services, contributing significantly to the success of the scholarly project initiative.

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 of 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 2012, 67 percent of our graduates matched to residencies in one of the country's 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; Duke University; University of Washington; Massachusetts General Hospital; the Hospital of the University of Pennsylvania; Barnes-Jewish Hospital; and UPMC.

FOR MORE INFORMATION ABOUT THE 2012 RESIDENCY MATCH: www.medadmissions.pitt.edu/why-choose-pitt/residency-match.php

DEMOGRAPHICS

›› The School of Medicine has 590 MD students: 274 women (46 percent) and 316 men (54 percent). Of these students, 147 (25 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.

FOR MORE INFORMATION ABOUT DIVERSITY PROGRAMS: www.medadmissions.pitt.edu/diversity-program

›› In addition, for 2012–13, the medical school anticipates having 296 registrants in PhD programs (including the students in the Medical Scientist Training Program), plus 68 students in MS programs and 57 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, 2012, the School of Medicine had 2,262 regular faculty members plus 2,345 volunteer faculty. Eighty-six 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 2012, the medical school received 4,912 applications for admission and interviewed 827 prospective students for the first-year class of 148 members.

FOR ADMISSIONS INFORMATION: www.medadmissions.pitt.edu/index.php

›› The School of Medicine includes the following 31 departments:

Anesthesiology
Biomedical Informatics
Cardiothoracic Surgery
Cell Biology
Computational and Systems 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
Plastic Surgery
Psychiatry
Radiation Oncology
Radiology
Structural Biology
Surgery
Urology

›› The two newest departments — Plastic Surgery and Cardiothoracic Surgery — reflect the School of Medicine's position at the leading edge of medical education and clinical practice, as well as the recent and rapid evolution of surgical subspecialties as independent disciplines. Similar departments are still rare in American medical schools, and the same can be said of our Departments of Computational and Systems Biology, Critical Care Medicine, Developmental Biology, and Structural Biology.

FOR MORE INFORMATION: www.medschool.pitt.edu/departments_divisions/index.aspx

CURRICULUM

HIGHLIGHTS & 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 that deal with the human side of medicine from the very beginning of the medical school experience. 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.

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 such as health policy, epidemiology, and comparative effectiveness research) to appeal to individual students' interests and long-term career 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 test it; encourage them to pursue research opportunities; and help them understand the structure of thought that is so critical to the successful practice of clinical 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 projects by participating in a summer research program between the first and second years of medical school, 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 careers as physician-scientists. The goal in every case, however, is to enhance their ability to think independently, critically, and creatively and, thereby, make them better equipped to practice medicine in the 21st century.

The Class of 2012 was the fifth class to complete the four-year scholarly project experience. Their endeavors resulted in 64 fellowships, grants, or other national awards; 29 School of Medicine awards; coauthorship of 200 peer-reviewed papers; and 227 national presentations and abstracts.

FOR MORE INFORMATION: http://scholarlyproject.medschool.pitt.edu/

Simulation Training

All Pitt medical students engage in comprehensive learning activities using whole-body simulators; about 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, among other procedures, 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 lifelike 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

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 clinical diagnostic exercises built from actual cases of graduated difficulty. Now widely used in American medical schools and around the world, 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, well-integrated component of our curriculum and catalyzes the development of cognitive skills in our students. As an early adopter of this innovation, Pitt has a long track record of success with PBL.

In addition, team-based learning (TBL) has been introduced into a growing number of courses, including Human Genetics, Cellular and Pathologic Basis of Disease, and Behavioral Medicine, to enhance active learning and student engagement. TBL is a teaching method that emphasizes independent study immediately followed by intensive application of concepts to challenging problems by small teams of students.

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: Clinical Pharmacology; Exercise Is Medicine; Infectious Disease in Obstetrics and Gynecology; Molecular Medicine; Neoplasia and Neoplastic Disease; Neurosurgery Technologies; Science of Resuscitation; or Surgical Integrated Life Sciences.

Standardized Patients

Throughout their medical education, students encounter standardized patients—actors and actresses 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. A standardized patient can contribute to the learning process by stepping out of character to offer feedback on the encounter and an assessment of the student's performance.

FOR MORE INFORMATION: www.omed.pitt.edu/standardized

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

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 and team-based learning sessions. 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.

Recognized Approach

In 2008, the University of Pittsburgh School of Medicine received the American Medical Student Association's Paul R. Wright Award for Excellence in Medical Education for its emphasis on 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 computers and LCD projectors that make it practical for the full group to be engaged in computer-enhanced learning activities.

>> Lecture rooms regularly used by medical students feature multimedia presentation systems that enable use of both traditional teaching materials and the presentation of live images (e.g., a rash on a patient's leg) to an entire class at one time.

>> 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 useful Web sites, and other value-added content for courses. For example, in the Cellular and Pathological Basis of Disease course, student instruction is augmented by two programs. One is a "mentored" instructional and self-testing program; the other is a "virtual microscopy" application that combines and compares histological images of normal and abnormal tissue to strengthen student appreciation of the structural consequences of intracellular disease processes.

>> 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 via computer and mobile devices.

>> "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 social and extracurricular activities, student affairs and financial aid information, commonly used applications, and other electronic materials.

FOR MORE INFORMATION: http://zone.medschool.pitt.edu/Pages/default.aspx

>> 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. For example, an easy-to-use virtual patient simulator for education and assessment called vpSim was conceived, designed, developed, and tested by LET. Students and faculty use vpSim interactive cases in the classroom, in workshops, and for independent learning. It is now used by more than a dozen medical, osteopathic, pharmacy, and dental schools around the world and by the entire Veterans Affairs health system.

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 postgraduate career decisions and applying for residency programs.

>> Material already in the curriculum on bioterrorism is being expanded and focused on the theme of public health preparedness. Included are such topics as disaster preparedness; biological, chemical, and radiological terrorism; vaccines; drug-resistant organisms; infectious disease outbreaks; and related safety issues. Rather than being covered in a single course, these topics are addressed longitudinally, where appropriate, in existing courses.

>> 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, 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, Behind the Veil of "CSI": The Real World of Forensic Medicine, Medical Spanish, Vascular Surgery, Art and Medicine (in collaboration with the Carnegie Museum of Art and the Andy Warhol Museum), and Personalized Medicine: the Impact of Molecular Testing on Patient Care. Additional course topics are being developed.

FOR MORE INFORMATION ABOUT THE SCHOOL OF MEDICINE CURRICULUM: www.omed.pitt.edu

GLOBAL ENGAGEMENT

The School of Medicine operates on a global stage, with active collaborations connecting Pittsburgh with China, Colombia, Haiti, India, Ireland, Italy, Kazakhstan, Mozambique, and many other nations. Medical students and young investigators who train in this milieu encounter a wide variety of influences and discover a great many opportunities to broaden their horizons. Here are a few examples:

>> The School of Medicine recently signed a historic agreement with Tsinghua University—China's most elite institution of higher learning for science and technology. Beginning in 2012, every student at Tsinghua's new medical school will spend two years in Pittsburgh immersed in biomedical research.

>> The Ri.MED Foundation was created in 2006 as an international partnership among the Italian government, the Region of Sicily, the University of Pittsburgh, and UPMC. Since 2007, Ri.MED has sponsored research fellowships at the School of Medicine for young Italian investigators. These Ri.MED fellows will form the core faculty of the new Biomedical Research and Biotechnology Center, now under construction in Sicily.

>> Health sciences researchers at Pitt have multiple training grants from the National Institutes of Health's Fogarty International Center. For example, two grants currently support research and training in psychiatric genetics in India and Egypt. A grant in the Department of Surgery supports a program involving biomedical informatics and surgery in Colombia.

OPPORTUNITIES FOR IN-DEPTH STUDY

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

Areas of Concentration

Areas of Concentration (AOCs) enable students to cultivate 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, integrative health, resuscitation medicine, public health, and patient safety and quality improvement.

FOR MORE INFORMATION: 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 are Malawi, Kenya, Honduras, Haiti, Peru, the Philippines, India, Ireland, China, Uganda, Zambia, Mozambique, and Italy. UPMC maintains hospitals in Palermo and Dublin; students can rotate at both. In recent years, four Pitt medical students have been selected for international fellowships sponsored by the Centers for Disease Control and Prevention and the Fulbright-Fogarty program. On a broader scale, Pitt's Center for Global Health is coordinating University-wide efforts to establish international partnerships and collaborative initiatives in global health research, education, service, and policy to effectively address health issues affecting populations around the world.

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 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, 84 students are enrolled in the MSTP, which is funded by a grant from NIH 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, but the tuition and stipend benefits are not retroactive.

FOR MORE INFORMATION: www.mdphd.pitt.edu

The Clinical Scientist Training Program

The Clinical Scientist Training Program (CSTP) is for medical students interested in clinical research careers. We invite select students whose scholarly projects meet the NIH definition of clinical research to delve deeper into their mentored scholarly projects during a fifth year of training. Interested students apply to the CSTP in January of the year they plan to commit to full-time research (typically between the third and fourth years of medical school). Selected students are appointed as research fellows for the research year, during which they receive a living stipend, travel funds, health insurance, and tuition toward the graduate certificate in clinical research. After successful completion of the fellowship year, they receive a CSTP scholarship toward the final year of medical school. By providing formal research training and partial tuition assistance in the final year of medical school, the CSTP seeks to increase the number of Pitt graduates who choose clinical research careers.

FOR MORE INFORMATION: 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 two summers and a dedicated year of laboratory-based research training as well as enrichment courses to prepare them for careers in academic medicine.

Those selected for the program receive partial tuition assistance for the four years of medical school plus a stipend during the two research summers and the research year. The PSTP currently has 27 students. Medical students can also apply as internal candidates for the PSTP in their second year. If they transfer into the PSTP as internal candidates, the tuition assistance applies only to the last two years of medical school.

FOR MORE INFORMATION: www.pstp.pitt.edu

Other Research Opportunities

Upon completing their first year of medical studies, more than 80 percent of the students in the Class of 2015 engaged in various summer research programs. 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 participate in a year-long program of specialized study or research available through Pitt's CSTP, PSTP, or an individual department; and still others take part in prestigious national fellowship programs such as those sponsored by NIH, the Sarnoff Cardiovascular Foundation, or the Howard Hughes Medical Institute.

STUDENT ADVISORY SYSTEM

Providing a comprehensive, effective, and individualized student advisory system is one of our highest priorities. 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, extra-curricular 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 MD degree, the School of Medicine offers academic degrees through the following graduate programs:

Interdisciplinary Biomedical Graduate Program (PhD)

This program features a core curriculum combined with research and dissertation work in one of these areas: molecular genetics and developmental biology, cell biology and molecular physiology, cellular and molecular pathology, immunology, molecular pharmacology, or molecular virology and microbiology.

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.

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)

The intent of this cross-campus program is to provide intensive training for students prepared to enter with a focused and developed interest in the structure and function of molecules that compose complex cellular pathways and systems. 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

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, multidisciplinary 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 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. ICRE also offers a special certificate program for PhD students who are enrolled in doctoral programs in Pitt's Schools of the Health Sciences.

Medical Education (MS or certificate)

These programs are for fellows and faculty members who are pursuing careers in medical education and clinical teaching. Students receive formal training and experience in the teaching of medical students and residents. These programs are among a select few programs in the country in medical education for medical educators.

FOR MORE INFORMATION ABOUT ICRE DEGREE PROGRAMS: www.icre.pitt.edu/degrees/degrees.html

NIH SUPPORT

1,044
INDIVIDUAL GRANTS

RANKED #5
OUT OF MORE THAN
3,000 INSTITUTIONS

$463 MILLION
RECEIVED IN RESEARCH SUPPORT

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 School of Medicine faculty, has ranked among the top 10 recipients of NIH funding.

» A recent five-year analysis of NIH funding indicates that, out of more than 3,000 institutions nationwide, Pitt and its affiliates are ranked fifth in the number of individual grants received. The University and its affiliates received more than $463 million in NIH support in fiscal year 2011, with 90 percent of this funding going to the Schools of the Health Sciences and affiliates. The School of Medicine and its affiliates received more than $352 million of the total amount that year. Among medical schools, the School of Medicine is ranked fifth in NIH funding, up from seventh in fiscal year 2009.

» In addition, as of July 30, 2012, the University of Pittsburgh has received more than $217 million through the American Recovery and Reinvestment Act. The vast majority of Pitt's 440 individual awards—nearly 90 percent—went to the Schools of the Health Sciences, with the School of Medicine receiving the lion's share.

» 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.

RESEARCH

›› The University of Pittsburgh spent approximately $780 million for research of all kinds in fiscal year 2012; nearly 82 percent of this amount was for research in the health sciences.

›› The University receives significant research support through the Pennsylvania Department of Health's Commonwealth Universal Research Enhancement (CURE) program, which is designed to promote biomedical research that will benefit the health and well-being of all Pennsylvanians. The program is funded through Pennsylvania's allocation of the 1998 Tobacco Master Settlement Agreement. In 2012, Pitt received $7.8 million in CURE funding to be used over a four-year period for health sciences research and infrastructure projects. CURE-funded projects have helped to spur our regional economy and have led, directly or indirectly, to the creation of approximately 5,330 jobs.

›› Within the School of Medicine, areas of research emphasis and strength include drug discovery and design; vaccine development; comparative effectiveness research; organ transplantation/immunology; stem cell biology and tissue engineering; medical device development; vascular biology; cancer research and therapy; cardiology and cardiovascular biology; bioinformatics and computational biology; psychiatry, neurobiology, systems neuroscience, and neurological surgery; structural biology; developmental biology; precision medicine; and clinical research/clinical trials.

›› The School of Medicine has developed an impressive array of research facilities. Of particular note is the 10-story, 335,000-square-foot Biomedical Science Tower 3. Opened in 2005, it houses the Center for Vaccine Research; the Drug Discovery Institute; the structural biology and computational and systems biology programs, which are among the most advanced in the country; the Pittsburgh Institute for Neuro-degenerative Diseases; and more than 10,000 tanks for zebrafish, one of the most important model systems for developmental research.

›› In addition, there is 44,000 square feet of newly renovated research space in the Thomas E. Starzl Biomedical Science Tower to accommodate the Vascular Medicine Institute and the Division of Pulmonary, Allergy, and Critical Care Medicine; 161,000 square feet of new research space in the Bridgeside Point II building near campus; the 218,000-square-foot John G. Rangos Sr. Research Center at Children's Hospital of Pittsburgh of UPMC, which opened in late 2008; and Magee-Womens Research Institute, which doubled its research space with a new facility in 2007.

›› University projects in the construction stage include a 350,000-square-foot biomedical research facility near UPMC Shadyside; a biomedical research and bio-technology center near Palermo, Italy, which is being funded, in part, by the Italian government and jointly overseen by the School of Medicine and UPMC; and additions to Salk Hall and to the Graduate School of Public Health.

›› Overall, the Schools of the Health Sciences currently occupy approximately 4.2 million gross square feet of research, academic, and administrative space in various buildings.

›› In 2000, the RAND Corporation founded a Pittsburgh branch, through which it developed the RAND–University of Pittsburgh Health Institute, a collaborative venture between RAND Health, Pitt's Schools of the Health Sciences, and Magee-Womens Research Institute. 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, comparative effectiveness research, translation of research into evidence-based practice, and global health.

›› Since 1996, the year Pitt's Office of Technology Management was founded, 89 companies have been 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
www.clinicalresearch.pitt.edu
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

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.

[1967] **David Gitlin, MD**, elucidates key elements of the biosynthesis of alpha-fetoprotein, which becomes a critical indicator of potentially life-threatening birth defects in developing fetuses.

[1979] In the first of several landmark papers on lead exposure in children, **Herbert Needleman, MD**, reports in the *New England Journal of Medicine* that subclinical exposure to lead is associated with lower IQ.

[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.

[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.

[2007] **Gary A. Silverman, MD, PhD**, and **Clifford 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.

[2009] **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 prostheses for people with paralyzing spinal cord injuries and neurological conditions.

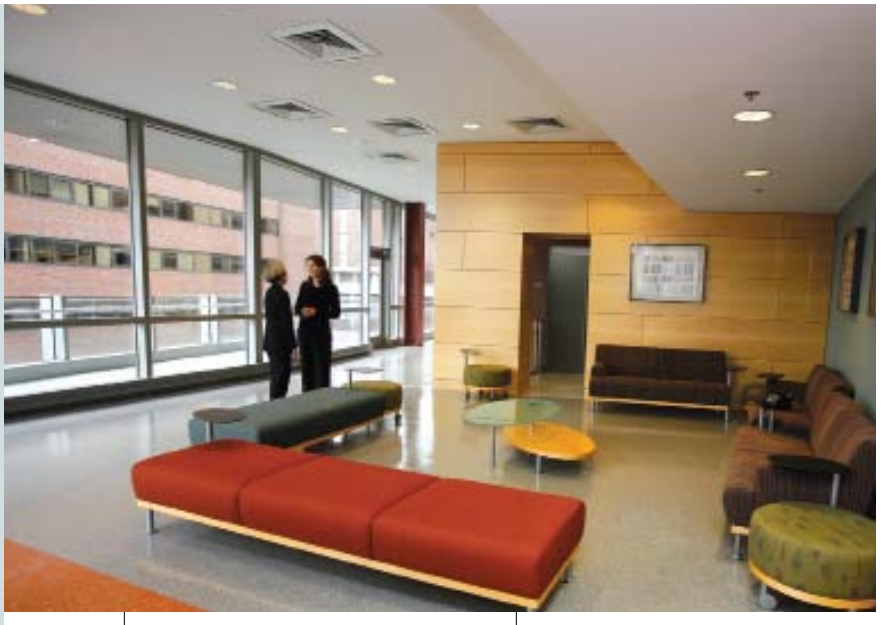
[2009] Using zebrafish as a model system, **Michael Tsang, PhD**, and collaborators pinpoint an enzyme inhibitor that enables them to increase the number of cardiac progenitor cells and thereby influence the size of the developing heart—a finding with broad implications for elucidating the role of the fibroblast growth factor pathway in heart development as well as in wound healing and treating other conditions.

[2010] **Edward Prochownik, MD, PhD**, discovers a means of arresting cancer stem cells derived from breast cancer cell lines. Notoriously difficult to study in the lab because they quickly differentiate into cancer cells, cancer stem cells seem to be immune to conventional cancer therapy. The creation of stable lines of cancer stem cells is enabling sustained research into how to destroy them.

[2010] **David H. Perlmutter, MD**; **Simon C. Watkins, PhD**; and **George Michalopoulos, MD, PhD**, report in *Science* that carbamazepine, a drug used for decades to treat epilepsy, reverses liver scarring and fibrosis in a mouse model of alpha-1 antitrypsin deficiency, which is the most common genetic cause for children needing liver transplants.

[2012] A team led by **David Hackam, MD, PhD**, identifies a protein in amniotic fluid that prevents necrotizing enterocolitis in mice, potentially paving the way for a cure for this devastating condition in premature infants.

[2012] A team led by **David Okonkwo, MD, PhD**, and **Walter Schneider, PhD**, develops a technology called high definition fiber tracking that allows doctors to clearly see for the first time neural connections broken by traumatic brain injury.



UPMC
(UNIVERSITY OF PITTSBURGH MEDICAL CENTER)

›› 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 an integrated global health enterprise and one of the nation's leading academic health care systems, with $10 billion in revenues, UPMC has more than 55,000 employees; more than 5,500 affiliated physicians, including more than 3,200 employed by the health system and more than 1,400 who are also full-time faculty of the School of Medicine; more than 20 tertiary care, specialty, and community hospitals serving 29 counties throughout Pennsylvania; as well as specialized outpatient facilities, cancer centers, rehabilitation facilities, retirement and long-term care facilities, imaging services, doctors' offices, and a health insurance plan covering 1.8 million members.

›› As of August 1, 2012, the UPMC Medical Education Program has 1,112 medical residents and 330 clinical fellows in programs approved by the Accreditation Council for Graduate Medical Education plus 82 clinical fellows in other programs.

›› For the 13th time in recent years, UPMC appears on the *U.S. News & World Report* Honor Roll of America's Best Hospitals for 2012. UPMC ranked 10th overall, up from last year's 12th place, making it the highest-ranked medical center in Pennsylvania, and was one of only 17 hospitals nationwide that made the Honor Roll of the "nation's best" in the 2012 survey. In addition, UPMC is recognized for excellence in 15 of the 16 adult medical specialties included in the magazine's survey, nine of which were ranked in

the top 10. The adult specialties for which UPMC is recognized include: ear, nose, and throat; gynecology; pulmonology; geriatrics; psychiatry; rheumatology; nephrology; rehabilitation; neurology and neurosurgery; gastroenterology; urology; diabetes and endocrinology; cardiology and heart surgery; cancer; and orthopaedics. In addition, Children's Hospital of Pittsburgh of UPMC is ranked ninth overall and ranked in nine of the 10 pediatric specialties included in the magazine's survey, three of which were ranked in the top 10.

>> The core of the health system is located in the Oakland, Shadyside, and Lawrenceville neighborhoods of Pittsburgh, where the following health care facilities are interwoven with University of Pittsburgh facilities: UPMC Presbyterian, UPMC Montefiore, Eye and Ear Institute, Magee-Womens Hospital of UPMC, Western Psychiatric Institute and Clinic of UPMC, Hillman Cancer Center, UPMC Shadyside, and Children's Hospital of Pittsburgh of UPMC.

>> Hillman Cancer Center is the flagship facility in the UPMC Cancer Center network of more than 35 clinical care facilities and home of the University of Pittsburgh Cancer Institute, one of only 40 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) and Ireland (where it manages UPMC Beacon Hospital near Dublin) as well as ventures in Japan, China, and Kazakhstan. With a long and distinguished record of pioneering and perfecting organ transplantation, UPMC dominates the field not only in terms of clinical expertise for the number and types of procedures performed but also in terms of research, development of new therapies, and training of transplant surgeons and physicians.

>> In recognition of its leadership in using information technology to improve clinical outcomes and

efficiency, UPMC has ranked among the nation's 100 Most Wired hospitals and health systems by *Hospitals & Health Networks* magazine since the inception of the distinction 14 years ago.

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), more bridges than any other city in the world (by some estimates), eight colleges and universities, nine Fortune 500 companies, and the remnants of Fort Duquesne, which was built in the 1750s and later renamed Fort Pitt.

›› While approximately 307,000 people call the city of Pittsburgh home, the population of the seven-county region is nearly 2.4 million. The city is vibrant, safe, and affordable; it features the amenities of a large city with small-town civility. (In fact, the British magazine *The Economist* gave Pittsburgh the jolly good rating of most livable city in the United States in 2011.)

›› 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.

›› 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 the Pittsburgh Cultural District. The Manchester Craftsmen's Guild, a multidisciplinary, minority-directed arts and learning center (and home of a leading series of jazz concerts), is another of the city's notable features. The city's newest gem is the August Wilson Center for African American Culture, a venue for dance, music, art, theater, and other cultural, educational, and artistic events.

›› Stage presentations in Pittsburgh can be found at the Pittsburgh Public Theater, which makes its home in the O'Reilly Theater; the City Theatre; 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; Carnegie Library of Pittsburgh, with 19 branches throughout the city; 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; a mix of small galleries, including the Pittsburgh Glass Center and the Society for Contemporary Craft; and much more.

›› *The Mothman Prophecies, Wonder Boys, Inspector Gadget, Hoffa, Lorenzo's Oil, Silence of the Lambs, Flashdance, The Next Three Days,* and the 2012 Batman blockbuster *The Dark Knight Rises* are among dozens of motion picture productions filmed in the Pittsburgh area in recent years.

›› For sports enthusiasts, Pittsburgh's three major professional teams—the 2009 Super Bowl champion Pittsburgh Steelers; 2009 Stanley Cup champion Pittsburgh Penguins; and the Pittsburgh Pirates, a franchise with a proud and successful past and a future of perennial hope and promise—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; artists Mary Cassatt, Romare Bearden, and Andy Warhol; authors Gertrude Stein, Rachel Carson, Annie Dillard, 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, Wiz Khalifa, 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 2006. Likewise, the city embraces some of its sports heroes, including Mario Lemieux, Terry Bradshaw, Hines Ward, 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 second tallest university building in the world 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 PITTSBURGH:
www.coolpgh.pitt.edu/
www.pittsburghcityliving.com/neighborhoodList.php
www.ocl.pitt.edu/rental/neighborhood.htmll

For more information:

University of Pittsburgh School of Medicine:
www.medschool.pitt.edu

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