FOUR QUESTIONS EVERY MED SCHOOL SHOULD ANSWER.

START NOW.
Four Questions Every Medical School Should Answer

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n the field of biomedicine, there’s never been a better time to ask questions—big questions, confounding questions, fundamental biological questions, and paradigm-shifting clinical questions. Why now? Because the tools and knowledge at our disposal have never been greater or more powerful, and their availability converges with a time of great need in this country. We must seize this moment to seek solutions and provide answers, because the window of opportunity will not always be so wide open.

All of us at the University of Pittsburgh School of Medicine are acutely aware that these are challenging times in medical education and biomedical research. We stand at the most disruptive moment in American medicine in more than a century, as the push for much-needed health care reform (by that, I mean improving quality and lowering costs) converges with the informatics revolution, the ability to personalize medicine, and dramatic advances in biologic imaging.

Even under intense economic pressures, however, disruptive change presents unprecedented opportunities. At Pitt, strategic decision-making over the past few decades has not only placed us on an unparalleled upward trajectory, it has also positioned us to take advantage of this historic moment.

For example, we’ve long invested in emerging scientific disciplines by creating new medical school departments in fields like immunology, developmental biology, biomedical informatics, critical care medicine, computational and systems biology, and structural biology. In parallel, we’ve built interdisciplinary centers where discoveries in multiple fields can lead to great leaps forward; these include our Center for Vaccine Research, Brain Institute, Drug Discovery Institute, Clinical and Translational Science Institute, Institute for Personalized Medicine, and the Heart, Lung, Blood, and Vascular Medicine Institute.

In just the past 10 years, we’ve constructed brick-and-mortar facilities that enable faculty and students to pursue cutting-edge biomedical research that betters the human condition and advances the fundamental understanding of medical science. Our 10-story Biomedical Science Tower 3 houses one of the largest zebrafish facilities in the nation, enabling a wide variety of research using this important animal model; this building’s specially constructed ground floor holds powerful nuclear magnetic resonance imaging and cryoelectron microscopy facilities. Nearby, both Magee-Womens Research Institute and Children’s Hospital of Pittsburgh of UPMC boast new, state-of-the-art research facilities of 125,000 and 300,000 square feet, respectively.

Students immersed in this interdisciplinary environment among outstanding scientists, clinicians, and educators are inspired and motivated to innovate and excel, helping to fulfill our primary mission to educate science-based, skilled, and compassionate clinicians prepared to meet the challenges of practicing medicine in the 21st century.

While the challenges of the present may provide a rationale for other institutions to scale back and lower their sights, the University of Pittsburgh School of Medicine remains committed to the grand visions that have brought us this far. Jonas Salk’s polio vaccine, which was developed right here on Pitt’s campus, left an indelible mark on the 20th century. In much the same way, we at Pitt are committed to being a part of the next big advancements in American medicine. I invite you to join us and to learn more about our efforts in the pages of this report.

ARTHUR S. LEVINE, MD
Senior Vice Chancellor for the Health Sciences and
John and Gertrude Petersen Dean of Medicine
THE UNIVERSITY OF PITTSBURGH has created a new institute to unlock the mysteries of brain function and develop novel treatments and cures for brain disorders. Like a Bell Labs for brain research, the Brain Institute aims to enable investigators to perform high-risk, high-impact neuroscience that will transform lives.

Centers supported by Pitt’s Brain Institute will focus on neurotechnology, neurogenetics, brain mapping, learning, and discovery in neuroscience, according to Arthur S. Levine, MD, senior vice chancellor for the health sciences and Petersen Dean of Medicine.

“The Brain Institute will bring University-wide resources to bear on some of the major health and scientific concerns of our time,” said Levine. “We have the will and the skills to unravel how the brain works, making this a very exciting time to conduct research in neuroscience.”

The University’s long history of neuroscience research includes such significant contributions as Pittsburgh Compound B for early detection of Alzheimer’s disease, a direct brain interface empowering a woman with quadriplegia to feed herself by moving a robotic arm with just her thoughts, and new diagnostic imaging tools being developed to detect concussions and traumatic brain injuries.

The Brain Institute’s founding scientific director is Peter L. Strick, PhD, Thomas Detre Professor of Neuroscience, Distinguished Professor, and chair of neurobiology. A leading expert on the neural
basis of movement and cognition, Strick pioneered the use of viruses to reveal circuits of interconnected neurons—a brain-mapping technique widely noted as one of the most powerful yet. His studies continue to provide insights into a wide range of brain disorders like Parkinson’s disease, dystonia, autism, depression, and schizophrenia. Strick is also codirector of the Center for the Neural Basis of Cognition (a joint program with Carnegie Mellon University) and is a senior research career scientist at the VA Pittsburgh Healthcare System.

“The critical task of discovering how the brain develops, how it functions normally, and how to alleviate and cure abnormal function requires a multilevel approach,” Strick said, adding that Pittsburgh’s neuroscientists form “a phenomenal community” with broad expertise in bioengineering, communication disorders, computer science, neurosurgery, psychiatry, psychology, and rehabilitation.

Neurodegenerative diseases and psychiatric disorders currently have few effective treatments, Strick noted, adding, “If we had the answers today, drug companies would be rushing new cures onto the market. But those answers only come from basic research.”

Centers planned for the Brain Institute include:

• **A NeuroTech Center** to restore movement to the paralyzed and vision to the blind and to develop new technology-based treatment approaches for motor and cognitive disorders.

• **A NeuroGenetics Center** to develop nonhuman primate models of neurodevelopmental, neuropsychiatric, and neurodegenerative disorders to accelerate the development of new treatments and cures.

• **A NeuroMapping Center** to unravel the complex circuits that form the neural bases of movement, cognition, emotion, learning, language, and creativity—everything that makes us human. This center will explore the mind-body connection that underpins the emerging field of health neuroscience.

• **A NeuroLearning Center** to study the biological bases of learning and memory, including brain changes involved in learning, human development, and overcoming cognitive impairment.

• **A NeuroDiscovery Center** to support particularly innovative, multidisciplinary neuroscience research.
PITT RECRUITS NOTED SICKLE CELL EXPERTS

Three national leaders in the research and treatment of sickle cell disease have joined the Department of Medicine, Division of Hematology/Oncology, marking a major commitment to improve the care of patients with this devastating genetic disease and promote research toward a cure.

The recruitment of Solomon F. Ofori-Acquah, PhD, Laura De Castro, MD, MHSc, and Gregory J. Kato, MD, comes nearly a year after the University’s Heart, Lung, Blood, and Vascular Medicine Institute (VMI) and UPMC helped to launch the Ryan Clark Cure League in partnership with the former Steelers defenseman. Kato, visiting professor of medicine, is a research scientist.

Ofori-Acquah, associate professor of medicine, and De Castro, visiting associate professor of medicine, are clinically associated with the UPMC Adult Sickle Cell Disease Program. Ofori-Acquah, associate professor of medicine, is a research scientist.

Kato, former head of the Sickle Cell Vascular Disease Section at the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health (NIH), will lead the UPMC Sickle Cell Disease Research Center of Excellence. Ofori-Acquah will lead a newly created Center for Translational and International Hematology, part of VMI, which will guide new research programs and partnerships with sickle cell disease programs in Africa. De Castro will lead efforts to develop novel clinical and translational research programs, along with several related clinical services.

Sickle cell disease causes abnormally shaped red blood cells that can block the flow of healthy, oxygenated blood to the body’s organs and tissues.

An estimated 2 million Americans carry one of the sickle cell genes. Millions of people worldwide suffer from sickle cell disease, anemia, or pain and other symptoms resulting from this disease, for which there is only one Food and Drug Administration-approved drug.

Kato’s research focuses on biomarkers and mediators of vascular dysfunction in sickle cell disease, particularly those associated with pulmonary hypertension and leg ulceration. He has also led early-phase testing of investigational drugs for sickle cell disease. Prior to joining NHLBI, Kato was associate professor of pediatrics at Johns Hopkins University and of pediatric oncology at Johns Hopkins Kimmel Cancer Center. His 2014 publication in the journal Blood describes a new mechanistic role for excess iron in promoting the development of pulmonary hypertension, a life-limiting complication of sickle cell disease.

Ofori-Acquah formerly served as assistant professor of pediatrics at Emory University in the Division of Hematology/Oncology, where he also was founding director of the Center for Endothelial Biology. His November 2013 publication in the Journal of Clinical Investigation demonstrated a paradigm shift in scientific understanding of a life-threatening disease: complication called acute chest syndrome; this research focused on hemin, a byproduct of hemolysis. He has received a major, five-year NIH grant to continue this line of investigation.

Prior to joining the School of Medicine, De Castro was associate professor of medicine in the Division of Hematology at Duke University. De Castro’s research interests include investigations of sickle cell-related psychosocial issues and end-organ damage. She has been a principal or coprincipal investigator on more than 20 NIH- and industry-sponsored clinical studies focusing on sickle cell disease as well as other hemoglobinopathies.

DEPARTMENT OF IMMUNOLOGY ADDS TOP INVESTIGATOR

DARIO A.A. VIGNALI, PHD
Professor and Vice Chair of Immunology; Coleader, Cancer Immunology Program; and Codirector, Tumor Microenvironment Center, both at the University of Pittsburgh Cancer Institute

Significance: Vignali is an immunology researcher who is internationally known for his investigations into tumor immunology, autoimmune disease, molecular and cellular aspects of regulatory T cell function, and immune regulation by inhibitory receptors. He has written more than 130 peer-reviewed publications and holds multiple patents related to immunoregulatory molecules.

Notable: Vignali was recruited from St. Jude Children’s Research Hospital, where he was professor of pathology and vice chair of immunology. He received a PhD in immunology of infectious diseases from the London School of Hygiene and Tropical Medicine and completed postdoctoral fellowships at the German Cancer Research Center and Harvard University.

Quotable: “We currently focus on identifying and dissecting negative regulatory pathways that limit anticancer immunity. In moving to Pittsburgh, we hope to enhance our discovery-based platforms, expand our human tumor immunology programs, and gain a better mechanistic understanding of the tumor microenvironment.”
of natural killer T cells and the cells’ function during infection.

molecular mechanisms that regulate the development and survival
of natural killer T cells and the cells’ function during infection.

University of California, San Diego. Her research interests include
her PhD in molecular biology from the Institute of Molecular Pathology
Department of Genetics at Harvard Medical School. His research
in cancer biology at the Dana-Farber Cancer Institute and the

Luis de la Torre, MD, visiting associate professor of surgery,
completed residencies in pediatrics and pediatric surgery at the
National Autonomous University of Mexico and a fellowship in
pediatric colorectal surgery at Schneider Children’s Hospital, Long
Island, N.Y. He specializes in the diagnosis, treatment, and rehabilita-
dation of children with complex colorectal conditions and pioneered a
less invasive surgical approach to the treatment of Hirschsprung’s
disease. De la Torre is the founding director of the Colorectal Center
for Children at Children’s Hospital of Pittsburgh of UPMC, which
provides multidisciplinary medical and surgical care for children
who are born with or acquire disorders of the bowel or rectum.

Marijn Ford, PhD, assistant professor of cell biology, received his
PhD from the Cambridge (UK) Medical Research Council Laboratory
of Molecular Biology and completed postdoctoral training at the
University of California, Davis. His work focuses on structural biology,
with particular emphasis on protein X-ray crystallography and
characterization of dynamin-related protein fusion and scission.

Daniel Forman, MD, visiting professor of medicine, comes to Pitt
from Brigham and Women’s Hospital and Harvard Medical School.
He trained in cardiovascular and geriatric medicine at Beth Israel
Hospital. Current investigations pertain to geriatric cardiology and
translational work in skeletal muscle and functional capacity, along
with related benefits of exercise training. He is also studying novel
approaches to cardiac rehabilitation to better address age-related
dynamics (e.g. frailty, multimorbidity, sarcopenia) affecting
management of heart failure, myocardial infarction, and valvular
heart disease.

Robin Lee, PhD, assistant professor of computational and
systems biology, received a PhD in cellular and molecular medicine
from the University of Ottawa and completed a research fellowship
in cancer biology at the Dana-Farber Cancer Institute and the
Department of Genetics at Harvard Medical School. His research
focuses on understanding TNF-induced signal transduction circuits
and regulation of NF-κB-driven transcription through competition
on target promoters.

Peter C. Lucas, MD, PhD, associate professor of pathology and
of pediatrics, received his MD and PhD from Vanderbilt University.
A physician-scientist arriving from the University of Michigan Medical
School, Lucas has clinical expertise in molecular anatomic and breast
surgical pathology. He studies the relationship between chronic inflamma-
tion and the development of vascular, metabolic, and neoplastic
diseases, particularly the role of an NF-κB signaling pathway controlled
by the three-protein CBM (CARMA, Bcl10, and MALT1) complex.

Linda McAllister-Lucas, MD, PhD, associate professor of
pediatrics and chief, Division of Pediatric Hematology/Oncology,
earned her MD and PhD from Vanderbilt University and comes to
Pitt from the University of Michigan Medical School, where she was
associate professor of pediatrics and associate director of the Medical
Scientist Training Program. Current research interests include molecular
mechanisms of inflammatory and neoplastic disease, with emphases
on oncprotein promotion of lymphoid malignancy and the contribu-
tions of G-protein coupled receptor-dependent signaling in cancer
pathogenesis and inflammatory disease.

Bradley Molyneaux, MD, PhD, assistant professor of neurology,
received his MD and neurobiology PhD at Harvard, where he also was
chief resident in neurology and completed fellowships in neurocritical
care and in the Department of Stem Cell and Regenerative Biology.
Molyneaux’s research interests include mechanisms of cerebral cortex
development and repair, genes controlling the development of cortical
projection neuron subtypes, and early corticospinal motor neuron
specification events.

Roderick O’Sullivan, PhD, assistant professor of pharmacology
and chemical biology, earned his PhD in molecular biology from
the Institute for Molecular Pathology in Vienna, Austria, and completed
a postdoctoral fellowship at the Salk Institute for Biological Studies.
His investigations focus on telomere replication, disruption of ASF1
protein-mediated histone exchange, and the role of the alternative
lengthening of telomeres (ALT) pathway for telomere homeostasis
in normal and cancer cells.

Inderpal (Netu) Sarkaria, MD, assistant professor and vice chair
of clinical affairs, Department of Cardiothoracic Surgery, received
his MD from the University of Medicine and Dentistry of New Jersey
and completed general and thoracic surgery residencies at NewYork-
Presbyterian Hospital and Memorial Sloan Kettering Cancer Center. His
research focuses on minimally invasive and robot-assisted pulmonary
and esophageal surgery, as well as molecular profiling of esophageal
diseases and lung cancer.

Matthew Smith, PhD, assistant professor of ophthalmology,
received his PhD in neural science from New York University and
completed postdoctoral training at Carnegie Mellon University and
the University of Pittsburgh. His research interests focus on neuro-
physiological and computational approaches to understanding the
visual system, as well as characterization of functional connectivity
among neurons and how connectivity patterns relate to visual
perception and cognition.
Thomas E. Starzl, MD, PhD, known as the father of transplantation, joins 84 new members and 21 foreign associates elected to the National Academy of Sciences (NAS) in 2014 in recognition of his “distinguished and continuing achievements in original research.”

Starzl, who received the National Medal of Science in 2006, is Distinguished Service Professor of Surgery in the School of Medicine.

“Dr. Starzl’s contributions to science and medicine are extraordinary,” said Arthur S. Levine, MD, senior vice chancellor for the health sciences and John and Gertrude Petersen Dean of Medicine. “He is a physician-scientist of the highest caliber.”

Starzl performed the world’s first successful liver transplant in 1967 while at the University of Colorado. In 1981, Starzl joined the University of Pittsburgh School of Medicine and led the team of surgeons who performed the city’s first liver transplant. Thirty liver transplants were performed that year, launching the only liver transplant program in the nation and invigorating the University’s heart and kidney transplant programs. In 1989, Starzl introduced the anti-rejection medication FK-506, which markedly increased survival rates for liver and other organ transplants and led the way to other successful types of organ transplants, including pancreas, lung, and intestine.

He remains active in research, mapping the relationship between donor and recipient cells and developing new therapeutic strategies to achieve immune tolerance after transplantation with a much lower risk of side effects from immunosuppressive therapy.

Known today as the nation’s foremost scientific body, NAS was established in 1863 by President Abraham Lincoln to provide independent advice to the government on matters related to science and technology. Election is one of the highest honors accorded to scientists, and academy members are considered pioneers in their fields.
EMERGENCY PRESERVATION AND RESUSCITATION

National media outlets were abuzz with the news of an unprecedented clinical trial that aims to buy time—up to an hour with no heartbeat or circulation—for victims of cardiac arrest from extreme blood loss.

A patient with severe trauma and massive blood loss who is also in the throes of cardiac arrest needs special care. But what to focus on? The quickly bleeding wound? The arrest? Emergency medicine physicians and trauma surgeons could use a few extra minutes.

Cue EPR, emergency preservation and resuscitation. Pitt’s late Peter Safar, MD (Distinguished Professor of Resuscitation Medicine), with colleagues, including Samuel Tisherman, MD (former Pitt professor of critical care medicine and of surgery), developed the procedure in preclinical studies. EPR involves flushing out the patient’s blood and pumping cool saline into the aorta. With no blood, brainwaves, or breathing, this paused state will allow surgeons to repair damage, Tisherman predicts. He’ll know more as clinical trials unfold at UPMC Presbyterian and at several other academic medical centers.

The Department of Defense–funded trial of EPR officially began in April at UPMC Presbyterian. So when the right patient comes into the emergency department, the EPR team is primed to “race against the clock,” says Tisherman.

“We want to make a substantial contribution to biomedical research globally. The goal is not only to do world-class science, but also to do the kind of science that will lead to the emergence of a biotechnology industry in southern Italy.”

Arthur S. Levine, MD, Petersen Dean of Pitt’s School of Medicine and the Scientific Director of BRBC

The 334,000-square-foot research facility in Carini is expected to open in 2016. BRBC will include a corporate incubator to shepherd its discoveries to market.
EXPORTING MEDICAL EXCELLENCE

The University of Pittsburgh School of Medicine is expanding its global reach in multiple ways. Two ongoing projects with international partners are bringing Pitt expertise—in biomedical research, medical education, and clinical training—to Italy and Kazakhstan.

CARINI, ITALY

A partnership that includes Pitt, UPMC, and the Italian government brought solid-organ transplantation to Sicily in 1999. That project got a permanent home in 2004, when a 70-bed hospital opened in Palermo.

In the coming years, a similar public-private partnership will result in the construction of the Ri.MED (Ricerca Mediterranea or Mediterranean Research) Biomedical Research and Biotechnology Center (BRBC) in nearby Carini. The 334,000-square-foot research facility is expected to open in 2016. Pitt’s School of Medicine will be responsible for the scientific direction and staffing of the center. BRBC will include a corporate incubator to shepherd its discoveries to market. Ri.MED investigators who train in research at Pitt will ply the fields of structural biology, computational biology, drug discovery, vaccine development, biomedical device development, regenerative medicine, tissue engineering, molecular imaging, and neuroscience.

ASTANA, KAZAKHSTAN

In 2013, the University of Pittsburgh School of Medicine was selected to guide the Republic of Kazakhstan’s Nazarbayev University (NU) as it establishes its own medical school, which aims to educate physician-scientists to become that nation’s next leaders in health care, medical education, and biomedical research. Pitt will partner with NU to institute a U.S.-style curriculum; design and develop teaching facilities; recruit and mentor school leadership and faculty; plan organizational and administrative structures, policies, and procedures; and develop courses, syllabi, and clinical experiences with the participation of physician-educators from hospitals in Kazakhstan.

Massimo Pignatelli, MD, PhD, a distinguished pathologist and biomedical scientist, was recruited through an international search process to serve as founding dean of Nazarbayev University School of Medicine (NUSOM), which will open with its first class of students in August 2015. Previously, Pignatelli was at the University of Glasgow in Scotland, where he served as head of the School of Medicine. He is a noted physician-scientist whose research focuses on epithelial adhesion molecules. He is also a Pitt adjunct professor of pathology.

“My hope is that NUSOM will become a model for every medical school in the nation,” said Pignatelli. “This is the goal of the project—to create the hub of medical education and biomedical research in Central Asia. The project has all the necessary components, including infrastructure, resources, and political stability.”
IN SUMMER 2014, THE FIRST COHORT OF TSINGHUA SCHOLARS SAID FAREWELL TO PITT AFTER TWO YEARS OF INTENSE AND PRODUCTIVE RESEARCH TRAINING.
In August 2012, Pitt’s School of Medicine welcomed the arrival of 21 students from Tsinghua University School of Medicine in Beijing. This most prestigious of Chinese scientific institutions had recently entered into a first-of-its kind agreement with our own medical school to have its students undergo a rigorous, two-year biomedical research training program in Pittsburgh. That first cohort of Tsinghua students arrived with a great deal of excitement and enthusiasm, plus a measure of trepidation at the impending immersion in various Pitt research labs and a foreign language.

That was two years ago. At a spring 2014 scientific program, 51 Tsinghua scholars (the original 21, plus a second cohort that arrived in August 2013) displayed posters describing their latest scientific work exploring topics from dengue vaccines to DNA repair. The scholars’ coauthors and mentors included department chairs, institute directors, one MacArthur fellow, and recent inductees to the Institute of Medicine. Their efforts have resulted in numerous peer-reviewed publications.

The scholars’ new-and-improved English skills were on full display, as well, as they eagerly explained their projects to Pitt faculty and students mingling in front of their posters. When asked what he has gained from the program, one student laughed and said, “Scientific thinking, of course, but also just talking about science in English. In my lab, I have learned to explain my research process and discuss.”

Program director Jeremy M. Berg, PhD, Pittsburgh Foundation Professor of Personalized Medicine and associate senior vice chancellor for science strategy and planning, health sciences, has seen strong improvement in the scholars’ ability to think like researchers. “Many have really learned to not only take technical challenges in stride but also to approach a problem, overcome obstacles, and ask the right questions to achieve results.”

The Pitt-Tsinghua program welcomed its third group of students in August 2014.

Also in 2012, the School of Medicine began a collaboration with China’s prestigious Central South University Xiangya School of Medicine. Under the five-year agreement, Pitt provides two years of rigorous biomedical research training to medical students, most of whom have already undergone six years of medical school, including clinical training. As of August 2014, 17 of these medical students are on campus, and five have recently returned to Changsha to complete medical school after their two years in Pittsburgh. In 2014, Xiangya Hospital formed a partnership with UPMC in order to establish an international medical center that will improve access to high-quality care for patients within the region.

“MANY HAVE REALLY LEARNED TO NOT ONLY TAKE TECHNICAL CHALLENGES IN STRIDE BUT ALSO TO APPROACH A PROBLEM, OVERCOME OBSTACLES, AND ASK THE RIGHT QUESTIONS TO ACHIEVE RESULTS.”

JEREMY M. BERG, PhD
HOW DO WE ENABLE FACULTY AND STUDENTS TO REACH THEIR PEAK POTENTIAL?

PITT’S PROGRESS: INSTITUTE FOR PERSONALIZED MEDICINE
PROJECTS TACKLE INFORMATICS, PHARMACOGENOMICS

Transforming the University of Pittsburgh’s Institute for Personalized Medicine from idea to reality is a lot like assembling a jigsaw puzzle — the big picture gets clearer when pieces fit together.

“Biology is complicated, human populations are complicated, health care systems are complicated, legal and ethical frameworks are complicated — and all that has to coalesce,” says Jeremy M. Berg, PhD, Pittsburgh Foundation Professor of Personalized Medicine, associate senior vice chancellor for science strategy and planning, health sciences, and institute founding director. Even so, Berg remains excited by the challenge, though “probably a little more humble than I was a year ago,” he adds.

The School of Medicine and UPMC established the institute in 2013. Its mission is to apply new knowledge in genetics, genomics, and other disciplines to promote and develop evidence-based medicine, with the ultimate goals of improving disease prevention and treatments and decreasing costs. Considerable talent and support are available now, not only at Pitt, but also through strategic alliances with academic institutions and industries within the region and around the world, Berg notes.

Currently, the institute is building collaborations in pharmacogenomics and informatics.

The Pittsburgh Genome Resource Repository is a joint effort with Pitt’s Departments of Biomedical Informatics and Human Genetics,
University of Pittsburgh Cancer Institute, UPMC, and the Pittsburgh Supercomputing Center (PSC) to build an archive where large, multiple-terabyte data sets can be stored, managed, and made available to investigators. First up is the NIH-funded data set known as the Cancer Genome Atlas, a project begun in 2006 to collect information on 30-plus cancers.

“The idea has been to try to figure out what the mutational spectrum looks like in different sorts of tumors. Are there things that are common to different sorts of tumors or, more interestingly, tumors that occur in different anatomical regions but have more in common at the genetic and biochemical level than you would have thought?” Berg asks.

The data set encompasses hundreds of terabytes and millions of files worth of genomic information on tissue samples from thousands of patients. Interestingly, with 16 percent of those patients, Berg says Pitt/UPMC is the largest single contributor to the Cancer Genome Atlas. The Pittsburgh Genome Resource Repository incorporates Pitt’s clinical data with the atlas.

“THE CHALLENGE IS TO ORGANIZE THE DATA SO IT DOESN’T TAKE A NEW INVESTIGATOR A YEAR TO ASK A QUESTION. THE BIG BENEFIT HAS ACTUALLY BEEN JUST GETTING THE GROUPS TO KNOW ABOUT EACH OTHER AND WORK TOGETHER.”

“The challenge is to organize the data so it doesn’t take a new investigator a year to ask a question,” he adds, explaining that Pitt, UPMC, and PSC collaborators have been able to leverage their expertise to establish workable data sets. “The big benefit has actually been just getting the groups to know about each other and work together.”

Informational sessions have been held for some interested investigators and feedback has been encouraging, Berg says.

Also being supported through the institute is a pharmacogenomics-focused investigation led by Philip Empey, PharmD, PhD, assistant professor of pharmacy and therapeutics, School of Pharmacy; Steven E. Reis, MD, associate vice chancellor for clinical research, health sciences, and director of the Clinical and Translational Science Institute; and Dietrich A. Stephan, PhD, professor and chair of the Department of Human Genetics, Graduate School of Public Health.

The project will evaluate the potential effectiveness of certain anticoagulants used with cardiac stents based on individual patients’ genetic profiles. Some genetic variance is known to be associated with a higher risk for nonresponse or unwanted side effects. “So it’s a question of doing the tests and saying, ‘We’re not going to give you this drug because we think, based on your genetics, you’re unlikely to respond. But here’s a different drug you’re more likely to respond to,’” says Berg.

The U.S. Food and Drug Administration has compiled information on genetic factors that may affect the performance of more than 100 drugs, Berg says.

“Everybody agrees on what the future looks like in the sense that all this information is going to be collected somehow and is already sitting there in your medical record for the next time a doctor prescribes something,” he continues. “The problem is how to do it if that information doesn’t already exist. There are huge possible rewards, but we need to take baby steps to get there.”
TOTAL OF $375,000 AWARDED TO SIX TEAMS OF INVESTIGATORS

SUCCESS A CINCH FOR PINCH

What happens when smart individuals get challenged to dream up creative new ways to help people stay healthy—and have just three months to do it? At Pitt, smartphone applications that will alert people with Parkinson’s disease that it’s time to take another dose of medicine and support smokers as they try to kick the habit and a bioactive bandage designed to hasten the healing of diabetic skin ulcers have been awarded $100,000 prizes as the first winners of the Pitt Innovation Challenge (PInCh).

Three additional teams of investigators received $25,000 awards to help advance their plans to reduce hospital readmissions, monitor prescription drug adherence, and develop a text-based helpline focused on sexual health for teens.

More than 90 teams participated in the challenge, which was sponsored by the University of Pittsburgh’s Clinical and Translational Science Institute (CTSI), Office of the Provost, and Innovation Institute. Each team submitted a video entry during the first phase of the competition. Twenty-nine teams were then asked to provide a written description of their projects, and 10 finalists were asked to present during the showcase, a live, Shark Tank-style judging event held in May 2014.

“PInCh is a celebration of the pioneering and entrepreneurial spirit of some of the brightest, most enterprising teams of visionary thinkers in and around the Pittsburgh region,” said CTSI director Steven E. Reis, MD, associate vice chancellor for clinical research, health sciences, and professor of medicine. “We are looking forward to using the PInCh model in the future to again tap the vast bank of creativity, talent, and drive available in Western Pennsylvania.”

Organizers were pleased by the large and diverse response for the first competition. They also hope that the interdisciplinary teams that did not win—many of whom connected with each other because of PInCh—continue brewing innovations together.

“As researchers, we’re not trained to think about how we disseminate the discoveries that we make—how to make them sustainable, or scale them up so they can have a population-level impact,” said Ellen Beckjord, PhD, MPH, assistant professor of psychiatry, whose project is one of three $100,000 award winners. She added that PinCh and commercialization-focused programs offered through Pitt’s Innovation Institute are changing those attitudes.

“We’re in the business to help people, and if what I do only helps the 100 people I’ve had in my trial, I haven’t done my job,” Beckjord said.

In addition to the cash prize, Beckjord’s group and the other winning teams get the assistance of a project manager to begin implementing their ideas.

$100,000 AWARDS:

**QuitNinja:** A smartphone application to encourage smoking cessation with real-time interventions when the urge to smoke hits

*Ellen Beckjord, PhD, MPH, assistant professor of psychiatry*

**SPark:** Will adapt smartphone motion-sensor technology to monitor the movement of a person with Parkinson’s disease and provide guidance about when to take medication

*Samay Jain, MD, assistant professor of neurology*

**Sealion:** Bioactive bandages that can speed healing of skin ulcers and be applied weekly by patients at home

*Yadong Wang, PhD, William Kepler Whiteford Professor of Bioengineering, Swanson School of Engineering, associate professor of surgery*

**ENVIABLE NIH STANDING**

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 1998 and has remained within this enviable echelon ever since.

In a preliminary analysis of NIH funding for federal fiscal year 2014, the faculty of the University of Pittsburgh ranked fifth in dollars awarded, with more than $450 million in NIH funding and more than 90 percent of this funding going to the Schools of the Health Sciences. The faculty of the School of Medicine, together with that of the Graduate School of Public Health, also ranked fifth in fiscal year 2014, with total NIH funding of nearly $329 million.

Overall, the University of Pittsburgh spent approximately $698 million for research of all kinds in fiscal year 2014; more than 80 percent of this amount was for research in the health sciences.
Lucky us.

(PITT MED)
ELITE SOCIETIES RECRUIT PITT CREW

Hail to Pitt’s newest Turks, a baker’s dozen of faculty members tapped to join the prestigious Association of American Physicians (AAP/“Old Turks”) and the American Society for Clinical Investigation (ASCI/“Young Turks”).

New AAP members from the School of Medicine are
David Hackam, MD, PhD, former Watson Family Professor of Surgery and associate dean for medical student research; David A. Lewis, MD, Thomas Detre Professor of Academic Psychiatry and chair of psychiatry; Patrick S. Moore, MD, MPH, Distinguished Professor of Microbiology and Molecular Genetics, Pittsburgh Foundation Professor of Innovative Cancer Research, and director (with Chang) of the Cancer Virology Program, University of Pittsburgh Cancer Institute; and Sally E. Wenzel, MD, professor of medicine and director of the University of Pittsburgh Asthma Institute at UPMC and the University of Pittsburgh School of Medicine.

Founded in 1885, AAP is dedicated to the pursuit of medical knowledge, experimentation and discovery in basic and clinical science, and the application of new findings to clinical medicine. Each year, 60 people are nominated for membership in recognition of excellence in their fields. Today, the association represents the best medical minds and provides a forum to promote collegiality, create and disseminate knowledge, and provide role models for generations of upcoming physician-scientists.

ASCI inductees are Cristian Apetrei, MD, PhD, professor of microbiology and molecular genetics; Carlton M. Bates, MD, professor of pediatrics and chief, Division of Nephrology; Hülya Bayır, MD, professor of critical care medicine; Peter C. Lucas, MD, PhD, associate professor of pathology; Linda McAllister-Lucas, MD, PhD, associate professor of pediatrics and chief, Division of Hematology/Oncology; Mary L. Phillips, MD, MD (Cantab), Pittsburgh Foundation-Emmerling Professor of Psychotic Disorders and professor of psychiatry and of clinical and translational science; Aleksandar Rajkovic, MD, PhD, Marcus Allen Hogge Professor of Reproductive Genetics and professor of obstetrics, gynecology, and reproductive sciences; and Yutong Zhao, MD, PhD, associate professor of medicine, Division of Pulmonary, Allergy, and Critical Care Medicine.

The University received special recognition for its eight new inductees—at 10 percent of the total, more than any other single school in 2014—during a dual ASCI/AAP meeting in Chicago.

The eight join 41 other Pitt colleagues on the membership rolls of ASCI, an organization of more than 2,800 physician-scientists who have achieved notable success relatively early in their careers.

Founded in 1908, ASCI is a medical honor society with a clear preference for celebrating up-and-coming scholarly achievement in biomedical research. New members must be 50 or younger at the time of their election.

SADOVSKY GETS NOD

Yoe Sadovsky, MD, Elsie Hiliard Hillman Professor of Women’s Health Research; professor and vice chair (research) of obstetrics, gynecology, and reproductive sciences; professor of microbiology and molecular genetics; and director of the Magee-Womens Research Institute, has been elected to the Institute of Medicine (IOM), an honor that is considered among the highest in the field.

Sadovsky’s research focuses on the development of the placenta and the function of specialized placental cells called trophoblasts. Using human placental cells as well as mouse models, he studies molecular pathways that govern placental development and adaptive response to stress. Primary areas of research include placental uptake and processing of metabolic fuels, the role of microRNA in placental function, and placental injury and adaptation. Sadovsky completed his MD at Hebrew University Hadassah Medical School in Jerusalem, his residency in obstetrics and gynecology at Washington University in St. Louis, and his postdoctoral training at the University of California, San Francisco.

Other prestigious honors accorded to Sadovsky during 2014 were his election to the presidency of the Society for Gynecologic Investigation for the 2016-17 term and his acceptance of the Cozzarelli Prize in biomedical sciences for a paper published in the July 2013 Proceedings of the National Academy of Sciences (PNAS) that demonstrated that trophoblasts may have a unique ability to not only block viral transmission from mother to baby, but also to confer the trait upon other cell types.

The annual Cozzarelli Prize recognizes the top PNAS-published papers in six scientific categories that reflect excellence and originality. Sadovsky shares the prize with senior coauthor Carolyn Coyne, PhD, associate professor of microbiology and molecular genetics, and colleagues from the School of Medicine and the Graduate School of Public Health.
A few of Pitt’s leading medical educators brought home hardware from recent conferences of the Association of American Medical Colleges (AAMC). Cynthia Lance-Jones, PhD, assistant dean for medical education, was honored with the 2013 Alpha Omega Alpha Robert J. Glaser Distinguished Teacher Award, a singular honor recognizing her role in both curricular design and basic science education. As block director of the first-year basic science core curriculum, Lance-Jones oversees six courses covering principles of anatomy, biochemistry, genetics, cell biology and pathology, immunology, and microbiology. John Mahoney, MD, associate dean of medical education, earned an Outstanding Reviewer Award for his work on AAMC’s MedEdPORTAL publications section.

Finally, former vice dean of the medical school Steven Kanter, MD, was honored with the Merrell Flair Award in Medical Education, the highest honor for medical education awarded by AAMC. The award recognizes an individual who has made major contributions over a significant period of time to medical education in North America. Kanter has been a firm, guiding hand on the curriculum at Pitt for 23 years. From 2008 to 2012, he was editor-in-chief of Academic Medicine, the top journal in the field. Kanter, having earned a stellar reputation in his time at Pitt, departed in 2014 to assume the deanship at the University of Missouri–Kansas City School of Medicine.

Ann E. Thompson, MD, former associate dean for faculty affairs, has been named vice dean of the School of Medicine. In her new role, Thompson will serve as a senior deputy to Arthur S. Levine, MD, Pitt’s senior vice chancellor for the health sciences and John and Gertrude Petersen Dean of Medicine, in the management and advancement of the medical school.

“Dr. Thompson’s many achievements include building and maintaining successful clinical and academic programs with exceptional records for fellowship training and research productivity,” Levine said. “She has held leadership roles as a medical school administrator and in her clinical field of critical care medicine and has consistently advocated for the recruitment and promotion of outstanding women at Pitt and in academic medicine as a whole.”

Thompson is a professor of critical care medicine. She served as chief of pediatric critical care from 1981 to 2009 and was interim chair of critical care medicine from 2006 to 2008. She is a past president of the Society of Critical Care Medicine — only the second woman to hold that position — and she is a senior editor of Pediatric Critical Care Medicine.

Thompson received her Bachelor of Arts in biology from the University of Chicago in 1969 and her medical degree from Boston’s Tufts University School of Medicine in 1974. In 2003, she received a master’s degree in health care policy and management from Carnegie Mellon University.

Q&A WITH A TOP MEDICAL EDUCATOR, STEVEN KANTER, MD

How do you describe Pitt’s approach to medical education?

Kanter: We want our students to become creative and critical thinkers. We want them to be good, collaborative problem solvers. So we’ve developed different experiences around that. For example, we blend lectures with other types of teaching modalities like small-group learning and team-based learning.

The Scholarly Project is a great example. People say that medical school is a mile wide but only an inch deep. In some ways, it does need to be a survey of a very broad set of information. But if that’s all you do, then you’ve missed opportunities. If you give med students a few opportunities to go deep on something, they come face-to-face with unanswered questions in medicine. Students ask themselves,
“How do scientists even develop a question that is answerable?” That’s actually very difficult, and the students have a chance to grapple with that in the Scholarly Project. They focus on an area that intrigues them, and they design and execute meaningful, hypothesis-driven research on that topic. [For more on the Scholarly Project, see page 24.]

How does the curriculum react to changing realities in medicine?

We maintain the curriculum as a living, dynamic entity that evolves over time. The curriculum committee is charged, in part, with viewing the curriculum in that way. That’s why a number of new things have been introduced, even though it always involves some rearranging. We’ve developed a culture among both faculty and students—this is just a part of what we do. Recently, we’ve introduced sessions on health care finance. We’ve introduced interprofessional education, and we’re able to do that in a relatively short period of time because that’s the culture.

Students at Pitt begin clinical observation and interacting with patients in the first few weeks of med school. What are the benefits of that early exposure to patients?

We started that back in the early ’90s, and what we heard from students right away was, number one, they loved it. And they said things like, “Gee, seeing patients even makes the biochemistry seem more relevant.” It was interesting to us that there wasn’t necessarily a direct relationship between the particular biochemistry or cell biology or genetics they were studying that day and the type of patients they were seeing. But somehow, seeing patients and their problems helped students make connections and see a clear purpose to what they were doing in class. On some level, it made the science overall more compelling and relevant.

Med students at Pitt often say that, while med school is challenging and rigorous, they haven’t found the cutthroat competition they anticipated.

Why is that?

Our curriculum leaders have worked hard to create a collaborative, cooperative work environment. Small-group learning is a part of that. The students, to their credit, have responded by developing a welcoming, supportive ethos. Also, we recently moved to a different grading system in the first two years. We used to have three options: honors, pass, and fail. We’ve moved to just the pass/fail option for those years because, with the work that’s done in the first two years, there’s a certain competency that students need to develop. But memorizing every minute detail may not be better than spending the evening at the theater and coming back refreshed.
“WHEN I’M SINGING TO THOSE BABIES, I THINK: I’M SINGING TO A FUTURE IMPORTANT PERSON. THAT’S THE CREDIT I GIVE TO THEM.”
Thirty-five years ago, as an obstetrics/gynecology resident, Carey Andrew-Jaja, MD, worked with an attending physician who loved to sing and occasionally serenaded newborn babies as he worked.

Andrew-Jaja, a Pitt clinical professor of obstetrics, gynecology, and reproductive sciences who is known for going about his own work with an infectious joy and an engaging smile, recalls what his singing colleague said when he retired: “He asked me, ‘Andy, do you sing to your babies?’ And I said, ‘No, that’s your stuff.’ He said, ‘Go ahead. Do it.’ And so I took it over. He passed the baton to me. I started to sing to my babies ever since then, and I do it every single time.”

Andrew-Jaja was just appointed president of the medical staff at Magee-Womens Hospital of UPMC. But he has been a memorable influence on Pitt medical students and residents for many years. And in summer 2014, he became a YouTube sensation when a video from the previous year went viral. In it, he croons “Happy Birthday” and “What a Wonderful World” to newborns at Magee. The video has been watched more than a million times and was covered by news outlets around the world. Scores of colleagues and patients’ families responded with personal stories of their meaningful interactions with “the singing doctor,” as he is known around the hospital.

Of the infants he welcomes into the world, Andrew-Jaja says, “They are special. Each of them is an individual, and I’ve delivered thousands and thousands of babies. When I’m singing to those babies, I think: I’m singing to a future important person. That’s the credit I give to them.”
Med students choose Pitt for a lot of different reasons, including the elite academic medical center and hospital system, top-notch biomedical research, and the urban campus in one of America’s most livable cities. They generally don’t anticipate exposure to a small-town medical practice or the charms of rural America. But perhaps they should.

The best med schools offer a breadth of unexpected discoveries for the future physician, whether through varied research opportunities or diverse clinical experiences. At Pitt, all students complete a four-week family practice clerkship in the third or fourth year. Most students complete this rotation in Pittsburgh, but those who elect to do so through Dr. Jill Owens’ family practice in Bradford get an uncommon experience along Pennsylvania’s bucolic northern border. With fewer than 9,000 citizens, Bradford is the largest town in McKean County, which includes more than 130,000 acres of the Allegheny National Forest, 25,000 acres of state game lands, and an extensive patchwork of private farms, fields, and forests. Working and playing outdoors is a way of life for many locals here. People fish. They hunt deer, black bear, turkey, grouse, and other small game. Industry centers around resources like timber, oil, and gas.

“TELEMEDICINE IS ONE TOOL THAT CAN MAKE A DIFFERENCE, AND THIS CLERKSHIP MAY BE THE ONE IN WHICH STUDENTS LEARN THE MOST ABOUT THAT. THEY LIVE IT.”
The setting and the culture translate to a unique patient population with its own set of ailments, not to mention a particular way of practicing medicine. With assistance from the Center for Rural Health Practice on Pitt’s Bradford campus, students are immersed in the family practice run by Owens, a 1997 graduate of the School of Medicine who returned to her hometown of Bradford to practice family medicine. With very few specialists close by, Owens does more than most family docs in Pittsburgh, including assisting on neonatal resuscitation after other doctors perform C-sections. With no easy access to a catheter lab or cardiologist, the protocol for handling heart attack victims is different too. She and a few emergency medicine docs collectively run the small intensive care unit in Bradford.

When not working, students have the chance to explore the outdoors and the unique social setting. “Bradford as a community has been great,” says one. “I’m here in summertime, so I get to be outside, which is wonderful. I imagine that those here in the winter will get to cross-country ski and things of that nature. But for me, I get to see deer on my morning run. I get to go hiking on the weekends.”

The program began in 2011 when Pitt was awarded a Health Resources and Services Administration grant for education in rural medicine. Included in the grant were resources to set up telecommunications with rural sites. The family medicine clerkship director, Robin Maier, MD, from Pitt’s Department of Family Medicine, has developed curricular elements to supplement the clinical experience, which she delivers via webcam.

“Telemedicine is one tool that can make a difference,” says Maier, “and this clerkship may be the one in which students learn the most about that. They live it.”

With a very large rural population in Pennsylvania, Maier sees the rotation as an important training ground for future doctors and even an opportunity for valuable research that asks, “How can we better deliver health care to rural areas, where outcomes for many conditions are not as good?” These are important, compelling, and complex questions that funding organizations such as the Patient-Centered Outcomes Research Institute are interested in answering. A student looking for a niche in translational research can find more than one kind of inspiration in rural Pennsylvania.

“They also just get a taste of a different way to practice,” adds Maier. “They frequently come back and tell us that Jill Owens is a rock star in that community.”
A great many Pitt Med students find that their scholarly work leads to quantifiable results, not to mention, when they begin interviewing, the eager attention of residency program directors!
The best physicians have a solid grounding in the scientific method. They don't have to be scientists, but they must understand how research works and how scientific discoveries become clinical medicine. At Pitt, we challenge medical students to contribute to scholarly research during their med school years. In each graduating class, without fail, we find med students who seize this opportunity and produce some stunning results.

Pitt's innovative Scholarly Project requirement was introduced a decade ago, when the Class of 2008 entered medical school. At the time, some said it would drive away applicants (who didn't want to do research, presumably), but the opposite has proven true. Today, the Scholarly Project is being emulated at some of the nation's other top medical schools.

In 10 years of refining this element of Pitt's medical curriculum, a few key features have become critical to the program's success. First, every med student is invited to take part in summer research between the first and second years of medical school. Roughly 75 percent of the Class of 2014 accepted, with many students building mentoring relationships and exploring research topics that would eventually lead to their scholarly projects.

Students are paired with established scientists, including some of our most accomplished faculty members. Depending on their interests, med students delve into everything from wet-bench laboratory research to computational biology; others explore the subtleties of the doctor-patient relationship or mine public health data for new insights into disease trends. In these and scores of other ways, med students build their own scientific knowledge and become the type of clinicians who can make a difficult diagnosis and help patients make the best decisions based on the evidence.

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**2014 O’MALLEY AWARD WINNERS**

At Scholars Day 2014, five graduating MD students were individually honored with a Bert and Sally O’Malley Award for Outstanding Medical Student Research. The best of the best from the Class of 2014:

**HEBIST BERHANE, MD**
Investigating the Radioprotective Nature of JP4-039 on Human Foreskin Cell Lines Isolated from Patients with Fanconi Anemia and Establishing the Drug’s Mechanism of Action

MENTOR:
Joel S. Greenberger, MD, Claude Worthington Benedum Foundation Professor and Chair of Radiation Oncology

RESIDENCY MATCH:
Radiation Oncology, UPMC Medical Education Program, Pittsburgh

**STEPHANIE DREIFUSS, MD**
Prevalence of Endogenous CD34+ Adipose Stem Cells Predicts Human Fat Graft Retention in a Xenograft Model

MENTOR:
J. Peter Rubin, MD, UPMC Professor and Chair of Plastic Surgery

RESIDENCY MATCH:
Plastic Surgery, UPMC Medical Education Program, Pittsburgh

**AMANDA GELMAN, MD**
Racial Disparities in Awareness of HPV and HPV Vaccine Uptake

MENTOR:
Sonya Borrero, MD, Associate Professor of Medicine

RESIDENCY MATCH:
Primary Internal Medicine, University of Colorado School of Medicine, Denver

**DANIEL LUDWIG, MD**
Development of Magnetic Resonance Imaging To Identify Conduction Dyssynchrony in the Presence of Left Ventricular Scar

MENTOR:
David Schwartzman, MD, Professor of Medicine

RESIDENCY MATCH:
Diagnostic Radiology, Barnes-Jewish Hospital at Washington University Medical Center, St. Louis

**JACQUELINE MOREAU, MD**
Improving Early Detection of Melanoma

MENTOR:
Laura K. Ferris, MD, PhD, Associate Professor of Dermatology

RESIDENCY MATCH:
Dermatology, Massachusetts General Hospital, Boston
“SOME OF THE BEST RESIDENTS WE GET COME FROM PITTSBURGH,” THEY TOLD HER DURING HER INTERVIEW. “WHY IS THAT?”

RESIDENTS STAND OUT

Jacqueline Moreau chose Pitt largely because of the Clinical Scientist Training Program (CSTP), which provided her with a full year of support to conduct research between her second and third years of medical school. But her research portfolio wasn’t the only thing that caught the attention of the dermatology residency program directors at Massachusetts General Hospital (MGH).

“Some of the best residents we get come from Pittsburgh,” they told her during her interview. “Why is that?”

“Pittsburghers are the salt of the earth,” says Moreau. “They are hard working. They believe in community. And they don’t come in with a sense of entitlement.” She noticed early on that the city welcomed newcomers. (She’s originally from New England, but five years at the med school makes you a Pittsburgher in our book.)

Moreau has no doubt that her research experience helped her land the residency she wanted. “I presented my research at a few conferences and had program directors approach me afterwards to ask me to interview,” she says.

In addition to her solid presentation skills, Moreau graduated with a list of publications, including a few with Martin Weinstock, MD, PhD. Currently at Brown University, Weinstock trained in internal medicine at Pitt in the 1980s, moved to MGH’s dermatology residency program (speaking of great dermatology residents from the ‘Burgh), and is now one of the world’s foremost authorities on the epidemiology of melanoma.

IN-DEPTH STUDY FOR MED STUDENTS

Through a raft of specialized programs, diverse research opportunities, and areas of concentration, med students at Pitt are able to explore their medical interests in depth. Many will take a year off at some point to earn a master’s degree in public health, biomedical ethics, or a related field; others will devote a full year to research through one of the following specialized programs:

The Clinical Scientist Training Program (CSTP) offers a leg up for medical students who show an interest in and a talent for clinical research. Select students whose mentored scholarly projects meet the NIH definition of clinical research are invited to delve deeper into their research 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, research funds, 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, the CSTP seeks to increase the number of Pitt graduates who choose clinical research careers and contribute to the vital work of translating biomedical science into clinical care.

Graduates from 2014 matched to the following residency programs:

JAYSHIV BADLANI, MD
Jackson Memorial Hospital, Fla. / Internal Medicine

KYLE JACKSON, MD
Johns Hopkins Hospital / General Surgery

IAN JOEL, MD
Ronald Reagan UCLA Medical Center / Internal Medicine

SIMIAO LI, MD
McGaw Medical Center of Northwestern University / Emergency Medicine

CONSTANTINOS MICHAELIDIS, MD
Brigham and Women’s Hospital / Internal Medicine

JACQUELINE MOREAU, MD
Massachusetts General Hospital / Dermatology
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 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 Class of 2014 included six graduating PSTP students who matched to top residency programs in some of the most competitive medical specialties, including internal medicine at Tufts Medical Center, emergency medicine at the Hospital of the University of Pennsylvania, otolaryngology at Vanderbilt University Medical Center, orthopaedic surgery at UPMC, diagnostic radiology at Barnes-Jewish Hospital, and orthopaedic surgery at the University of New Mexico School of Medicine. Collectively, these six graduates have published 17 papers (four as first author), received five national or international awards (best poster, best talk, or travel awards), one Howard Hughes Medical Institute (HHMI) research fellowship, and filed two patents.

**TOP STUDENTS WIN PRESTIGIOUS FELLOWSHIPS**

Two of Pitt’s current PSTP students were awarded highly coveted research training fellowships through the HHMI Medical Research Fellows Program. The students will be supported through a one-year leave of absence, during which they can dedicate themselves to research projects and associated research training. In addition, a prior HHMI fellow from Pitt’s PSTP, Erica Nakajima, was one of only four national HHMI fellows chosen as Academy of Achievement delegates to the 2014 International Achievement Summit.

The award-winning students and their projects:

**WAI-YING (WENDY) YAU**
Characterizing the Longitudinal Relationship between Amyloid Deposition and Cerebral Perfusion in Humans and Transgenic Mice Carrying Mutations for Autosomal Dominant Alzheimer’s Disease

**MENTOR:**
William E. Klunk, MD, PhD, Distinguished Professor of Psychiatry, Professor of Neurology

**ZACHARY YOCHUM**
Determining the Molecular Pathways and Domains of TWIST1 Required for TWIST1-Mediated Suppression of Apoptosis in KRAS Mutant Non-Small Cell Lung Carcinoma

**MENTOR:**
Timothy F. Burns, MD, PhD, Assistant Professor of Medicine, Division of Hematology/Oncology

**EVERY YEAR, MEDICAL STUDENTS SEEK TO CONTINUE THEIR TRAINING AT INSTITUTIONS ACROSS THE COUNTRY. UNIVERSITY OF PITTSBURGH STUDENTS JOINED MORE THAN 16,000 OTHERS IN THE 2014 MAIN RESIDENCY MATCH, WHICH IS ADMINISTERED BY THE NATIONAL RESIDENT MATCHING PROGRAM.**

At Pitt, 148 graduating medical students matched to programs in 24 states, including the District of Columbia and Hawaii. Nearly every top residency program in the country welcomes one or more new MDs from Pitt’s Class of 2014, including those at Brigham and Women’s, Massachusetts General, and Beth Israel Deaconess Hospitals, as well as universities like Johns Hopkins, Yale, Stanford, Vanderbilt, Columbia, Michigan, and Northwestern. Forty-three matched to highly regarded UPMC residency programs.

More than a third of the class chose primary care fields in 2014. Ten matched in the highly competitive specialty of orthopaedics—a record for the med school. Other competitive specialties to which Pitt students matched were radiation oncology, otolaryngology, dermatology, plastic surgery, and neurosurgery.

Seven Pitt couples entered the match as pairs and successfully matched together. A few of those couples fulfilled our longstanding belief that great relationships begin in med school orientation!
Match Day is a big deal for all graduating med students, but for those in the Medical Scientist Training Program (MSTP), our combined MD/PhD program, the anticipation has been building for an especially long time. Most classmates they entered med school with are long gone because MSTP students begin with two years of MD training then break for several years of PhD research before returning to complete their clinical work. At some point, they watch the MD students they entered with celebrate Match Day and move on to residency positions. Match Day for MSTP students typically arrives about seven years after they begin medical school. In 2014, Pitt said farewell to 11 of these budding physician-scientists.

“The match went quite well this year,” says Richard Steinman, MD, PhD, associate dean for the MSTP and associate professor of medicine and of pharmacology and chemical biology. “This is a great group, and we are both proud of them and sorry to lose them. So many could have gone to any program in the country they wanted. They strategically chose programs that would give them the best skills to continue the careers they want as academic investigators.”

**PITT’S 2014 MSTP GRADUATES**

- **Amin Afrazi, MD, PhD**  
  General Surgery, University of Wisconsin, Madison

- **Max Horowitz, MD, PhD**  
  Obstetrics/Gynecology, UPMC Medical Education Program, Pittsburgh

- **Jeffrey Koenitzer, MD, PhD**  
  Internal Medicine, Washington University in St. Louis/Barnes-Jewish Hospital, Mo.

- **Hannah Lee, MD, PhD**  
  Orthopaedic Surgery, UPMC Medical Education Program, Pittsburgh

- **Jean Lin, MD, PhD**  
  Internal Medicine, Yale University, New Haven, Conn.

- **Pavle Milutinovic, MD, PhD**  
  Medicine-Pediatrics, Duke University, Durham, N.C.

- **Vivek Patel, MD, PhD**  
  Radiology-Diagnostic, Stanford University, Calif.

- **Jason Sanders, MD, PhD**  
  Emergency Medicine, Harvard University/Brigham and Women’s Hospital, Boston, Mass.

- **Deepak Soneji, MD, PhD**  
  Neurology, UPMC Medical Education Program, Pittsburgh

- **David Svilar, MD, PhD**  
  Pediatrics, Washington University in St. Louis/St. Louis Children’s Hospital, Mo.

- **Rachel Margaret Whelan, MD, PhD**  
  Pediatrics/Psychiatry/Child Psychiatry, Tulane University, New Orleans, La.
Other MSTP bragging points include Pitt's enviable success rate in winning F30 awards from the National Institutes of Health. Also known as Ruth L. Kirschstein National Research Service Awards, F30s are granted to MSTP students who demonstrate the potential to become highly trained, productive, independent physician-scientists. NIH’s ultimate goal with this program is to increase the number of future investigators with both clinical knowledge and skills in basic, translational, or clinical research. Nearly two-thirds of Pitt's MSTP students are successful in their F30 applications.

**RECENT AWARDS INCLUDE:**

**ALYCE ANDERSON**
Defining the Role of Integrins in IL-23-Dependent Intestinal Immunity

**INSTITUTE:** National Institute of Diabetes and Digestive and Kidney Diseases

**MENTOR:** Mandy McGeachy, PhD, Assistant Professor of Medicine and of Immunology

**LAUREN BRILLI**
Elucidating the Mechanisms of Kidney Regeneration and Therapeutic Augmentation after Acute Kidney Injury

**INSTITUTE:** National Institute of Diabetes and Digestive and Kidney Diseases

**MENTOR:** Neil Hukriede, PhD, Associate Professor and Vice Chair of Developmental Biology

**TAYLOR EDDENS**
Pneumocystis Antigen Discovery and Vaccine Development

**INSTITUTE:** National Institute of Allergy and Infectious Diseases

**MENTOR:** Jay Kolls, MD, Visiting Professor of Pediatrics

**ANDREY FINEGERSH**
Effects of Preconception Alcohol on Epigenetics and Offspring Drinking

**INSTITUTE:** National Institute on Alcohol Abuse and Alcoholism

**MENTOR:** Gregg Homanics, PhD, Professor of Anesthesiology and of Pharmacology and Chemical Biology

**MATTHEW HEDBERG**
Phosphoinositol-3-Kinase Signaling and Pik3ca: Critical Mitogenic Drivers in Head and Neck Squamous Cell Carcinoma

**INSTITUTE:** National Cancer Institute

**MENTOR:** Jennifer Grandis, MD, UPMC Professor of Head and Neck Surgical Research, Distinguished Professor of Otolaryngology

**ELIZABETH OCZYPOK**
Receptor for Advanced Glycation End Products (RAGE) as an Upstream Activator of the Th2 Inflammatory Immune Response in Asthma

**INSTITUTE:** National Institute of Environmental Health Sciences

**MENTOR:** Tim Oury, MD, PhD, Professor of Pathology

**JOSHUA STURM**
Intrinsic Connectivity of the Auditory Midbrain in a Mouse Model of Tinnitus

**INSTITUTE:** National Institute on Deafness and Other Communication Disorders

**MENTOR:** Karl Kandler, PhD, Professor of Otolaryngology and of Neurobiology

Pitt’s MSTP has 71 students currently—big enough to maintain a lively and diverse group dynamic but small enough that nobody is getting lost in the mix.

“To help everyone stay on course, we have a monthly meeting with the entire MSTP student body,” says Steinman. “It’s in a workshop setting, with senior through beginning students mixed together around tables. The topics may be research, or ethics, or maybe how to pick the best mentors.

“We have students involved in all facets of the program. Student reps meet regularly with me. We have students organizing the scientific retreat. Others play a role in admissions, organize our ‘second look’ visit for accepted applicants, and help to frame the research ethics course we run. Having students in all those roles makes for a very coherent program.”

APPROXIMATELY TWO-THIRDS OF PITT’S MSTP STUDENTS ARE SUCCESSFUL IN THEIR F30 APPLICATIONS.
GRADUATE PROGRAMS
MEDICAL SCHOOL ISN’T JUST FOR MDS

In addition to approximately 600 students in the four-year MD program, there are nearly 300 students pursuing PhD degrees in 12 programs that include neuroscience, biomedical informatics, computational biology, molecular biophysics and structural biology, and clinical and translational science. The size and scope of Pitt’s research enterprise are significant enough that graduate students in this wide a range of disciplines receive training that allows them to work at the cutting edge of biomedical science.

A longstanding program in integrative molecular biology has recently been updated to reflect an increasing emphasis on integrative systems biology. The goal is to train students in emerging transformative methodologies that emphasize genomics, proteomics, complex cellular pathways, and the dynamics of cellular and organismal function. Students in this program operate at the exciting interface between basic bench-top biology, computational analysis of big data sets, and the emergence of 21st century clinical translation.

Other PhD candidates spend the first year in the interdisciplinary biomedical graduate program before committing to one of six participating programs. Many of these students have interests in areas like cancer biology and infectious diseases that lie at the intersection of multiple disciplines, while others use the interdisciplinary program to explore distinct scientific interests.

“It’s like an umbrella program,” says Austin Nuschke, a PhD candidate in pathology. “You have 30 or 35 students every year who take an introductory, interdisciplinary course called ‘Foundations of Biomedical Science,’ which covers everything under biomedical science. During that first year, you rotate through labs in any of the six programs under this umbrella.”

The six programs are cell biology and molecular physiology, cellular and molecular pathology, immunology, molecular genetics and developmental biology, molecular pharmacology, and molecular virology and microbiology.

Nuschke was interested in pathology coming in, but he appreciated the freedom of that first year, during which he worked with three different mentors in laboratory settings. A critical element of the program is its emphasis on laboratory research from day one. While classroom activities are important, the real goal is to train professional laboratory scientists who will become the research leaders of tomorrow.

After the interdisciplinary year, each student chooses a track and transfers into one of the degree-granting programs. Nuschke’s choice of cell and molecular pathology has led him in some pretty interesting directions—though he entered grad school focused on science, he’s learning quite a bit about health care entrepreneurship. In October 2013, he and Don Taylor, a bioengineering PhD candidate in Pitt’s Swanson School of Engineering, won the Michael G. Wells Student Health Care Entrepreneurship Competition. The $10,000 award from Pitt’s Innovation Institute enables the team, with their mentor Alan Wells, MD, DMS, the Thomas Gill Professor of Pathology, to continue with research and commercialization of their biotech innovation, an advanced wound-healing gel.

Curostem is a topical wound gel aimed at curing chronic wounds that otherwise consume billions of dollars of ineffective care that results in poor clinical outcomes. Curostem incorporates human mesenchymal stem cells (MSC) into a space-filling bioengineered gel that can be topically applied to wounds in most clinical care settings. This bioactive product responds to dynamic cues from the wound itself, providing the necessary components to complete the healing process.
Nuschke and Taylor say that no product on the market has this dynamic wound-healing capability because no other team has mastered the ability to keep MSCs alive and functioning for enough time to promote wound closure and healing. The team has already patented core aspects of this technology and has an additional patent pending.

Curostem is aimed at patients with chronic wounds such as pressure and diabetic ulcers—a population of six million American patients annually. When Nuschke delivers his pitch to potential investors and other partners, he says that if the product reaches 10 to 20 percent of the $5 billion pressure ulcer wound care market in this country, that would represent a market opportunity of $500 million–$1 billion.

Commercialization is a long road, however. Along the way to finishing his PhD around the end of 2015 (“four and a half years is pretty average for a PhD in our lab”), Nuschke and his colleagues continue to refine the components of the product, research wound healing in animal models, explore good manufacturing practices, work on establishing the company, and court potential investors.

“I WOULD SAY THE BREADTH OF OPPORTUNITIES AT PITT IS EXCELLENT,” SAYS NUSCHKE. “THERE IS A LOT OF DIFFERENT RESEARCH GOING ON, AND ALL OF IT IS PRETTY HIGH QUALITY. YOU CAN’T GO WRONG ENTERING THIS PROGRAM BECAUSE YOU ARE PRETTY CERTAIN TO FIND SOMETHING THAT YOU WILL BE COMFORTABLE DOING. WHEN YOU LOOK AT MEDICALLY ORIENTED GRADUATE PROGRAMS, THE QUALITY OF RESEARCH HERE IS EXCELLENT AND THE FUNDING ENVIRONMENT IS GOOD.”
CODE BLACK

Ryan McGarry, MD
DIRECTOR
A riveting new documentary film directed by Ryan McGarry, MD (Class of 2009), Code Black, brings the emergency department of a major hospital serving America’s second largest city to life in vivid—sometimes jarring—detail. "If you’re an outsider, this looks like total chaos," says McGarry in a voiceover of one scene. "But as a doctor, I see unity in that chaos. There’s a team here in all that coming together to save someone’s life."

As a med student at Pitt, McGarry participated in an emergency medicine clerkship and research rotation at Los Angeles County General. "I had no intentions of coming to LA to make a film," McGarry told Pitt Med. "It was accidental, really, which is often how documentary films get started."

Having studied English at Penn as an undergrad and read cinematography journals since childhood, McGarry saw the cinematic potential of the hectic ED environment. A few weeks into his LA rotation, he began lugging around a 40-pound camera. Then, when his clerkship was nearing an end, Pitt gave him an extension to continue filming and thereby gave the project a big boost. After earning his MD, McGarry arrived at LA County as an emergency medicine resident intent on completing the film. Now, he’s an assistant professor of emergency medicine at Cornell University who is on staff at NewYork–Presbyterian Hospital in Manhattan.

The feature-length documentary is now sweeping the festival circuit and earning top prizes nationwide, including Best Documentary Feature at both the 2013 Los Angeles Film Festival and the 2013 Hamptons International Film Festival.
HOW DO WE ADVANCE BIOMEDICAL SCIENCE AND LAUNCH THE NEXT BIG INNOVATION?

CREATIVE / COLLABORATIVE / TRANSFORMATIONAL

WE ARE IN AN ERA OF UNPRECEDEDENTED CHALLENGES AND OPPORTUNITIES. EVEN AS WE MAINTAIN AN ENVIOUSABLE POSITION IN RESEARCH SUPPORT, WE STRIVE TO PUSH THE BOUNDARIES OF WHAT SCIENCE AND MEDICINE CAN ACCOMPLISH.

PITT TO LEAD NATIONAL CENTER OF EXCELLENCE TRANSLATING BIG DATA TO KNOWLEDGE

The National Institutes of Health (NIH) has awarded the University of Pittsburgh an $11 million, four-year grant to lead a Center of Excellence for Big Data Computing, which will help scientists capitalize more fully on large amounts of available data and make data science a more prominent component of biomedical research.

The highly competitive process for grants under the new NIH Big Data to Knowledge initiative — known as BD2K — attracted proposals from 136 institutions around the nation. Pitt’s Center for Causal Modeling and Discovery, one of only 11 such centers to be funded, aims to develop new tools and approaches to turn the tremendous amount of information available to physicians and scientists — including data from electronic health records, digital images, and molecular analyses of genes, proteins, and metabolites — into discoveries that will benefit human health.

“Individual biomedical researchers now have the technology to generate an enormous quantity and diversity of data. Adequately analyzing these data to discover new biomedical knowledge remains a major challenge, however,”
said Gregory Cooper, MD, PhD, professor and vice chair of the Department of Biomedical Informatics, School of Medicine, and principal investigator on the project. “Our goal is to make it much easier for researchers to analyze big data to discover causal relationships in biomedicine.”

The new center is a multidisciplinary collaboration of researchers from Pitt, Carnegie Mellon University, the Pittsburgh Supercomputing Center, and Yale University. Within its successful application, Pitt proposed innovative collaborations with multiple universities.

“As part of a national consortium, this Center of Excellence will put Pitt on the map as a home of big data science,” said Arthur S. Levine, MD, senior vice chancellor for the health sciences and John and Gertrude Petersen Dean of Medicine. “Our strengths in this field have stimulated collaborations with leading institutions, including Harvard and Stanford, and now we will be able to further develop such partnerships in many more meaningful ways.”

The center includes a team that will develop and implement causal modeling and discovery algorithms, or processes, to support the data analyses of three separate investigative groups, each focusing on a distinct biomedical problem whose answer lies in a sea of data: cell signals that drive the development of cancer, the molecular basis of lung disease susceptibility and severity, and the functional connections within the human brain (the “connectome”).

Each project will act as a test bed for the development, rigorous testing, and refinement of analytic tools. When successful, the algorithms and software likely can be applied to other biomedical research questions. The center will provide free, open-source software that scientists all over the world can use with their own datasets to uncover causal biomedical relationships. Their feedback will further enhance the algorithms and software.

“The good news is that we have so much data. But the bad news is that we have so much data,” said Jeremy M. Berg, PhD, codirector of the center, Pitt’s associate senior vice chancellor for science strategy and planning in the health sciences, and Pittsburgh Foundation Professor of Personalized Medicine. “Our challenge is to find strategies that enable us to sort through all this collected information efficiently and effectively to find meaningful relationships that lead us to new insights in health and disease.”

“The center also will be a training ground for the next generation of data scientists who will advance and accelerate the development and broader use of big data science models and methods,” said center codirector Ivet Bahar, PhD, who is Distinguished Professor, John K. Vries Professor, and chair of the Department of Computational and Systems Biology, School of Medicine. “We will create new educational materials as well as workshops and online tutorials to facilitate the use of causal modeling and discovery algorithms by the broader scientific community and to enable efficient translation of knowledge between basic biological and applied biomedical sciences.”
GRANTS OF NOTE

Early-career scientists have a lot to learn. Practical problems like finding the best reagents and the business end of a pipette might be a cinch, but the bottom line is this: The search for funding is perpetual.

Over the years, Pitt School of Medicine researchers have been extraordinarily successful in scoring financial support from many sources, including foundations, industry, and individual philanthropy. The National Institutes of Health (NIH) provides the lion’s share, however, with an alphanumeric soup of grants that correspond to scientific career advancement. Here are a few snapshots of active Pitt grants that range from training initiatives to independent investigations and multicenter collaborations.

PITT EXPERTS TO EVALUATE CARE FOR PEDIATRIC TRAUMATIC BRAIN INJURIES

Researchers at Children’s Hospital of Pittsburgh of UPMC and Pitt’s Graduate School of Public Health were selected by the National Institute of Neurological Disorders and Stroke to lead a $16.5 million international study to evaluate treatments for pediatric traumatic brain injuries (TBI). The effort is being led by Michael J. Bell, MD, professor of critical care medicine and of neurological surgery, and director of Pediatric Neurocritical Care and Neurotrauma at Children’s Hospital, and Stephen Wisniewski, PhD, senior associate dean, professor of epidemiology, and codirector of the Epidemiology Data Center at Pitt Public Health. The study will provide data for improved TBI research protocols that will reduce variability in treatments and evaluate the effectiveness of six different therapies, including strategies to lower intracranial pressure, treat secondary injuries, and deliver nutrients.

KIDNEY RESEARCH CENTER GETS A BIG BOOST

The Pittsburgh Center for Kidney Research was awarded a five-year, $5.8 million grant from the National Institute of Diabetes and Digestive and Kidney Diseases. The center supports four research facilities encompassing cellular physiology, single nephron and metabolomics, kidney imaging, and model organisms at the University of Pittsburgh.

“Our Center for Kidney Research is designed to facilitate research that advances our understanding of how the kidney works, with a goal of improving how we diagnose and treat kidney diseases,” said Thomas Kleyman, MD, Sheldon Adler Professor of Medicine, chief of the Renal-Electrolyte Division, and center director. The grant will support research facilities, educational programs, and pilot projects to enhance kidney-focused research at Pitt and related institutions.

PITT SCIENTISTS RECEIVE $3.5 MILLION FOR BRAIN RESEARCH FROM DSF CHARITABLE FOUNDATION

In 2014, Pitt officials announced the inception of the University of Pittsburgh Brain Institute (UPBI), which will enable investigators to perform high-risk, high-impact neuroscience, with the aim of transforming lives. With a $1.75 million gift from the DSF Charitable Foundation, UPBI researchers will establish a Neuro-Discovery Center, akin to a Bell Labs for neuroscience, and hunt for new drugs for the treatment of neurodegenerative diseases, like amyotrophic lateral sclerosis, Huntington’s disease, and Parkinson’s disease. Scientific director Peter L. Strick, PhD, Distinguished Professor and chair, Department of Neurobiology, will use $750,000 of the DSF gift for a pilot fund to support especially innovative basic and translational research. Another $1.8 million DSF gift will be used to explore the application of a new imaging technology, high definition fiber tracking, to traumatic brain injury, particularly in wounded veterans of the U.S. armed forces, and to fund a project that will look for drugs that can affect the function of mitochondria, the so-called powerhouses of cells.

MICROBICIDE TRIALS SUPPORT HIV PREVENTION

The Microbicide Trials Network (MTN) received funding of $70 million to support its research into 2021, and it will continue to develop and test products that reduce the spread of HIV. The MTN was created in 2006 with funding from the National Institute of Allergy and Infectious Diseases (NIAID). The new funding means the MTN will continue to serve as one of five NIAID HIV/AIDS clinical trials networks for the next seven years. The research, based at the University of Pittsburgh and Magee-Womens Research Institute, is focused on the development and evaluation of promising microbicides, which are products applied inside the vagina or rectum to prevent HIV transmission. Two groups continue to have high rates of new infections—young women and men who have sex with men, according to principal investigators Sharon Hillier, PhD, Richard L. Sweet Professor of Reproductive Infectious Diseases and professor of obstetrics, gynecology, and reproductive sciences, and Ian McGowan, MD, PhD, professor of medicine, Division of Gastroenterology, Hepatology, and Nutrition. The MTN network is affiliated with more than 25 clinical research sites in Africa, North America, South America, and Asia.

PITT STUDY EXAMINES BENEFITS OF DEPRESSION TREATMENT FOR HEART FAILURE PATIENTS

Can treating depression in patients with heart failure help them live longer? That’s one of the questions that University of Pittsburgh researchers hope to answer with a new five-year, $7.3 million grant from the National Heart, Lung, and Blood Institute. Nearly six million Americans live with heart failure, and studies confirm that about a quarter of them suffer from depression. “Evidence-based depression treatments clearly improve health-related quality of life, yet it is presently unknown whether they also reduce morbidity and mortality, particularly in patients with heart failure. This trial will help us find out,” said principal investigator Bruce L. Rollman, MD, MPH, professor of medicine, of psychiatry, of biomedical informatics, and of clinical and translational science.
GRANTS OF NOTE, CONTINUED

**MELANOMA PROGRAM RENEWED**

The University of Pittsburgh Cancer Institute (UPCI) Melanoma and Skin Cancer Program directed by John M. Kirkwood, MD, Usher Professor of Melanoma Research, Department of Medicine, and professor of dermatology and of clinical and translational science, has received renewal of its skin cancer research through the National Cancer Institute’s competitive Specialized Program of Research Excellence (SPORE) program. The grant is for more than $12 million and is the fourth awarded to UPCI through the prestigious SPORE program (the other three are in head and neck, lung, and ovarian cancers). The five-year renewal of this SPORE grant for skin cancer will fund many new and existing projects. About 76,000 new cases of melanoma are diagnosed every year in the United States, and about 9,400 people die every year from the disease, according to the National Cancer Institute. SPORE grants are already making a difference—several new therapies for melanoma have been approved since 2011, compared to just three agents approved in the 30 years prior.

**GE-NFL GRANT AWARDED TO PITT, UPMC CONCUSSION PROGRAM TO CONDUCT INNOVATIVE BRAIN IMAGING RESEARCH**

General Electric and the National Football League awarded one of their inaugural Head Health Initiative grants to a University of Pittsburgh and UPMC effort in which researchers will assess whether high definition fiber tracking (HDFT) can identify concussion and subsequent recovery in a newly injured athlete in order to safely return him or her to play. HDFT, developed by a team led by Walter Schneider, PhD, professor of psychology and of neurological surgery and a senior scientist at the University of Pittsburgh’s Learning Research and Development Center, will be tested in a one-year study to see if it can become the first imaging technique to accurately and consistently aid in the diagnosis of concussion and injury prognosis. “HDFT could provide an objective way of identifying and quantifying damage, as well as a way to monitor healing,” said Schneider. “Concussion patients may find it a relief to be able to point to a specific cause for symptoms that otherwise might seem inexplicable.” Schneider, Michael Collins, PhD, associate professor of orthopaedic surgery and director of the concussion program at UPMC, and Anthony Kontos, PhD, associate professor of orthopaedic surgery and assistant research director of the concussion program, are coprincipal investigators on the project. They received a $300,000 grant, with an option to apply for additional funding after the opening six months of the study.

**PITT, UPMC RECEIVE AWARDS TO CREATE CLINICAL DATA RESEARCH NETWORK, CONDUCT COMPARATIVE EFFECTIVENESS RESEARCH**

Pitt, UPMC, and their collaborators at other academic centers have received three new awards from the Patient-Centered Outcomes Research Institute (PCORI). The funds will be used to establish a new clinical data network to evaluate the outcomes of health interventions, to compare approaches that encourage communication between patients with mental illness and their health professionals, and to help researchers select optimal methods to analyze data from studies in which they observed, but did not try to influence, outcomes. The projects were among 82 selected for a total of $191 million in funding in December 2013 by PCORI, an independent nonprofit organization authorized by the U.S. Congress in 2010. The new Pitt awards build upon seven current PCORI-funded projects totaling more than $11 million. “The University of Pittsburgh and UPMC have built an infrastructure that encourages comparative effectiveness research, in which existing health interventions are compared to identify the ones that do people the most good and the least harm. PCORI’s support reflects the success of these efforts,” said Arthur S. Levine, MD, Pitt’s senior vice chancellor for the health sciences and Petersen Dean of Medicine.

**TEAM TBI ADVANCES NEW THERAPIES**

The U.S. Department of Defense (DoD) has awarded $4.6 million to David Okonkwo, MD, PhD, professor of neurological surgery, to conduct clinical interventions for traumatic brain injury (TBI) patients. The project, TEAM TBI (Targeted Evaluation, Action, and Monitoring of Traumatic Brain Injury), brings together advanced evaluation methods and internationally recognized experts to identify evidence-based therapies for patients who have sustained a traumatic brain injury. The TEAM TBI clinical trials offer powerful new research MRI imaging techniques, including high definition fiber tracking, developed in Pittsburgh under DoD support, which holds potential to visualize neural connections damaged by TBI, much like X-rays show fractured bones. Data will be collected to establish treatment efficacy.

**PITT RECEIVES $10 MILLION GRANT FROM NIMH FOR CONTE CENTER FOCUSED ON SCHIZOPHRENIA**

The National Institute of Mental Health has awarded a five-year, $10 million grant to establish the Silvio O. Conte Center for Translational Mental Health Research in the School of Medicine’s Department of Psychiatry. The center focuses on cortical cells, brain circuits, neuronal connectivity, and cognition in schizophrenia.

Schizophrenia is a devastating illness and major public health problem, affecting 0.5 to 1 percent of the world’s population. Symptoms can include hallucinations, delusions, disorganized thinking, and mood disturbances. Current treatments for schizophrenia have limited effectiveness, and most were discovered by serendipity rather than goal-oriented, rigorous science. “There is an urgent need for a new approach to developing treatments,” said David A. Lewis, MD, Thomas Detre Professor of Academic Psychiatry, chair of Pitt’s Department of Psychiatry, and director of the Conte Center. “This innovative center will initiate drug development methodically by first identifying molecular targets that influence the course of the illness, a strategy that has been successful in other areas of medicine.”
UPCI AWARDED NEARLY $10 MILLION IN PRESTIGIOUS NCI GRANTS TO FOSTER CANCER RESEARCH

The University of Pittsburgh Cancer Institute (UPCI) has been awarded two grants from the National Cancer Institute (NCI) that will help bring the latest research from bench to bedside. The first, an NCI Experimental Therapeutics-Clinical Trials Network with Phase I Emphasis grant, will be led by UPCI deputy director Edward Chu, MD, professor of medicine and of pharmacology and chemical biology, and is a $4.25 million, five-year project that funds early-phase clinical research of novel agents and drug combination regimens.

The second grant, a Lead Academic Participating Site (LAPS) grant, is part of the new National Clinical Trials Network (NCTN), designed to accelerate the time it takes research to move from the lab to patients through technological advances and enhanced cooperation. The nearly $5 million award is led by Adam Brufsky, MD, PhD, professor of medicine and UPCI’s associate director for clinical investigation. The grant will fund the costs of maintaining a clinical trials infrastructure that permits patients to enroll in national trials led by NCTN at more than a dozen sites across the UPMC CancerCenter network. UPCI is one of only 12 centers in the country to receive the NCI Experimental Therapeutics-Clinical Trials Network with Phase I Emphasis grant and the only center in Pennsylvania to receive a LAPS grant.

NEW OVARIAN CANCER PROGRAM FUNDED

More than 14,000 women in the U.S. died last year from ovarian cancer, a disease that often isn’t detected until later stages when it is significantly more difficult to treat. Now, the University of Pittsburgh Cancer Institute and Roswell Park Cancer Institute will join forces, thanks to an $11 million grant from the National Cancer Institute (NCI), to develop a deeper understanding of the disease and identify ways to prevent and cure it. The five-year grant, from NCI’s Specialized Program of Research Excellence (SPORE), will fund four studies examining strategies to reduce risk in women considered at high risk for developing ovarian cancer. One of five ovarian cancer–focused SPORE grants awarded nationally, this is the only one focused exclusively on immunotherapies. “Our clinical trial will explore the roles of chronic inflammation, cancer development and the body’s immune response, and how the immune response can be used to immunize the patient against her own cancer,” said Robert P. Edwards, MD, professor of obstetrics, gynecology, and reproductive sciences and director of the Ovarian Cancer Center for Excellence at Magee-Womens Hospital of UPMC.

$2 MILLION GRANT TO STUDY NOVEL ANTI-INFLAMMATORY DRUG THAT MAY BE USEFUL IN SEPSIS

Rama K. Mallampalli, MD, professor of medicine and director of the Acute Lung Injury Center of Excellence, received a $2 million R01 grant from the National Heart, Lung, and Blood Institute to study the preclinical development of a novel anti-inflammatory drug that may be useful in sepsis. Mallampalli is internationally recognized in the area of lipid metabolism and proteolysis as it relates to acute lung injury from pneumonia and sepsis. His laboratory has investigated the fundamental regulation of enzymes needed for surfactant lipids and previously discovered that the mitochondrial-specific phospholipid, cardiolipin, is an important mediator of pneumonia. His research program characterized the molecular behavior of orphan ubiquitin E3 ligases that target key proteins for their degradation and examined how they affect the pathobiology of sepsis and pneumonia. Recently, his team discovered a new class of ubiquitin-based small molecule therapeutics that is effective in preclinical models of inflammation. Mallampalli is the principal investigator of an NIH Program Project Grant, four R01 grants, and a Veterans Association Merit Review Award, all of which investigate mechanisms involved in inflammatory lung injury.

$2 MILLION NIH GRANT RENEWS UPCI RESEARCH INTO VIRUSES, CANCER PATHWAYS

NIH has renewed a grant for more than $2 million for Patrick Moore, MD, MPH, Distinguished Professor of Microbiology and Molecular Genetics and director of the Molecular Virology Program at the University of Pittsburgh Cancer Institute (UPCI), who will use the money to continue research into the newest human cancer virus causing most Merkel cell carcinomas. A team led by Moore and Yuan Chang, MD, Distinguished Professor of Pathology, discovered the Merkel cell polyomavirus in 2008, the seventh human cancer virus identified and the second discovered by the Moore/Chang group. The new grant will fund the research through March 2019. Moore, Chang, and colleagues identified a protein that allows the usually harmless polyomavirus to transform healthy cells into Merkel cell carcinoma, a rare but deadly skin cancer. They hope their work—which emphasizes the importance of fundamental research to medical progress—can soon be translated into human clinical trials.

$6 MILLION NIH GRANT TO ESTABLISH A NATIONAL INSTITUTE OF DRUG ABUSE CENTER OF EXCELLENCE FOR COMPUTATIONAL DRUG ABUSE RESEARCH

Ivet Bahar, PhD, Distinguished Professor and John K. Vries Professor and chair of computational and systems biology, and Xiang-Gun Xie, PhD, MBA, professor of pharmacy in the School of Pharmacy, along with Carnegie Mellon associate professor Eric Xing, PhD, received a five-year, $6 million NIH grant to establish a National Institute of Drug Abuse center of Excellence for Computational Drug Abuse Research, as a joint initiative between the University of Pittsburgh and Carnegie Mellon University. The investigators aim to advance and implement state-of-the-art computational chemical genomics technologies to facilitate drug abuse prevention and treatment research and to centralize the chemical genomics knowledge base through a cloud computing server platform; to enable efficient information exchange among drug abuse researchers; and to accelerate the development of novel interventions for preventing and treating drug abuse and addiction.
CLINICAL INSIGHTS FROM HIGH DEFINITION FIBER TRACTOGRAPHY

It started because a 66-year-old man could see only half of what he looked at. Magnetic resonance imaging (A) revealed a tumor in the left occipital lobe, displacing large portions of the visual cortex, says Robert M. Friedlander, MD, Walter E. Dandy Professor and chair of neurological surgery.

Preoperative testing (B) indicated partial visual field loss (black areas) in both eyes consistent with the tumor location and (C) high definition fiber tractography (HDFT) technology, developed at Pitt to enhance existing brain imaging techniques, confirmed that important connections called optic radiation fibers had been pushed aside but—most critically—remained intact.

Using HDFT, surgeons planned an intricate surgical approach to remove the tumor while preserving the optic radiation fibers, as shown in a postsurgical MRI (D). Patients with occipital lobe tumors are typically counseled not to expect much, if any, lost vision to return after surgery.

In this case, thanks to successful HDFT-guided surgery, postoperative visual assessment and HDFT confirmed marked visual field improvement (E) and preservation of optic radiation fibers (F).
UNLOCK INNOVATION \ INVESTIGATIONS AND REVELATIONS

THE HISTORY OF DISEASE, IN COLOR
PITT SHARES A DATABASE THAT HELPS SCIENTISTS UNDERSTAND CONTAGION

The Danish nobleman Tycho Brahe was among the last great “naked-eye” observers of the cosmos. Before his death in 1601, Brahe passed along his life’s work—30 years of detailed observations of the night sky—to his assistant, Johannes Kepler, urging him not to let the fruit of his labors languish.

They did not. Brahe’s careful observations became the basis for Kepler’s laws of planetary motion, which would, in turn, contribute to Isaac Newton’s law of universal gravitation.

Four centuries later, the Pitt researchers who created Project Tycho, a digital database that provides open access to U.S. disease surveillance data, hope they have created a similar foundation for discovery. The newly built epidemiological archive chronicles reports of 56 infectious diseases in every state before, during, and after vaccination licensure from 1888 to recent times.

It took almost three years and more than 200 million keystrokes to create the Project Tycho archive. Many of those workers were University of Pittsburgh undergrads as well as students from Digital Divide Data, a social enterprise that provides jobs and education to young people in Cambodia, Laos, and Kenya. These clerks standardized and organized almost 90 million cases from weekly public health records (paper and PDFs) from all U.S. states and territories, including more than 3,000 American cities. What they wrought: the largest centralized bank of digitized disease surveillance data ever assembled.

And access to it is free, says Wilbert van Panhuis, MD, PhD, assistant professor of epidemiology at Pitt’s Graduate School of Public Health and lead investigator for the project. “Our vision was that not only us but everybody should be able to use this public data for analysis and models.” For instance, anybody with enough interest and access to the Internet—a scientist at a university or pharmaceutical company, a journalist, an undergrad—can easily track where and when the polio vaccine was implemented and its efficacy in those cities.

“We hope there are epidemiological, disease-curing Keplers today who will be able to use these data to derive important laws and insights on how epidemics arrive, leave, and interact,” says co-investigator Donald S. Burke, MD, who, in addition to being a professor of medicine and of infectious diseases, is dean of Pitt’s Graduate School of Public Health, director of the Center for Vaccine Research, UPMC Jonas Salk Professor of Global Health, and Distinguished University Professor of Health Science and Policy.

The field of public health data compilation has been fraught with redundancies. Most projects are focused on specific questions; a researcher might toil for years answering a question like, What effects do condom distribution programs have on the rate of HIV infection in the rural United States? In search of answers, investigators painstakingly build data sets that often are not shared. And it can be difficult to get funding to create archives with no specific research questions in mind.

Happily, both the National Institutes of Health and the Bill and Melinda Gates Foundation saw value in creating a massive digital archive and funded Project Tycho.

The Project Tycho team has also been inventing new methods to process and analyze public health data. In a November 2013 New England Journal of Medicine paper, Project Tycho researchers (from Pitt’s public health, medicine, and information sciences schools, with collaborators from Johns Hopkins University) revealed that vaccination programs for polio, measles, mumps, rubella, hepatitis A, diphtheria, and pertussis (whooping cough) have prevented more than 100 million cases of serious childhood infectious diseases since 1924. Still, some of these pathogens are reemerging. Pertussis vaccines, for example, have been available since the 1920s, but the worst whooping cough epidemic since 1959 occurred in 2012, with more than 48,000 cases nationwide reported by December of that year.

“Parents who question the risk-benefit balance of vaccination may refuse or delay immunization of their children,” the Project Tycho team reports, “which leads to local variations in vaccine coverage and increased risk of disease outbreaks.” Van Panhuis admits he hopes the project “will introduce new evidence into the debate about vaccination.”

The next big step for Project Tycho is to go global. But, van Panhuis says, technological, economic, and political barriers can hinder cooperation. For instance, developing countries that rely on tourism might be wary of releasing information about epidemics. And they may not even have the means to collect data, let alone analyze them. What’s in it for us?, the gatekeepers may wonder.

Well, perhaps the lives of millions. Van Panhuis remains optimistic. He says understanding a disease’s narrative, locally and globally, can help move the scientific field forward in developing theories about causation—and then, ways to control or prevent disease.
IT TOOK ALMOST THREE YEARS AND MORE THAN 200 MILLION KEYSTROKES TO CREATE THE PROJECT TYCHO ARCHIVE—THE LARGEST CENTRALIZED BANK OF DIGITIZED DISEASE SURVEILLANCE DATA EVER ASSEMBLED.
In the past year, the University of Pittsburgh Drug Discovery Institute (UPDDI) established two programs that utilize quantitative systems pharmacology (QSP) to develop therapeutics for metastatic breast cancer and Huntington’s disease. QSP has emerged as a powerful and increasingly affordable means of addressing the inherent complexity of human disease through the integration of what have traditionally been two distinct fields: pharmacology and systems biology.

Pitt is on the cutting edge of this effort to fully illuminate the therapeutic applications of new and existing drugs for personalized medicine. A QSP approach combines computational and experimental methods to investigations and is a major theme of UPDDI’s partnership with academics and industry. By taking a systems-level approach to translational science, the institute ensures that laboratory discoveries contribute to functional knowledge and improved drug efficacy and safety.

The first of two UPDDI programs announced in February is a collaboration between the Women’s Cancer Research Center of the University of Pittsburgh Cancer Institute, Magee-Womens Research Institute, and the Institute for Personalized Medicine that hopes to address the ongoing risk for relapse that faces breast cancer survivors. An unbiased and comprehensive molecular profiling of primary and metastatic tumors will help identify what drives breast cancer growth and metastasis and why some breast cancers produce life-threatening metastases.

“The implementation of QSP for personalized medicine is expected to increase the likelihood of discovering novel therapeutics and diagnostic tests for metastatic breast cancer,” said D. Lansing (Lans) Taylor, PhD, Allegheny Foundation Professor of Computational and Systems Biology and UPDDI director.

Although the gene that causes Huntington’s disease has been identified, there is currently no treatment that can delay onset or slow progression. UPDDI, the University of Pittsburgh Brain Institute, the Department of Neurological Surgery, and the Department of Computational and Systems Biology have implemented a QSP approach to model Huntington’s disease progression as a set of interdependent, dysregulated pathways in an effort to identify novel therapies for a wide range of neurodegenerative diseases.

UPDDI is at the forefront of a national focus on QSP best demonstrated by the establishment of the National Center for Advancing Translational Sciences at NIH in 2011 to encourage collaboration across scientific disciplines and help speed the development of treatments for patients. Pitt’s own Innovation Institute, launched in 2013 with the combination of the Office of Technology Management, Office of Enterprise Development, and Institute for Entrepreneurial Excellence, leverages the University’s expertise in teaching and supporting entrepreneurship and transforming research into innovation with commercial potential.

One recent example of scientific discoveries moving from Pitt labs to the marketplace is the start-up company Complexa Inc., which raised more than $8 million of venture capital to license and develop molecules discovered and patented by scientific advisor Bruce A. Freeman, PhD, the Irwin Fridovich Professor and chair of the Department of Pharmacology and Chemical Biology. Using naturally occurring nitro-fatty acids, Freeman and his team of Pitt researchers hope to develop anti-inflammatory drugs that could reverse the effects of diseases such as diabetes by regulating inflammatory and anti-inflammatory pathways.
**Paradigm Shift in the Treatment of Sepsis**

Pitt has a long track record in the treatment of severe sepsis—a systemic inflammatory response to infection that is complicated by acute organ dysfunction. Each year, sepsis, the body’s response to severe infections, kills more people than breast cancer, prostate cancer, and HIV/AIDS combined. Many of the top clinical research papers in this area over the past few decades were written by Pitt investigators. The latest such contribution comes from a team of investigators led by Derek Angus, MD, MPH, Distinguished Professor, Mitchell P. Fink Professor, and chair of the Department of Critical Care Medicine. In one of the largest-ever randomized trials of care for septic shock, Angus and his colleagues found that “early goal-directed therapy” for severe sepsis—a protocol introduced in a very influential 2001 paper—actually did not change survival chances for people who develop the deadly condition.

The findings, published in a May 2014 issue of the *New England Journal of Medicine*, are likely to change the way sepsis is diagnosed and treated.

“We found no overall differences in two protocolized approaches when compared to conventional treatment. The study provides strong evidence that will have immediate consequences,” said Angus. “Many organizations have endorsed structured guidelines for sepsis treatment that often call for invasive devices early in care. But with prompt recognition and treatment of the condition, we found that these approaches do not improve outcomes but do increase the use of hospital resources.”

The five-year, multicenter study, called “Protocolized Care for Early Septic Shock” or ProCESS, was sponsored by an $8.4 million grant from the National Institute of General Medical Sciences (NIGMS).

ProCESS set out to determine whether a specific protocol would increase the survival rates of people with septic shock. Instead, it showed something far more important—that over the past decade, the care of people with sepsis has significantly improved nationwide,” said Sarah Dunsmore, PhD, who managed the ProCESS trial for NIGMS. “ProCESS showed that regardless of how the delivery of the interventions was monitored, sepsis patients in these clinical settings are receiving effective treatments.”

**New England Journal of Medicine**

**Regenerating Muscle After Trauma**

When a large volume of muscle is lost due to trauma, the human body cannot sufficiently respond to replace it. Instead, scar tissue forms and frequently impairs the recovery of strength and function. In the journal *Science Translational Medicine*, Stephen Badylak, MD, PhD, DVM, professor of surgery and deputy director of the McGowan Institute for Regenerative Medicine, reports that damaged leg muscles grew stronger and showed signs of regeneration in three out of five men whose old injuries were surgically implanted with extracellular matrix (ECM) derived from pig bladder.

Pig bladder ECM has been used for many years as the basis for medical products for hernia repair and treatment of skin ulcers. It is the biologic scaffold that remains after cells have been removed. Previous research conducted by Badylak’s team suggested that ECM also could be used to regenerate lost muscle by placing the material in the injury site, where it signals the body to recruit stem and other progenitor cells to rebuild healthy tissue.

J. Peter Rubin, MD, coprincipal investigator of the study and UPMC Professor and chair of plastic surgery, surgically implanted compressed ECM sheets designed to repair the injury sites. Within 48 hours of the operation, the participants resumed physical therapy.

“This new study is the first to show replacement of new functional muscle tissue in humans, and we’re very excited by its potential,” Badylak said. “These are patients who can’t walk anymore, can’t get out of a car, can’t get up and down from a chair, or can’t take steps without falling. Now we might have a way of helping them get better.”

**Science Translational Medicine**

**SOME BREAST CANCER TUMORS EVADE DRUGS BY HIJACKING EPIGENETIC MACHINERY**

A breast cancer therapy that blocks estrogen synthesis to activate cancer-killing genes sometimes loses its effectiveness because the cancer takes over epigenetic mechanisms, including permanent DNA modifications in the patient’s tumor, once again allowing tumor growth, according to an international team headed by the University of Pittsburgh Cancer Institute.

The finding warrants research into adding drugs that could prevent the cancer from hijacking patients’ repressive gene regulatory machinery, which might allow the original therapy to work long enough to eradicate the tumor, the researchers report in their National Cancer Institute–funded study, published in *Science Translational Medicine*.

“Our discovery is particularly notable as we enter the era of personalized medicine,” said senior author Steffi Oesterreich, PhD, professor of pharmacology and chemical biology and director of education at the Women’s Cancer Research Center. “Resistance to hormonal therapy is a major clinical problem in the treatment of most breast cancers. Through testing of a tumor’s genetic and epigenetic make-up, we may be able to identify the patients most likely to develop such resistance and, in the future, create a treatment regimen tailored to giving each patient the best chance of beating their cancer.”

**Science Translational Medicine**
PRACTICE MAKES THE BRAIN’S MOTOR CORTEX MORE EFFICIENT

Not only does practice make perfect, it also makes for more efficient generation of neuronal activity in the primary motor cortex, the brain region that plans and executes movement. The study, led by senior investigator Peter L. Strick, PhD, Distinguished Professor and chair of neurobiology, showed that practice leads to decreased metabolic activity for internally generated movements, but not for visually guided motor tasks, and suggests that the motor cortex is “plastic” and a potential site for the storage of motor skills. Neuron activity was comparable between monkeys that were trained to perform visually guided and internally generated tasks. However, metabolic activity was high for the visually guided task but only modest during the internally generated task.

HUNTINGTON’S DISEASE PROTEIN CAUSES DEATH OF NEURONS

Huntington’s disease patients inherit a gene that contains too many repeats of a certain DNA sequence, resulting in the production of an abnormal form of a protein called huntingtin (HTT). Senior investigator Robert Friedlander, MD, Walter E. Dandy Professor and chair of neurological surgery, and colleagues have identified a mechanism by which mutant HTT can cause brain cell death. The study examined brain tissue samples from both mice and human patients affected by Huntington’s disease and found that mutant HTT collects in mitochondria and binds to mitochondrial proteins that transport other proteins into the mitochondria. Mutant HTT inhibits this process and ultimately triggers cell-suicide pathways. The mitochondrial dysfunction occurred more often near the synapses of neurons, likely impairing the neuron’s ability to communicate or signal its neighbors. “We learned that these events occur early in the disease process,” Friedlander said. “If we can find ways to intervene at this stage, we may be able to prevent neurological damage.”

BRAIN SCANS REVEAL DIFFERENCES IN DEPRESSION AND BIPOLAR DISORDER

Brain scans measuring blood flow can help diagnose bipolar disorder at an early stage and distinguish the condition from depression. Using a new imaging method, arterial spin labeling, to measure blood flow to brain regions associated with depression, researchers could identify with 81 percent accuracy which patients were depressed (unipolar depression) and which patients had bipolar depression. Currently, only one in five patients with bipolar disorder is correctly diagnosed when first assessed by a physician, with an accurate diagnosis often taking up to 10 years. “Earlier and more accurate diagnoses can make an enormous difference for patients and their families and may even save lives,” noted Jorge Almeida, MD, PhD, assistant professor of psychiatry and lead author of the study. “This study highlights the usefulness of neuroimaging to help identify biological markers associated with different mental health conditions.” Pitt coauthors on the study include Mary L. Phillips, MD, MD (Cantab), Pittsburgh Foundation-Emmerling Professor of Psychotic Disorders and professor of psychiatry and of clinical and translational science.
A malfunction in the “proofreading” machinery that repairs DNA damage caused by ultraviolet (UV) light explains why people with one form of xeroderma pigmentosum (XP), an inherited, incurable disease of light sensitivity, are at high risk for developing skin cancer. Normally, a repair protein called human UV-damaged DNA-binding protein (UV-DDB) signals for repair when two UV-DDB molecules bind to the damaged site, said senior investigator **Bennett Van Houten, PhD**, Richard M. Cyert Professor of Molecular Oncology. “The new study shows that UV-DDB makes stops along the DNA strand and transiently attaches to it. When it comes to a spot that has been damaged by UV radiation, two molecules of UV-DDB converge and stay tightly bound to the site, flagging it for the attention of repair machinery.” The researchers tracked a mutant UV-DDB protein associated with one form of XP and found that the mutant UV-DDB molecules can still bind to DNA but continue to slide along the DNA rather than staying put to signal where the fix is needed. Without this important damage control, UV-induced errors accumulate, leading to cell alterations that foster cancer development.

**AMERICAN JOURNAL OF EPIDEMIOLOGY**

LOW VITAMIN D LEVELS LINKED TO PRETERM BIRTH

African-American and Puerto Rican women with low levels of vitamin D during pregnancy are more likely to go into labor early and give birth to preterm babies. “Preterm birth is the most important problem in modern obstetrics and leads to higher risks of chronic lung disease, deafness, visual impairment, and learning and cognitive disability,” said senior author **Hyagriv N. Simhan, MD, MS**, associate professor of obstetrics, gynecology, and reproductive sciences and chief of the maternal-fetal medicine division. “While we get vitamin D from our diets, our primary source is our body making it from sunlight,” said lead author **Lisa Bodnar, PhD, MPH**, associate professor in Pitt Public Health’s Department of Epidemiology. Among nonwhite mothers, the incidence of spontaneous, preterm birth decreased by as much as 30 percent as vitamin D levels increased. Bodnar and her coauthors did not find a similar relationship between maternal vitamin D levels and preterm birth in white women.

**AMERICAN JOURNAL OF TRANSPLANTATION**

**DENDRITIC CELL THERAPY**

A single dose of treated dendritic cells (DCs) prevented rejection for almost four months in a preclinical animal model of kidney transplantation, according to senior investigator **Angus W. Thomson, PhD, DSc**, Distinguished Professor of Surgery and professor of immunology. That finding could lay the foundation for eventual human trials of the technique. The donor kidney was rejected after about 40 days among monkeys that got only immunosuppressive drugs but survived for about 113 days in the group that had a prior infusion of treated DCs. “This study shows it is possible to prepare the patient’s immune system for a donor kidney by administering treated dendritic cells from the donor in advance of the transplant,” Thomson said.

**CANCER RESEARCH**

SECOND-MOST COMMON BREAST CANCER SUBTYPE A GOOD CANDIDATE FOR A PERSONALIZED APPROACH TO TREATMENT

The second-most common type of breast cancer is very different from the most common type and appears to be a good candidate for a personalized approach to treatment. Invasive lobular carcinoma (ILC), characterized by a unique growth pattern in breast tissue, has distinct markers that indicate there may be benefits from drug therapies beyond those typically prescribed for the more common invasive ductal carcinoma. “A subset of patients with lobular carcinoma receive less benefit from tamoxifen than patients with ductal carcinoma,” said senior author **Steffi Oesterreich, PhD**, professor of pharmacology and chemical biology and director of education at the Women’s Cancer Research Center. The study explores the function of estrogen receptors in ILC cell lines and points to potential new targets for drug therapy in future clinical trials, which Oesterreich and colleagues are developing.

**NATURE**

OMICS INDICATORS IN CLINICAL TRIALS

**William L. Bigbee, PhD**, professor of pathology and outgoing chair of the NIH Cancer Biomarkers Study Section, is coauthor of an article that includes a proposed 30-point checklist of criteria for the use of “omics-based” predictors in clinical trials. The predictors are derived from computational modeling of multidimensional genomic and proteomic data derived from bodily samples that is used to recommend a clinical course of action, such as cancer therapy or preventive surgery. “Oomics-based tests are very powerful tools that are revolutionizing medicine,” said Bigbee. “However, there are many variables and opportunities for error, including study design, patient selection, biological sample integrity, and data analysis and management. The checklist is intended to provide clear expectations and guidelines for the development and implementation of omics-based tests and will hopefully eliminate unintentional errors.”
UNLOCK INNOVATION \ INVESTIGATIONS AND REVELATIONS

PUBLICATIONS OF NOTE, CONTINUED

NATURE CELL BIOLOGY

WHEN CELLS ‘EAT’ THEIR OWN POWER PLANTS

A mix of serendipity and dogged laboratory work allowed a team of Pitt scientists to solve the mystery of a basic biological function: how mitochondria signal that they are damaged. The Pitt team’s work has opened the door for research into cures for disorders, like Parkinson’s disease, that are believed to be caused by dysfunctional mitochondria in neurons. Cardiolipins, essential lipids on the inner membrane of mitochondria, move to the outer membrane when a mitochondrion is damaged, where they signal the cell to destroy the mitochondrion. The LC3 protein binds to cardiolipin and causes a specialized structure to form around the mitochondrion to carry it to the digestive centers of the cell. “It’s a beautiful, efficient mechanism that we will seek to target and model in developing new drugs and treatments,” said senior author Valerian E. Kagan, PhD, DSc, professor and vice chair of the Department of Environmental and Occupational Health, Graduate School of Public Health. Together with Charleen T. Chu, MD, PhD, A. Julio Martinez Professor of Neuropathology, Department of Pathology, School of Medicine, and Hilya Bayir, MD, professor of critical care medicine and research director of pediatric critical care medicine, Children's Hospital of Pittsburgh of UPMC, the three cosenior authors engaged a team of nearly two dozen scientists to identify this novel mitophagy signal.

PLOS ONE

MOOD-STABILIZING DRUG COULD BE NEW TREATMENT FOR INHERITED LIVER DISEASE

Researchers used a worm model to show that fluphenazine, a drug approved as a mood stabilizer for schizophrenia and dementia, has potential as a treatment for α1 antitrypsin (AT) deficiency, an inherited disease that affects one in 3,000 births. In AT deficiency, a mutation leads to production of an abnormal protein, ATZ, which is prone to clumping. The protein aggregates accumulate in liver cells and lead to scarring of the organ or to tumor formation.

“A drug to slow or stop this process might prevent the need for liver transplantation in these patients,” explained David H. Perlmutter, MD, Distinguished Professor and Vira I. Heinz Professor of Pediatrics. Perlmutter’s team worked with Stephen Pak, PhD, research assistant professor of pediatrics, and Gary Silverman, MD, PhD, Twenty-Five Club Professor of Pediatrics and professor of cell biology, who had previously screened more than 2,000 compounds in C. elegans, a microscopic worm found in soil, and found that flufenazine could reduce ATZ accumulation in the worm. Follow-up studies found that flufenazine reduced ATZ accumulation in several mammalian cell models of AT deficiency and reduced hepatic fibrosis in a mouse model in vivo. The results demonstrate the power of the worm model to rapidly screen drug candidates.

JOURNAL OF CLINICAL INVESTIGATION

BREAKTHROUGH IN HIV/AIDS RESEARCH

Chronic activation of the immune system and inflammation are major determinants of progression of HIV infection to AIDS and also play an important role in inducing excessive blood clotting and heart disease in HIV patients. Ivona Pandrea, MD, PhD, professor of pathology, and colleagues at Pitt’s Center for Vaccine Research demonstrated that blocking bacteria from leaving the intestine reduces the chronic immune activation and inflammation. “We now have direct evidence of a major culprit in poor outcomes for some HIV-infected people, which is an important breakthrough in the fight against AIDS,” said Pandrea. The study found that the drug Sevelamer significantly reduces the levels of bacteria that escape from the gut as well as health complications in nonhuman primates infected with the simian form of HIV. The gut bacteria bind to Sevelamer, making it more difficult for the bacteria to escape into the body.
LUNG LESIONS IN INDIVIDUALS WITH TB ARE VARIABLE

The lung lesions in an individual infected with tuberculosis (TB) are surprisingly variable, independent of whether the patient has clinically active or latent disease. The research team, co-led by senior investigator JoAnne L. Flynn, PhD, professor of microbiology and molecular genetics, carefully tracked granulomas (lesions created by the body’s immune response in an attempt to wall off the TB bacteria) that developed in the lungs of monkeys infected with TB. The researchers found that each granuloma starts with only one bacterium and that bacterial replication continues for about four weeks before the body counters with an adaptive immune response to kill off the invaders. Even an animal with a severe, active infection had some sterile granulomas, indicating that the immune system was capable of killing bacteria. The researchers found. “To our surprise, infected individuals have a collection of granulomas, some containing live bacteria and some that are sterile because the immune system has killed all the bacteria,” said Flynn. She adds, “The next step is to understand how the body sterilizes some granulomas and not others and build on the successful response for the development of more effective vaccines against TB.”

DISCOVERY OF IMMUNE AVOIDANCE MECHANISM COULD LEAD TO TREATMENTS FOR DEADLY MOSQUITO-BORNE VIRUSES

A mosquito-borne virus that causes a rare but deadly disease, eastern equine encephalitis virus (EEEV), “hijacks” a regulatory system of its hosts to suppress immunity. Senior author William B. Klimstra, PhD, associate professor of microbiology and molecular genetics at Pitt’s Center for Vaccine Research, and his colleagues discovered that EEEV has a binding site in its RNA that fits perfectly with a microRNA present in the immune cells of the invaded organism. When the virus binds the microRNA in immune cells, it restricts its own replication, thus evading an immune response. Meanwhile, the virus is able to replicate and spread undetected in the host’s neurological system and cause disease. When a manufactured mutant version without the microRNA binding site was tested in the laboratory, the researchers found that the host’s immune system was able to mount an effective response to the mutant virus. The results suggest that the mutant virus could be used as an EEEV vaccine and that microRNA blockers may have potential as a therapeutic treatment for EEEV-infected patients.

PREMATURE AGING OF IMMUNE CELLS PRESENT IN JOINTS OF KIDS WITH CHRONIC ARTHRITIS

The joints of children with the most common form of chronic inflammatory arthritis, juvenile idiopathic arthritis, or JIA, contain immune cells that resemble those of 90-year-olds, according to a new study led by researchers at the School of Medicine and Children’s Hospital of Pittsburgh of UPMC. JIA affects one of every 1,000 children in the U.S., said senior researcher Abbe N. de Vallejo, PhD, associate professor of pediatrics and of immunology. About one-third of the T cells of children with JIA had shortened telomeres (the tip region on chromosomes), and the cells had reduced or completely lost the capacity to proliferate. It is thought that aging occurs when the telomeres become too short for DNA replication and cell division to proceed normally. Much more must be learned about the development of JIA, de Vallejo said, but these findings could point the way to new therapies.

EAR–BRAIN COMMUNICATION

A precise rhythm of electrical impulses transmitted from cells in the inner ear coaches the brain how to hear, according to a new study led by Pitt researchers. To investigate the importance of the impulses, senior investigator Karl Kandler, PhD, professor of otolaryngology and of neurobiology, and his team used genetically engineered mice that lack a key receptor on the inner hair cells, which causes them to change their beat. The data showed that when the inner ear beats in a different rhythm, the brain doesn’t get the instructions it needs to wire itself correctly. The mice can detect sound, but they have problems perceiving the pitch of sounds. In humans, such subtle hearing deficits are associated with central auditory-processing disorders (CAPD), which relate to how the brain processes sounds. The causes underlying CAPD have remained obscure, and Kandler postulates that the findings suggest that an abnormal rhythm of electrical impulses early in life may be an important contributing factor in the development of CAPD.
PITTSBURGH IS UNPRETENTIOUS. IT’S A CITY THAT BELIEVES IN ITSELF. IF YOU’RE WILLING TO WORK HARD ALONGSIDE YOUR NEIGHBORS—WHETHER IT’S SHOVELING SNOW OR RUNNING A CLINIC—THEY’LL BELIEVE IN YOU TOO. AS THE CITY’S MEDICAL SCHOOL, WE SEEK TO IDENTIFY AREAS OF NEED, CONTRIBUTE OUR EXPERTISE AND ENERGY, AND HELP MAKE A MOST LIVABLE CITY EVEN BETTER.

CARE BEFORE THE CRISIS

Jack Rozel, MD, was at an appointment with a health care provider once (yes, even doctors occasionally get sick), when a staff person casually asked, “Where do you work? What do you do?”

“Oh, I work at this place called re:solve Crisis Network,” he replied.

“She got kind of quiet for a moment,” recalls Rozel, a Pitt assistant professor of psychiatry. “Then, she teared up a bit and said, ‘Thank you.’

A few years earlier, she was going through a really bad domestic violence situation and was trying to get out of that situation. She had some mental health struggles, as well, and we were able to work with her. We were able to steer her toward the right domestic violence resources, help her get into mental health treatment, and help her get out of that bad situation. Now she’s doing great. She was able to go to technical school to get the job skills to be the independent person that she needed and wanted to be.”

In partnership with Allegheny County’s Department of Human Services, Western Psychiatric Institute and Clinic of UPMC (WPIC) spearheaded the creation of re:solve Crisis Network. The goal was to build a new model for crisis intervention. Since opening in 2008, the clinic has provided more than one million services to county residents.

“It was a very competitive process to win this contract,” says Rozel, the crisis network’s medical director since 2010. “And what UPMC and WPIC did was spend a lot of time doing focus groups
Mental illness is fairly prevalent, with one in four Americans meeting the criteria for a psychiatric diagnosis each year. Even more experience trauma, stress, or life circumstances that can challenge one’s capacity to cope and may or may not lead to psychiatric illness. Early intervention, using personal and professional support, is important to staying mentally healthy.

The resolve Crisis Network is just one of more than 50 nonhospital behavioral health services operated by Western Psychiatric Institute and Clinic (WPIC) that address crises as well as acute and chronic illness. Designed to treat conditions across the lifespan from autism to Alzheimer’s, more than 400,000 of these ambulatory services are provided annually, reaching more than 32,000 individuals.

WPIC’s programs offer a wide variety of evidence-based practices from housing support and medication management to diagnostically based treatment. For example, there’s a homeless outreach team consisting of drug and alcohol specialists, a clinical coordinator, and an outreach nurse. Pitt psychiatry faculty also help run a mobile program that provides medication for seriously mentally ill individuals at high risk for psychiatric and physical illnesses, as well as unplanned hospitalizations. Services are offered through clinics, in schools, and even in people’s homes. Confidential phone counseling, support, and connections to other services are all available by calling resolve Crisis Network at 1-888-7-YOU-CAN.
A SAFETY NET AT SHUMAN

Jonathan R. Pletcher, MD, associate professor of pediatrics, recalls talking with a patient at Allegheny County’s Shuman Juvenile Detention Center. “This young adult had hearing loss, but he did not have access to hearing aids or support for accommodations,” Pletcher says. “His peers would sneak up behind him and try to scare him. One time, this kid saw someone out of the corner of his eye and knocked the person out before he could taunt him. He was charged with assault and sent to Shuman. This is only one example of how a young adult could really benefit from comprehensive services—counseling, help with his hearing and communication, and support for learning accommodations.”

These services come as part of care provided by Pletcher and a team of health care workers at Shuman. The Pennsylvania Department of Public Welfare mandates that young adults in detention centers receive routine medical and mental health services. Pletcher, along with Elizabeth Miller, MD, PhD, division chief and associate professor of pediatrics, is clinical director of the Division of Adolescent Medicine. The division has provided health care services at Shuman for the past 20 years. For medical students and residents, Shuman is a place to test their new skills. Working with experts from Pitt and Western Psychiatric Institute and Clinic of UPMC, they receive training in areas like adolescent mental health and learn how social services and the juvenile justice system operate.

With med students and other trainees at his side, Pletcher tries to help young adults consider behaviors that affect their health in the short term as well as chronic health concerns like seizure disorders, hearing loss, diabetes, sickle cell disease, and long-term mental health problems. He says it’s not unusual for young men at the facility to be evaluated for hypertension, which is a clue to how stressful their lives have been before coming to Shuman. Pletcher credits Miller with putting an emphasis on trauma-informed care—understanding the impact of trauma and how it affects the way these young people engage with the world and health care professionals in particular.

“Prior trauma in this population is almost universal, and it permeates every part of their lives,” says Pletcher. “Many youths have intergenerational family problems, including parents who are missing for a variety of reasons.”

Pletcher and the health care team at Shuman do their best to connect young adults to a safety net of services in Allegheny County. Many young people at Shuman have relied on emergency rooms for health care and have had trouble accessing routine care for things like chronic conditions, mental illness, and even hearing aids.

“Working with these young adults is challenging, but it is one of the most gratifying aspects of my career,” says Pletcher. “The challenges they face are immense, but they respond well to support. These kids are true heroes whose strength as survivors of trauma can be developed so that they stay out of the adult prison system.”

SCHWEITZER FELLOWS PROMOTE TEEN HEALTH

On a chilly Tuesday night, the school gym is filled with middle school-aged girls, moving from table to table in a scavenger hunt. The game helps them learn about different health topics relevant to their age group like healthy lifestyles, relationships, and puberty. They’re participating in a community program called Girls Night Out, an event organized by third-year medical student Nancy Fang and school nurses from the district. The program is a portion of Fang’s Schweitzer fellowship project, part of the U.S. Albert Schweitzer Fellows Program.

Since 1997, the Pittsburgh Schweitzer Fellows Program, one of 13 program sites across the U.S., has been involving students from various local schools in serving vulnerable individuals and communities and developing students’ leadership skills and commitments to community service. Competitively chosen from health-focused graduate student applicants in a variety of fields, each Schweitzer fellow receives a $2,000 stipend to create and implement a program to benefit underserved populations in the Pittsburgh area over the course of one year. Fang and others are part of a many-year history of Pitt medical students receiving Schweitzer fellowships for diverse projects.

Fang was working on community-based projects with Elizabeth Miller, MD, PhD, associate professor of pediatrics and chief, Division of Adolescent Medicine at Children’s Hospital of Pittsburgh of UPMC, and considered different ideas for her fellowship. When Miller mentioned to Fang that a local school district needed to redevelop a curriculum on puberty, Fang found her project.

“My main focus was to develop a relationship with the school nurses and school health programs,” says Fang. “I think there are few programs that connect school nurses with medical students, which doesn’t make sense to me. If you’re interested in pediatrics and don’t know how a school nurse’s office works or what they can offer to students, you’re missing a huge chunk of what the child’s life is.”

Several months later, Fang and collaborators hosted a Boys Night Out, with a similar focus on health and growing boys.

Third-year medical students Afshan Rizvi and Daniel Suter were also interested in health education and tailored their shared Schweitzer fellowship to be an interactive community project. Both were familiar with community work before being awarded their fellowships. Among other experiences, Rizvi had worked in the Birmingham Free Clinic (a walk-in clinic on Pittsburgh’s South Side run by a community partnership between the Division of General Internal Medicine’s Program for Health Care to Underserved Populations and the Salvation Army) for three years prior to medical school, and Suter worked with young adults who were homeless in Montréal. They decided to create health education sessions for beneficiaries of the residential rehabilitation program at the Salvation Army Adult Rehabilitation Center (ARC), which offers a residential work therapy program for men ages 21–65 who choose to seek rehabilitation for drug and alcohol addiction. The ARC also welcomes homeless men into its program.

“We did a needs assessment and asked them what topics they were interested in us covering and used that as a basis for our curriculum,” says Suter. “We go one evening a week and give one-hour sessions on different health issues. We don’t claim to know all the answers, but we try to connect them with resources or information.”

UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE
FOR MANY, THE CLINIC COMES TO REPRESENT A SORT OF TOUCHSTONE IN THEIR DEVELOPMENT AS PHYSICIANS—a place where they are entrusted with an opportunity to develop into skilled and compassionate clinicians.

THE PEOPLE IN YOUR NEIGHBORHOOD

The Birmingham Free Clinic (BFC) holds a special place in the hearts and minds of faculty, students, and alumni of the School of Medicine. Founded in 1994, BFC is the only free, walk-in health clinic in Pittsburgh. It offers acute and primary care, diagnostics, specialty care, Spanish-language clinics, medications, health education, and smoking cessation programs to uninsured and vulnerable people. All clinical services at BFC are provided by a volunteer staff consisting of University of Pittsburgh faculty, UPMC staff and residents, and students from the Schools of Medicine and Pharmacy. The clinic is run by Pitt’s Program for Health Care to Underserved Populations (a program administratively housed within the Division of General Internal Medicine) and the Salvation Army of Pittsburgh.

Medical students can volunteer for clinic-related duties at any time during med school. Most students in each first-year class volunteer. As they matriculate through med school, many students come to feel a depth of gratitude to the patients and staff at BFC. For many, the clinic comes to represent a sort of touchstone in their development as physicians—a place where they are entrusted with an opportunity to develop into skilled and compassionate clinicians.

BFC regularly hosts a traveling clinic known as the Guerrilla Eye Service (GES), which is funded by foundation grants and UPMC and run by Evan “Jake” Waxman, MD, PhD, associate professor and vice chair for medical and resident education in the Department of Ophthalmology. Wherever GES pops up, a rotating cadre of medical students and ophthalmology residents offers free vision care to underserved populations. They test for cataracts and glaucoma, and they even fill eyeglass prescriptions for free. “Taking care of people who otherwise wouldn’t get eye care is very important,” says Waxman, adding that it’s also important for med students and residents to get involved in community outreach.
MATCH MADE IN PITTSBURGH

While searching for a topic for her Scholarly Project, a signature feature of the Pitt curriculum, then-medical student Anna Marie Lewarchik, MD, happened to be on a pediatric rotation. In the outpatient clinic, a mother of three was exhausted and in obvious distress about how to care and provide for her children. One of the clinic’s pediatricians, who had recently moved from Minnesota, recommended that Lewarchik call a crisis nursery for help. Intrigued and eager to help, Lewarchik learned that a crisis nursery is a safe place for children to stay while their families negotiate tough times, whether it’s the hospitalization of a child and no friends or family to watch the siblings, needing to work when child care arrangements fall through at the last minute, or, as in this mother’s case, physical and emotional exhaustion. When Lewarchik discovered that Pittsburgh had no crisis nursery, she found both her Scholarly Project and a personal mission.

Lewarchik was happy to match in Pittsburgh for a combined four-year internal medicine and pediatrics residency so she could continue working on the nursery. She met with local physicians Lynne L. Williams, MD, PhD, and Tammy Murdock, MD, both School of Medicine alumnae, who helped develop the idea into a reality. With the help of three fellow residents and a Community Access to Child Health grant from the American Academy of Pediatrics, Lewarchik completed a needs assessment and found that Pittsburgh would benefit from having a crisis nursery. The survey revealed that 14 percent of caregivers had left their children in high-risk situations when caregivers needed emergency care; of those children left in high-risk situations, 10 percent suffered an injury or experienced behavioral problems; and 81 percent of caregivers said they would use a crisis nursery if one were available. Lewarchik, Williams, and Murdock wanted the crisis nursery to be a part of the community, a place where families felt supported and where they’d receive nonjudgmental help in times of crisis. They wanted it to be not only a safe place for children but a place where parents or caregivers could receive referrals to address chronic concerns to protect the long-term stability of their families.

In April 2014, Jeremiah’s Place opened (named after a child in foster care who would’ve benefited from a crisis nursery), cofounded by Williams, Murdock, and Eileen Sharbaugh, educational consultant with the Homeless Children’s Education Fund. The nursery is free for children ages 6 and under and is open 24 hours a day, seven days a week at the Kingsley Association in Pittsburgh’s Larimer neighborhood.

“The crisis nursery is all about protecting children,” says Murdock. “We know from research that toxic stress, which is sustained, severe stress, is not only difficult for children to experience, but it leads to higher risks of diabetes and other diseases and changes in epigenetics and the brain, among other effects.”

“I’m glad that my Scholarly Project resulted in a crisis nursery. I wish I could find that woman from the clinic and let her know we have one now,” says Lewarchik, now chief of the combined internal medicine–pediatrics program at UPMC.

“THE CRISIS NURSERY IS ALL ABOUT PROTECTING CHILDREN.”
With grateful appreciation for their generosity, we acknowledge the following individual, corporate, and foundation donors whose contributions of $500 or more to the University of Pittsburgh School of Medicine, University of Pittsburgh Cancer Institute, and Western Psychiatric Institute and Clinic of UPMC between July 1, 2012, and June 30, 2013, have supported us in our academic, research, and clinical missions.

THANK YOU

YOUR CONTINUING SUPPORT

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We invite you to join us as we strive to make the future brighter. By partnering with the School of Medicine, contributors play a vital role in the development of the medical school and the success of students and faculty.

CLYDE B. JONES III
Vice Chancellor for Health Sciences Development
President, University of Pittsburgh/UPMC Medical and Health Sciences Foundation

“EVERY DOLLAR GIVEN TO THE SCHOOL OF MEDICINE RESONATES IN OUR CLASSROOMS, RESEARCH LABS, CLINICS, AND COMMUNITY. WE ARE DEEPLY GRATEFUL FOR THIS SUPPORT AND PLEASED TO RECOGNIZE THOSE WHO HAVE CONTRIBUTED SO GENEROUSLY.”

CLYDE B. JONES III
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HOWARD N. LANG, MD, AND CAROL E. LANG, MS—
IN SUPPORT OF OUTSTANDING EDUCATION

The day’s rain and clouds soften the light passing through the living room where Howard and Carol Lang stand in front of a piano. They’re narrating the details of several photographs on the wall. They pause at a portrait of a bride sitting in a stunning white dress and long veil and remark that the print shows no signs of aging.

As they talk, the couple radiates a quiet adoration for each other. They met at the University of Pittsburgh as graduate students—he in medical school and she in speech pathology and audiology—after Dr. Lang and his best friend “switched lists” of potential girlfriends. The name “Carol” was at the top.

They married, graduated, and eventually moved to New York City. There, Dr. Lang finished his residency and Mrs. Lang worked with stroke patients as a speech pathologist at UPMC Presbyterian for 34 years and especially enjoyed the study and treatment of swallowing disorders.

“I enjoyed doing the testing and the therapy and working with stroke patients,” she says. “I worked in every unit in the hospital, but my primary assignment was neurology and neurosurgical services.”

“She’s a frustrated neurologist,” Dr. Lang teases.

Both attribute their career successes to the quality of education they received, and they want to support others who seek the same outstanding education. They are long-time donors to Pitt and have endowed scholarships in both the Schools of Medicine and of Health and Rehabilitation Sciences for students from Southwestern Pennsylvania.

“We were fortunate to attend grad school when we did,” says Mrs. Lang. “It’s such an expensive proposition now.”

Dr. Lang agrees and says, “It was the right thing for us to do.”

In the meantime, the Langs will continue pursuing their love of travel, spending time with family—and their devotion to each other.
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William G. and Sue Gin McGowan—Enabling Innovation

A major gift from William G. and Sue Gin McGowan launched one of the first regenerative medicine institutes in the world. Established in 1992 as the McGowan Center for Artificial Organ Development, the center became the McGowan Institute for Regenerative Medicine in 2001.

The McGowans were drawn to the entrepreneurial spirit of the original venture: to exploit new technologies and recent scientific advances to develop innovative therapies such as artificial hearts for patients with heart failure. Their initial investment has been combined with generous ongoing support from the William G. McGowan Charitable Fund to enable clinicians, engineers, and scientists working in the areas of tissue engineering, cellular therapies, and artificial and biohybrid organ devices to translate scientific discoveries from the laboratory to the clinic. In addition to the artificial heart program, clinical procedures pioneered at the McGowan Institute include regenerative therapies for burns and traumatic tissue loss.

The McGowan Charitable Fund provides financial support to organizations that reflect the visions, concerns, and life experiences of its benefactor, Bill McGowan, a risk-taking industrialist and the driving force behind the success of the telecommunications giant MCI. Mr. McGowan died in 1992 after a six-year fight against heart disease that included a heart transplant at UPMC, but the continued support of the fund has enabled the institute that bears his name to thrive and garner additional research funding from agencies like the Department of Defense, National Institutes of Health, and National Science Foundation.

In 2005, the McGowan Fund challenged other funders to match its 10-year, $7.5 million pledge—a strategy that has led to millions more for regenerative medicine research.

“The fund and the institute grew up together, and we are grateful for all the help we have received from the University to become a strategic grant maker,” said Diana Spencer, executive director of the McGowan Charitable Fund since 2006.

“Initially, Bill was a grateful patient who had a strong relationship with his surgeons,” said Sue Gin, president of the McGowan Fund. “Over time, as we interacted with the scientific leadership at Pitt, we developed a deep belief in their vision of how regenerative medicine could radically improve therapies for some patients.”

[As this report was being prepared for publication, we were saddened to learn of the death of Sue Gin, president of the William G. McGowan Charitable Fund.]
Having a conversation with Lawrence and Rebecca Stern of the Stern Family Foundation is like talking to bench scientists: The Sterns know firsthand how science and research can help save people’s lives. Mr. Stern, a chemical engineer, ran a biotech company called Talecris Biotherapeutics (now owned by global health care company Grifols). The company produced lifesaving plasma therapeutics for patients with rare genetic diseases and disorders, including hemophilia, alpha-1 antitrypsin deficiency, and primary immunodeficiency.

“It was a great thing to be involved in the health care side of business where we felt we were saving lives,” says Mr. Stern.

Through their philanthropy, they want to define and pilot best practices for the evolution of health, education, and welfare programs. Mrs. Stern, a teacher for many years, now uses her background in special education for a nonprofit she created, Yes, You Can Dance, which provides ballroom and social dance experiences for adults with special needs, older adults, and other populations. She leverages world-class talent on her board, which includes Anthony Delitto, PhD, professor of physical therapy and associate dean for research, School of Health and Rehabilitation Sciences (SHRS), and Ronna Delitto, MS, adjunct assistant professor of physical therapy, SHRS, to develop research that measures the benefits people receive when they get involved with social dance.

The Sterns describe themselves as “involved philanthropists” and enjoy learning the complexities, execution plans, and interim results from the research they support at Pitt. Since moving to Pittsburgh in 2000, they’ve created a team-like relationship with the University.

“The great part about being involved with Pitt is this ability to work with people who are leaders in the field, who are both creative and team-oriented,” says Mr. Stern. “They’re looking not just for our support but for our mindshare.”

That team includes Arthur S. Levine, MD, senior vice chancellor for the health sciences and Petersen Dean of Medicine; Jeremy M. Berg, PhD, associate senior vice chancellor for science strategy and planning, health sciences, professor of computational and systems biology, School of Medicine, Pittsburgh Foundation Professor and Director, Institute for Personalized Medicine; A. Everette James, JD, MBA, associate vice chancellor for health policy and planning for the health sciences, M. Allen Pond Professor of Health Policy and Management, Graduate School of Public Health, and executive director of Pitt’s Health Policy Institute; and Robert M. Arnold, MD, professor of medicine and Leo H. Creip Professor of Patient Care.

An initial meeting with Dr. Levine and a tour of the School of Medicine’s key initiatives in personalized medicine, pharmacogenomics, palliative care, and health policy impressed the Sterns. They asked Dr. Levine to use their support to fund projects he knows will create value but are difficult to get funding for through normal grant processes.

“Take what Dr. Levine has done to make the School of Medicine a powerhouse of innovation,” says Mr. Stern. “It’s as impressive as anything I’ve seen around the country, and I’ve seen a lot. Some support from Becky and me can help launch initiatives that we hope will help attract additional capital and investment to further put Pitt on the map.”
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TERRY BLECHMAN—
FAITH IN PITTSBURGH

Terry Blechman and her husband, Donald, were eating dinner in an Italian restaurant in Pittsburgh. The seating area was small, and they overheard a conversation at the next table. A couple was discussing which hospital they should go to for a particular treatment, and none they listed was in Pittsburgh. Mrs. Blechman says her husband “never stuck his nose in other people’s business,” but he said to them, “Why go somewhere else? Don’t you know you have the best hospitals in the country right here?”

The Blechmans had good reason to have such faith in Pittsburgh. In their hometown of Miami Beach, Fla., Mr. Blechman had received a grim diagnosis: He had esophageal cancer and six weeks to live. He was told there was nothing to do, other than to get his affairs in order. But, soon after, a stunned Mrs. Blechman received a friend’s recommendation to call James D. Luketich, MD, the Henry T. Bahnson Professor and chair, Department of Cardiothoracic Surgery at Pitt’s School of Medicine. Mrs. Blechman says they didn’t know anyone in Pittsburgh and had never been there, but they went for tests, consultation, and surgery the week after speaking to Dr. Luketich.

“We didn’t accept six weeks,” says Mrs. Blechman. “We fell in love with Dr. Luketch right away because neither did he. He knew what he was doing.”

Six weeks turned into five and a half “good, quality years,” as Mrs. Blechman describes them. The couple took a six-week cruise to Vancouver via the Panama Canal, enjoyed grandchildren’s high school and college graduations, and traveled regularly to the Bahamas so Mr. Blechman could fly fish.

“Donald never looked sick,” Mrs. Blechman recalls. “He thought his hair would fall out, so he shaved his head. But it never fell out! We knew how it was going to end, but we didn’t dwell on it. We couldn’t live like that. Donald could cope, so that made it possible for me to cope.”

During those five and a half years, the cancer returned at times. Dr. Luketich and colleagues formed a treatment plan, and the Blechmans returned regularly to Pittsburgh for medical care. Their experiences solidified Pittsburgh as their medical “home.” Mrs. Blechman still comes here for her own health care.

“I can’t begin to tell you how impressed I am,” Mrs. Blechman says. “Everyone has such concern, such heart, and skill. It’s the kind of care everyone hopes for when they’re sick.”

Eventually, Mr. Blechman’s treatments stopped working, and he died in 2010—after 53 years of marriage to Mrs. Blechman, two children, and four grandchildren. Because she was so grateful for the time and quality of life he had in his final years, Mrs. Blechman established the Donald Blechman Lecture in Surgical Oncology. Attending the yearly lecture makes her optimistic.

“I go to the lectures, which are filled with all these people in white coats, and think, ‘One of these days, someone in here is going to have a light bulb go off,’” says Mrs. Blechman. “Someone’s going to find the answer we’re all looking for.”

Mrs. Blechman doesn’t regret the decision to come to Pittsburgh “sight unseen” and has recommended it to other people looking for world-class health care.

She says, “You have to have faith that what you’re doing is right and not be afraid to do it. We were never afraid. And I got five more good years with my husband.”
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During his long and distinguished career, he was governor of the American College of Surgeons, president of the American Cleft Palate-Craniofacial Association, president of the American Society of Plastic Surgeons, and director of the American Board of Plastic Surgery. The school continues to honor Musgrave through the annual Ross H. Musgrave Lectureship, as well as the newly named Ross H. Musgrave Chair in Pediatric Plastic Surgery. A new namesake award for medical student excellence is also in the works.
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