Med Students Leap into Mentored Research

Pitt Med’s Class of 2018 is the 11th cohort of graduating med students to complete the scholarly research requirement as a condition of graduation from the MD program. First introduced as an innovative (those less visionary called it “misguided”) strategy to engage med students in mentored research throughout the course of their medical school experience, Pitt’s Longitudinal Research Project has since become a model for other top medical schools attempting to incorporate a rigorous research component into the MD curriculum.

Arthur S. Levine, MD, dean of the medical school since 1998, recalls, “When I first suggested that every Pitt medical student should be required to do research, I was warned that, (1) applications to the medical school would plummet, (2) the quality of applicants would decline, and (3) I would not last long as dean. Well, none of those things has happened,” says Levine, who celebrated 20 years as dean in 2018. He notes that admission to the medical school has become increasingly competitive. “And the fact that other top medical schools have followed our lead tells me we’re doing something right.”

The best medical students, it turns out, see the value of engaging in biomedical research. In fact, they increasingly recognize that their medical education would be incomplete without it.
LONGITUDINAL RESEARCH PROJECT BY THE NUMBERS / CLASS OF 2018

Beginning in year one of medical school, students in the Class of 2018 embraced the opportunity to engage in research through the Longitudinal Research Project. As of graduation day, the fruits of their labor include:

117 med students completed a research project
78 percent (of the class) participated in summer research between their first and second years of med school
258 peer-reviewed publications
plus an additional 54 submitted and/or under review
360 presentations at national and international meetings
49 national or state awards
80 local awards

2018 O’MALLEY AWARD WINNERS

At Scholars Day 2018, four 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 2018:

<table>
<thead>
<tr>
<th>NETANYA POLLOCK, MD</th>
<th>ARPAN PRABHU, MD</th>
<th>JAMES DOEZEL, MD</th>
<th>XIAO ZHU, MD</th>
</tr>
</thead>
<tbody>
<tr>
<td>c-Fes Kinase and MALT1 Protease Cooperation in AGTR1+ Breast Carcinoma</td>
<td>Radiation Oncology and YouTube: Assessing Informed Consent in Brachytherapy Patient Education Videos</td>
<td>Machine Learning Reveals Patterns of Ribosomal Protein Expression in Human Cancers</td>
<td>Role of the Receptor for Activated C Kinase 1 in Angiotensin-II Induced Constrictions of Preglomerular Vascular Smooth Muscle Cells</td>
</tr>
<tr>
<td>Residency Match: Pediatrics, Children’s Hospital Boston</td>
<td>Residency Match: Radiation Oncology, University of Arkansas College of Medicine, Little Rock</td>
<td>Residency Match: Internal Medicine, University of Chicago Medical Center</td>
<td>Residency Match: Plastic Surgery, UPMC Medical Education Program, University of Pittsburgh</td>
</tr>
<tr>
<td>Mentor: Linda McAllister-Lucas, MD, PhD, Associate Professor of Pediatrics and of Microbiology and Molecular Genetics</td>
<td>Mentor: Sushil Bernival, MD, Professor of Radiation Oncology</td>
<td>Mentor: Edward Prochownik, MD, PhD, Professor of Pediatrics and of Clinical and Translational Science</td>
<td>Mentor: Edwin Jackson, PhD, Professor of Pharmacology and Chemical Biology and of Medicine, Division of Renal-Electrolyte</td>
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MED SCHOOL DEMOGRAPHICS

6,874 students applied and 737 were interviewed for the 162 available positions in the medical school Class of 2022.

As of the 2018-19 academic year, 579 MD students are registered in the School of Medicine, including 315 women (54 percent) and 264 (46 percent) men. Of these, 187 (32 percent) are Pennsylvania residents; approximately 17 percent of Pitt medical students are from groups that are underrepresented within the medical profession.

There are 308 registrants in PhD programs (including those in the Medical Scientist Training Program), 134 students in MS programs, and 29 students in certificate programs.

The School of Medicine has 2,350 regular and 1,664 volunteer faculty members. Of these, 70 are current members of the Academy of Master Educators, an organization that recognizes and rewards excellence in medical education.
Postdoctoral fellow Akash Verma, PhD, earned the cover story in a November 2017 issue of *Science Immunology* (see page 34) when he identified how the human immune system responds to an oral fungus by the name of *Candida albicans*. Verma works in the Gaffen Lab, where the team identified the protein responsible for sounding the alarm when *C. albicans* invades the mouth. The research could lead to better treatment options for those suffering from a condition called oral thrush. Verma’s advisor, Sarah Gaffen, PhD, is the Gerald P. Rodnan Professor of Rheumatology in the Department of Immunology.

Filip Istvanic knows about bubble bursting. A student in the Physician Scientist Training Program, Istvanic developed a method using microbubbles, stimulated by ultrasound, to break apart tiny blood clots in blood vessels. Istvanic gave a talk on the subject at the European Symposium on Ultrasound Contrast Imaging in Rotterdam in January 2018. The Howard Hughes Medical Institute’s Medical Research Fellows Program supported his efforts. Istvanic began this work under his advisor, John Pacella, MD, associate professor of medicine, and Flordeliza Villanueva, MD, professor of medicine and vice chair for preclinical research.

Postdoctoral scholar in the Department of Biomedical Informatics Sarah Aboutalib, PhD, won a Radiological Society of North America Trainee Research Prize for her abstract on a computerized method aimed at classifying mammogram images in breast cancer patients. She worked with Shandong Wu, PhD, assistant professor of radiology and biomedical informatics.

Mehret Birru Talabi, MD, PhD, a 2011 graduate of Pitt’s Medical Scientist Training Program, was named one of 10 Distinguished Fellows by the American College of Rheumatology in 2017 for her focus on women’s health in rheumatic diseases. Birru Talabi, now an assistant professor of medicine, says she’d like to see a larger focus on women’s health in her field. “We need to figure out how to train providers—gynecologists, primary care physicians, rheumatologists—to make sure that issues related to contraception, reproductive health, and pregnancy planning are part of the ongoing conversation with patients.”

Pitt Med student Stephen Canton claimed the title Future City 2018 Alumnus of the Year in January 2018, landing him a spot as a judge at the 2018 Future City competition. In both 2004 and 2005, Canton participated in the competition, which exposes middle school students to the principles of engineering. “It’s the reason I went into engineering,” says Canton, who got his degree in bioengineering from Pitt in 2013. Canton is now developing a virtual reality training program that simulates how to scrub in.

**Educator Spotlight**

**SCOTT MAURER ON EMOTIONAL INTEL**

For pediatrician Scott Maurer, MD, work is a practice in empathy. Maurer, associate professor of pediatrics and chief of the Division of Palliative Medicine and Supportive Care at UPMC Children’s Hospital of Pittsburgh, serves families experiencing the pain of having a child with a chronic or terminal illness. His leadership in the classroom and in the hospital goes beyond teaching the nuts and bolts of patient care; he strives to model and teach emotional intelligence, which he says is necessary to the health of both patients and staff.

**How do you and your colleagues maintain the stamina to witness and hold grief every day at work?**

Sometimes I offer a kind word, or I pull someone aside when I know they have had a stressful day. I am a firm believer that the human experience is a shared experience. If something happens to you, it is helpful and cathartic if you can tell somebody about it. My colleagues and I are a family, and one person’s experience affects the rest of [us]. I rely on my colleagues as they rely on me.

**Is emotional intelligence something that can be learned?**

Often people think of communication skills as something that is just part of one’s natural ability, but communication is a teachable skill. I have the honor to be mentored by Bob Arnold, who is head of palliative medicine at Pitt and a cofounder of VitalTalk, a nonprofit dedicated to supporting emotional skills in medical professionals. I teach students that when dealing with patients and their families, the first step is to expect an emotional response, and then to identify the present emotion, and lastly to follow that observation with an expression of support and understanding.

**Why is emotional intelligence crucial to being a successful doctor?**

Study after study shows that parents take your medical knowledge for granted, and the way they are going to judge your skills as a physician is how compassionate you are and how well you communicate with them. Medicine is one of those strange things in that you have to rapidly build rapport with somebody. I know if someone trusts me. I have become very good at reading body language and reading nonverbal cues.
A MATCH MADE IN PITTSBURGH

Match Day 2018 at the University of Pittsburgh was a lively celebration of the hard work and accomplishments of our graduating med students. Held in the bright and airy confines of the Petersen Events Center lobby, Pitt’s Match Day festivities included dance music on full blast and a wall map of the United States, which students decorated with pushpins after they learned where in the world they would begin their residency training.

More than 18,000 graduating med students participated in the match across the nation. One hundred and forty Pitt students learned their residency assignments on Match Day. The Class of 2018 posted a record number of matches in two highly competitive specialties—10 in psychiatry and 10 in orthopaedic surgery. The programs attracting the most Pitt grads (after UPMC, which welcomes 37 new Pitt Med graduates to its training programs in 2018) include Johns Hopkins University, the University of Washington, and the University of Michigan.

Numerous Pitt Med students reported that research experience gained at Pitt paid off when it was time to select and interview for residency programs. While conducting mentored research as students, many feel that they got to “test drive” a specialty and a research area, giving them greater confidence in choosing a career path. Others added that they were glad they could speak about research with confidence and from experience in residency interviews.

GRADUATION KEYNOTE STRESSES MEDICINE AND MEANING

The 2018 School of Medicine Diploma Ceremony took place on May 21, in the historic Soldiers and Sailors Memorial Hall. The keynote speaker was Dayna Bowen Matthew, JD, PhD, William L. Matheson and Robert M. Morgenthau Distinguished Professor of Law and F. Palmer Weber Research Professor of Civil Liberties and Human Rights at the University of Virginia School of Law. Matthew is a long-standing advocate for health care equality and author of the book Just Medicine: A Cure for Racial Inequality in American Health Care. Matthew cofounded the Colorado Health Equity Project to help low-income people access better health care and, in 2015, worked for the U.S. Environmental Protection Agency’s Office of Civil Rights to assist historically vulnerable communities besieged by pollution.
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 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 either the Clinical Scientist Training Program or the Physician Scientist Training Program.

CSTP

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 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, 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.

Four members of the Class of 2018 are products of Pitt’s CSTP, having previously completed the research year.

CSTP GRADUATES AND THEIR RESIDENCY PROGRAMS:

<table>
<thead>
<tr>
<th>Name</th>
<th>Residency Match</th>
</tr>
</thead>
<tbody>
<tr>
<td>GABRIELA ALGARROBA, MD</td>
<td>Obstetrics/Gynecology, New York University, Winthrop Hospital, Mineola, N.Y.</td>
</tr>
<tr>
<td>Mentor:</td>
<td>Debra Bogen, MD, Professor of Pediatrics, of Psychiatry, and of Clinical and Translational Science</td>
</tr>
<tr>
<td>SHANTAL VILLALOBOS, MD</td>
<td>Internal Medicine, University of California, Los Angeles</td>
</tr>
<tr>
<td>Mentor:</td>
<td>Jon Davison, MD, Associate Professor of Pathology and of Clinical and Translational Science</td>
</tr>
<tr>
<td>JAMES DOLEZAL, MD</td>
<td>Internal Medicine, University of Chicago Medical Center</td>
</tr>
<tr>
<td>Mentor:</td>
<td>Edward Prochownik, MD, PhD, Professor of Pediatrics and of Clinical and Translational Science</td>
</tr>
<tr>
<td>MAULIN SHAH, MD</td>
<td>Internal Medicine, Cedars-Sinai Medical Center, University of California, Los Angeles</td>
</tr>
<tr>
<td>Mentor:</td>
<td>Evan Waxman, MD, PhD, Associate Professor of Ophthalmology</td>
</tr>
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</table>

Med Student Mingles with Nobel Laureates at Lindau

Tolani Olonisakin attended the 68th Lindau Nobel Laureate Meeting in June 2018. At this prestigious annual gathering, Nobel laureates mingle and share scientific inspiration with hundreds of students and postdoctoral fellows.

The 2018 meeting not only featured geographic diversity (with 43 Nobel laureates and students from 84 countries), but also, for the first time, women made up half of all student attendees. Eighteen University of Pittsburgh students have attended Lindau since 2004, when the organizers began tracking representation. Olonisakin, an MD/PhD student in Pitt’s Medical Scientist Training Program, was the only Pitt student selected for 2018.

Olonisakin described the experience as a unique opportunity to meet some of the top scientists in the world and to network with other young scientists from around the world. She appreciated the open exchange with her peers from Turkey, South Africa, Spain, and many other countries. She aims to keep in touch with many. “Lindau fosters collaboration among participants, even beyond the meeting,” Olonisakin told Pitt Med magazine. “Alumni are closely followed, and their continued scientific success is paramount.”

Olonisakin’s research in the lab of Janet Lee, MD, professor of medicine, focuses on bacteria like Klebsiella pneumonia, which have caused a growing number of deadly outbreaks in recent years due to multiple antibiotic resistant strains. She hopes to contribute to development of new tools to fight such infections.

While studying infections and immunity, Olonisakin is trying to forge her own career path as a physician-scientist, although her exact focus is yet to be determined. As she moves forward, she appreciates having the words of 2003 Nobel Laureate Peter Agre, MD, to help guide her decisions.

“He said to ask important questions that are beneficial to mankind,” Olonisakin said. “As I go further along my career, that will always be in the back of my head—not to go where the money is but to ask the important questions that will benefit mankind.”
PSTP

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 2018 included seven graduating PSTP students who matched to top residency programs in highly competitive medical specialties.

PSTP GRADUATES AND THEIR RESIDENCY PROGRAMS:

BERKCAN AKPINAR, MD

"I chose PSTP because I enjoy and value pursuing research in the setting of improving patient care."

Residency Match: Orthopaedic Surgery, New York University, New York City

Mentor: L. Dade Lunsford, MD, Distinguished Professor and Lars Leksell Professor of Neurological Surgery

KASSANDRA ALLBRIGHT, MD

"I knew I wanted to pursue a career with research as a component, but I didn’t want to complete a full MD/PhD program or lose track of the clinical pieces of my career and training."

Residency Match: Internal Medicine, Johns Hopkins Hospital, Baltimore

Mentor: Kacey G. Marra, PhD, Associate Professor of Plastic Surgery and of Bioengineering

RAFEY FEROZE, MD

"It gave me the unique opportunity to meet fellow medical students with a passion for laboratory research and allowed me to pursue cutting-edge biomedical science."

Residency Match: Internal Medicine, University of Michigan, Ann Arbor

Mentor: Fiordeliza Villanueva, MD, Professor of Medicine, Division of Cardiology

NAOMI GUNAWARDENA, MD

"I wanted to have the opportunity to dedicate more time to my research project than is typically available in medical school."

Residency Match: Pediatrics, UPMC Medical Education Program, University of Pittsburgh

Mentor: Grant Bullock, MD, PhD, Assistant Professor of Pathology

MARSHALL HUANG, MD

"The program offers a unique opportunity to spend a full year on basic science research without concurrent clinical responsibilities. This experience, combined with the didactic curriculum and regular discussion sessions, allowed me to develop skills essential for success in an academic career."

Residency Match: Ophthalmology, University of Utah, Salt Lake City

Mentor: Robert Friedlander, MD, Walter E. Dandy Professor and Chair of Neurological Surgery

THOMAS WOZNY, MD

"I had a passion for basic science and translational research and that I knew I wanted to translate into a career in academic medicine. The program's emphasis on longitudinal development through an individualized, trainee-driven curriculum was resident from the outset and has already proven to be invaluable in my own scientific and clinical pursuits."

Residency Match: Neurological Surgery, UPMC Medical Education Program, University of Pittsburgh

Mentor: R. Mark Richardson, MD, PhD, Associate Professor of Neurological Surgery

XIAO ZHU, MD

"I wanted to be among peers with like-mind goals of becoming the next generation of physician-scientists, innovating, and contributing to a brighter future for patients."

Residency Match: Plastic Surgery, UPMC Medical Education Program, University of Pittsburgh

Mentor: Edwin K. Jackson, PhD, Professor of Pharmacology and Chemical Biology, Professor of Medicine, Division of Renal-Electrolyte

PSTP Students Win Prestigious HHMI Fellowships for 2018–19

Two Pitt PSTP students were awarded highly coveted research training fellowships through the Howard Hughes Medical Institute (HHMI) Medical Research Fellows Program in 2018. The students will be supported through a one-year leave of absence, during which they’ll dedicate themselves to their research projects and associated training.

HHMI selected 66 top medical and veterinary students from around the nation to conduct full-time biomedical research in its Medical Research Fellows Program. The $3 million annual initiative is designed to develop the next generation of physician-scientists by giving the students a full year of mentored research training. HHMI fellows each receive $43,000 in grant support as they immerse themselves in their basic, translational, or applied biomedical research.

As an HHMI fellow, Aneta Kowalski hopes to build on what she learned in her first two years of med school. "I found our cardiology course to be the most fascinating, so during my research year, I’m excited to be learning about cardiology from a basic science point of view. I hope to not only refine my technical skills and produce sound data, but more importantly, I want to become the mini ’expert’ on my project."

Pitt students have a strong track record in HHMI’s fellowship program; successful students often credit the specialized grant writing course they take between their first and second years of med school. In addition to learning widely applicable keys to successful grant writing, the course provides very specific feedback on each student’s HHMI proposal.

In addition to financial support and the protected research time, HHMI provides fellows with extensive networking opportunities and a good deal of social support. Successful research fellows have the option of requesting a second year of funding.

“I’ve met distinguished physician-scientists as well as research-minded medical students from across the country,” said Audrey Kindsfather, who earned her second consecutive year of HHMI support. "I hope to use my second year in the program to continue to learn how to effectively communicate my research to physicians, scientists, and the general public. By studying how maternal age and fertility treatments affect embryos both individually and together, I hope to contribute to the growing knowledge base used by clinicians to select the best embryos for transfer to the mother."

PITT’S HHMI MEDICAL RESEARCH FELLOWS AND THEIR PROJECTS:

ANETA KOWALSKI (1ST-YEAR HHMI FELLOW)
Research Title: The Role of CREBRF and Its Metabolic-Risk Variant in Cardiac Metabolism and Function
Mentor: Edwin K. Jackson, PhD, Professor of Pharmacology and Chemical Biology, Professor of Medicine, Division of Renal-Electrolyte

AUDREY KINDSFATHER (2ND-YEAR HHMI FELLOW)
Research Title: Investigating the Combined Effects of Advanced Maternal Age and Assisted Reproductive Technologies on Mitochondria and Genomic Imprinting in Mouse Embryos
Mentor: Melissa Mann, PhD, Associate Professor of Obstetrics, Gynecology, and Reproductive Sciences
The Medical Scientist Training Program (MSTP) provides an opportunity for medical students interested in a biomedical research career to undertake doctoral work at either the University of Pittsburgh or Carnegie Mellon University in basic science, engineering, or public health. After two years of medical school, students complete PhD work before returning to medical training. Both degrees are completed in an average of seven to eight years. The program, funded by a grant from NIH with support from the Office of the Dean, offers full tuition and a yearly stipend.

In 2018, Pitt said farewell to 11 of these budding physician-scientists, who have matched to some of the most prestigious residency programs in the nation. Including the 14 new students beginning their first year of medical school in 2018, Pitt’s MSTP has 83 students currently—big enough to maintain a lively and diverse group dynamic. In the 2018–19 academic year, MSTP maintains its highest level of NIH support since its founding 30 years ago, with 20 Pitt MD/PhD students funded by NIH per year.

MSTP GRADUATE IS ON MIT’S TOP INNOVATORS LIST

As she prepared for her final year in Pitt’s Medical Scientist Training Program in summer 2017, Shinjini Kundu made some Internet waves with a well-received TEDx talk called “Artificial Intelligence Can Change the Future of Medical Diagnosis.” In the video, Kundu explores a medical future in which machine learning and artificial intelligence allow physicians to glean knowledge from medical images and thereby predict and prevent disease to an extent previously unimaginable. Kundu summarizes the research, including her own innovations, that indicate this is indeed possible.

Kundu has been working to make that future a reality. During her time in the MSTP, she earned a PhD in biomedical engineering at Carnegie Mellon University and created an artificial intelligence system that analyzes biomedical images to find patterns undetectable to the naked eye. In 2018, her innovations caught the attention of MIT Technology Review, which named her to its prestigious annual list of 35 Innovators Under 35.

Kundu’s technique, transport-based morphometry (TBM), is based on the mathematics of optimal mass transport and enables fully automated, data-driven analysis and statistical results that are easily interpreted biologically. She and her colleagues have used TBM in a variety of clinical applications, including osteoarthritis, which traditionally can’t be diagnosed until symptoms manifest and irreversible damage is visible on X-ray. According to their results, TBM enables detection of osteoarthritis three years in advance of symptoms with 86 percent accuracy based on the appearance of cartilage on knee MRIs.

As a graduate student, Kundu was inspired by the powerful effect that engineers could have on patient care. Now an MD/PhD Pitt graduate and a resident in diagnostic radiology at Johns Hopkins Hospital in Baltimore, she aims to become a leading expert in biomedical imaging technology by combining patient care with her passion for imaging technology and signal processing research.

PITT’S 2018 MSTP GRADUATES AND THEIR RESIDENCY MATCHES:

D. WONJAE CHUNG, MD, PHD
Residency Match: Psychiatry, UPMC Medical Education, University of Pittsburgh
Mentor: David Lewis, MD, Distinguished Professor, Thomas Detre Professor, and Chair of Psychiatry

JARED L. MOREINES, MD, PHD
Residency Match: Internal Medicine, Yale New Haven Hospital, New Haven, Conn.
Mentor: Anthony Grace, PhD, Distinguished Professor of Neuroscience; Professor of Psychiatry and of Psychology

XUAN DING, MD, PHD
Residency Match: Internal Medicine, Vanderbilt University Medical Center, Nashville, Tenn.
Mentor: Kang Kim, PhD, Associate Professor of Medicine, Division of Cardiology; Associate Professor of Bioengineering

TAYLOR J. EDDENS, MD, PHD
Residency Match: Pediatrics, UPMC Medical Education, University of Pittsburgh
Mentor: Jay Kolls, MD, Adjunct Professor of Medicine; Professor of Medicine and of Pediatrics, Tulane University School of Medicine

MATTHEW A. GERAMITA, MD, PHD
Residency Match: Psychiatry, UPMC Medical Education, University of Pittsburgh
Mentor: Nathan Urban, PhD, Professor of Neurobiology

SHINJINI KUNDU, MD, PHD
Residency Match: Diagnostic Radiology, Johns Hopkins Hospital, Baltimore
Mentor: Gustavo Rohde, PhD, Professor of Electrical and Computer Engineering, Carnegie Mellon University

JOHANNES C. KUTTEN, MD, PHD
Residency Match: Anesthesiology, University of Massachusetts Medical School, Worcester
Mentor: Jeffrey Isenberg, MD, MPH, Associate Professor of Medicine and of Pharmacology and Chemical Biology; Associate Professor of Bioengineering

EMILY M. ROSENBERGER, MD, PHD
Residency Match: Internal Medicine, UPMC Medical Education, University of Pittsburgh
Mentor: Mary Amanda Dew, PhD, Professor of Psychiatry, of Epidemiology, of Biostatistics, of Psychology, and of Clinical and Translational Science

BENJAMIN B. ROTHRAUFF, MD, PHD
Residency Match: Postdoctoral Fellow, University of Pittsburgh
Mentor: Rocky Tuan, PhD, Distinguished Professor of Orthopaedic Surgery

BO WANG, MD, PHD
Residency Match: Ophthalmology, Johns Hopkins Wilmer Eye Institute, Baltimore
Mentor: Joel Schuman, MD, Adjunct Professor of Ophthalmology; Chair, Department of Ophthalmology, New York University
Award-Winning MSTP Research Projects

On average over the past six years, Pitt MSTP students have coauthored six scientific publications (three as first author) by the time they graduate. 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, and 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. In recent years, roughly half of Pitt’s MSTP students have earned NIH grants.

F30 Awards to Current MSTP Students:

**HEATHER ACUFF**
Structural-Functioning Relationships: a Multimodal Neuroimaging Approach to the Study of Children and Adolescents Genetically at Risk for Bipolar Disorder
National Institute of Mental Health
Mentor: Mary L. Phillips, MD, Pittsburgh Foundation-Emmerling Professor of Psychotic Disorders, Department of Psychiatry

**MIRANDA CULLEY**
Frataxin Loss Induces Endothelial Dysfunction To Promote Pulmonary Hypertension
National Heart, Lung, and Blood Institute
Mentor: Stephen Chan, MD, PhD, Associate Professor of Medicine, Division of Cardiology

**JARED KOPELMAN**
Examining the Role of EAAT3 in OCD-like Behavior
National Institute of Mental Health
Mentor: Susanne E. Ahmari, MD, PhD, Assistant Professor of Psychiatry

**ANDREW LAMADE**
Targeting Mitochondrial PARP1 in Neuronal Ischemia-Reperfusion Injury
National Heart, Lung, and Blood Institute
Mentor: Hülya Bayır, MD, Professor of Critical Care Pediatric Research and Professor of Critical Care Medicine

**OTHER NOTABLE AWARDS TO MSTP STUDENTS:**

**ATINUKE DOSUNMU-OGUNBI**
2018 Minority Medical Student Award, American Society of Hematology
Mentor: Enrico Novelli, MD, MS, Associate Professor of Medicine, Division of Hematology/Oncology

**MARIA LY**
American Association for Geriatric Psychiatry Scholar Award
Mentor: Howard Aizenstein, MD, PhD, Charles F. Reynolds III and Ellen G. Deliysken Professor of Geriatric Psychiatry; Professor of Bioengineering; Professor of Clinical and Translational Science

**TOLANI OلونISAKIN**
American Heart Association Predoctoral Fellowship
Role of Thrombospondin-1 in Platelet-Mediated Protection during Pseudomonas aeruginosa-Induced Injury
Mentor: Janet Lee, MD, Professor of Medicine, Division of Pulmonary, Allergy, and Critical Care Medicine

RESEARCH FELLOWSHIPS SEND MSTP STUDENTS TO TOP FRENCH LABS

Thanks to fellowships from the Embassy of France, two Pitt MSTP students will pursue unique research experiences in France in 2018-19. The Chateaubriand Fellowship allows outstanding PhD students from American universities to conduct research in France for up to nine months.

MD/PhD students Gaelen Dwyer and Laura Molina began their PhD studies in 2017, after completing the first two years of medical school. Before embarking upon the final two years of medical school, each will spend four years in the laboratory completing PhD thesis research. Dwyer is a microbiology and immunology student in the laboratory of Héthurniquist, PhD, associate professor of surgery and of immunology. In France, she’ll work with cytokine signaling expert Jean-Philippe Girard, PhD, director of the Institute of Pharmacology and Structural Biology at the University of Toulouse and senior research director at France’s Institute of Health and Medical Research (Inserm). Dwyer will explore proteomic techniques and apply them to her own research on cytokine signaling networks in graft-versus-host disease.

Molina’s graduate work is in the med school’s cellular and molecular pathology program. She works in the lab of Satdarshan (Paul) Monga, MD, who holds an endowed chair as Professor of Experimental Pathology and has a secondary appointment as professor of medicine.

Molina is studying how developmental signaling pathways contribute to pediatric liver disease. With the support of the Chateaubriand Fellowship, she’ll work in France with Jessica Zucman-Rossi, MD, PhD, a world-renowned expert in the study of liver tumors and leader of Inserm’s research team exploring the functional genomics of solid tumors. Molina will gain valuable experience with computational biology techniques and apply them to the study of liver cancer.

Chateaubriand fellows are selected through a merit-based competition involving expert evaluators in both countries. Between 40 and 50 students in science, technology, and health fields are accepted annually, plus several more in the humanities and social sciences. The program allows top American doctoral students to initiate or reinforce collaborations, partnerships, or joint projects between French and American research teams. This fellowship is offered by the Office for Science and Technology of the Embassy of France in partnership with American universities, the National Science Foundation, and French research organizations.
Since 1998, the School of Medicine has celebrated its incoming class with a ceremony marking their entrance into the medical profession. In what has become a rite of passage, the students are bestowed a crisp white coat (donated by the Medical Alumni Association) and lots of congratulations. This year, the August ceremony, held at Carnegie Music Hall of Pittsburgh, was positively resplendent.

Seen at the affair: members of the Pittsburgh Ballet Theatre, the Pittsburgh Symphony Orchestra, and Pittsburgh Opera companies (all of whom performed); Dean Arthur S. Levine and other Pitt Med luminaries; KDKA-TV news anchor Susan Koeppen (who relayed the story of how two Pitt medical students helped save her life in 2011—lifesavers Vanessa Franco and Ranmal Samarasinghe, both MD/PhD Class of 2012, joined her at the event); and ceremony hosts and main sponsors orthopaedic surgery chair Freddie Fu, MD, and Hilda Pang Fu.

But the real stars of the show were the 162 matriculating students. We invited them to take turns posing as Pitt Med cover models at our pop-up photo booth. We’re only able to show a few shots here. But as you’ll see on these pages, the docs-to-be didn’t want to leave out the people who helped them get this far. Among our most popular tag lines: “Hi Mom!”
A great deal of learning happens in student group sessions, where students give presentations on the medical science behind their patients’ health concerns and also reflect on the patient experience. The variety of medical conditions and individual patient circumstances that each student encounters make for dynamic discussion. “It’s giving students real insight into how it is to deal with the medical system...which is something that makes every kind of physician a more effective physician,” says Maier. At its best, the program helps med students imagine what kind of doctors they want to be.

Interprofessional Care

All health professionals—physicians, surgeons, scientists, dental specialists, nurses, pharmacists, and many others—share the fundamental and sacred duty to care for and heal the patient. With so much expertise spread across so many individuals, it’s become clear that patients are served best by interprofessional teams working in multidisciplinary collaboration.

That’s why interprofessionalism is fundamental to all health sciences education at the University of Pittsburgh. First-year medical students learn this in their first months on campus when they participate in the Interprofessional Forum with their peers from the Schools of Nursing, Dental Medicine, Pharmacy, Public Health, and Health and Rehabilitation Sciences.

Throughout their med school experience, students learn that faculty clinicians and students move easily among all six Schools of the Health Sciences, frequently coming together to care for patients in the clinical facilities of UPMC.

MEDICAL SCHOOL ISN’T JUST FOR MDS

In addition to nearly 600 students in the MD program, more than 300 students are pursuing PhD degrees in programs like neuroscience, biomedical informatics, computational biology, molecular biophysics and structural biology, and clinical and translational science.

The Interdisciplinary Biomedical Graduate Program (PhD) combines a core curriculum with research and a dissertation focused on a choice of cell biology and molecular physiology, cellular and molecular pathology, molecular genetics and developmental biology, or molecular pharmacology.

The cross-campus Center for Neuroscience Graduate Training Program (PhD) introduces students to the fundamental issues and experimental approaches in neuroscience and trains them in the theory and practice of laboratory research.

The Biomedical Informatics Training Program (PhD, MS, or certificate) applies modern information technology to health care, education, and biomedical research.

Offered by the University of Pittsburgh and Carnegie Mellon University, the Joint Program in Computational Biology (PhD) is designed to develop expertise in the use of computational methods to identify and solve complex biological problems.

The interdisciplinary Molecular Biophysics and Structural Biology Graduate Program (PhD) trains students in a broad range of cutting-edge technologies used to study the function of biological macromolecules in physical terms and covers a diversity of research topics in molecular biophysics and structural biology.

The goal of the Integrative Systems Biology Program (PhD) 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 large data sets, and the emergence of 21st century clinical translation.

The Program in Microbiology and Immunology (PhD) aims to train highly motivated graduate students as self-reliant scholars in an environment with ready access to the breadth of expertise, approaches, and sub-disciplines that constitute the diverse fields of microbiology and immunology.

The Biomedical Master’s Program (MS) is designed for students who desire additional training, mentoring, and advising to strengthen their academic and professional credentials for admission to health professional schools or for entry into the biomedical workforce.

Among offerings from Pitt’s Institute for Clinical Research Education (ICRE) are programs in Clinical and Translational Science (PhD), Clinical Research (MS), and Medical Education (MS).
The School of Medicine operates on a global stage, with active collaborations connecting Pittsburgh with China, Colombia, France, Ghana, Honduras, India, Italy, Kazakhstan, Malawi, the Philippines, Vietnam, and many other nations.

On Pitt’s campus, 2018–19 is the Year of PittGlobal, as declared by the Office of the Provost. As we celebrate the University being at home in the world and highlight its position as a global convening point, the School of Medicine is happy to provide a few global updates of its own (in addition to those on pages 7, 21, and 29).

In 2012, Pitt’s School of Medicine was selected to guide the Republic of Kazakhstan’s Nazarbayev University (NU) as it established its own medical school. The Nazarbayev University School of Medicine now approaches a major milestone as the very first class of physicians is set to graduate in the spring of 2019.

The school’s mission is to educate physician-scientists to become this Central Asian nation’s next leaders in health care, medical education, and biomedical research. Pitt has worked with NU to institute a U.S.-style curriculum; design and develop teaching facilities; recruit and train 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 Kazakhstan and around the globe. The NU School of Medicine welcomed its first class in 2015 and began accepting international students in 2017.

A partnership that includes UPMC, Pitt, 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.

Since 2008, a similar public-private partnership known as Ri.MED (Ricerca Mediterranea or Mediterranean Research) has provided an innovative approach to advanced research training of highly talented early-stage investigators from Italy at the University of Pittsburgh, initially through a postdoctoral fellowship program and, later, as Pitt research associates and research faculty.

Under the guidance of scientific director Dario A.A. Vignali, PhD, Frank Dixon Professor of Cancer Immunology and vice chair of immunology, Ri.MED held its most recent annual symposium in Palermo, on the theme of cancer immunotherapy.

A PARTNERSHIP THAT INCLUDES UPMC, PITTSBURGH, 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.
Shivdev Rao, MD, Class of 2007

While an undergrad at Carnegie Mellon University, Shivdev Rao was a skateboarder and social history major, interested in philosophy and headed toward an academic career in the humanities.

Then he went to a lecture by architect William McDonough. McDonough told the story of Govindappa Venkataswamy, an Indian eye doctor who founded one of the largest ophthalmology hospital networks in the world and restored more than 2 million people’s sight for free. Venkataswamy achieved this by designing a swiveling surgical room resembling an assembly line, where he and his team could perform a cataract operation in 10 to 20 minutes, then quickly move to the next prepped patient.

McDonough’s philosophy, that “design is the first signal of human intention,” spoke deeply to Rao. “He inspired me to think about how I want to impact people,” says Rao, who then “pivoted” toward medicine. Rao (MD ’07) is now a clinical instructor in medicine at Pitt and executive vice president for UPMC Enterprises, the commercialization arm of the medical center.

Rao carries his ethos of influencing the world through design to his work at UPMC Enterprises. The unit invests in and builds technologies that do what Rao calls the “three As”: assist, augment, or automate aspects of health care delivery, with an immediate focus on UPMC’s $16 billion health care system.

This mission is newly evolved, says Rao. Enterprises—which has its colorful open-concept offices in Bakery Square—was originally called the Technology Development Center and focused largely on software-centered solutions for UPMC and elsewhere. The vision has broadened in recent years to include solutions based on everything from basic science to advanced analytics.

Rao says Enterprises’ “secret sauce” is access to UPMC’s 40 hospitals, 600 doctor offices, and 4,800 physicians, as well as its insurance plan; UPMC’s massive system constantly generates data and can function as a real-time feedback mechanism.

Still a practicing cardiologist, Rao takes weekly appointments at UPMC Magee-Womens Hospital and performs rounds at UPMC Presbyterian.

“Seeing patients always...informs me about some new nuance that I can bring here [to Enterprises],” he says.

At Enterprises, Rao focuses on solutions that “work backward” from patient care. Rao says the goal is to embrace higher-level ideas that would affect patient and provider experiences. These include artificial intelligence and its subsets like deep learning (wherein networks, with designs inspired by the structure of the brain, are capable of learning and sometimes making decisions from large datasets).

“Deep learning really sings in the imaging space, more than any other domain. Radiology, pathology, aspects of ophthalmology, and cardiology” will all benefit, says Rao.

For instance, a pathology system might filter for images with abnormalities and even make diagnostic suggestions based on the data to create an entirely new workflow. For perpetually overworked clinicians, Rao believes such technology would improve efficiency and help with decision-making. He emphasizes he doesn’t believe in “push-button” technology for diagnosis in the near future. Instead, he believes that “we can help doctors do better.” Through a partnership with Microsoft’s artificial intelligence labs, he envisions leveraging “technology to transform clinicians from overwhelmed and time scarce, to nearly omniscient and omnipresent healers.”

He says Enterprises is walking a path toward wholly person-centered health care, where every patient controls his or her own data over vastly interconnected systems.

“We’re far from that,” says Rao. “But we have all the ingredients.”
Door to Door

Raul Ruiz, MD

Trained in Emergency Medicine at Pitt, Raul Ruiz returned to his roots in California and now serves in the U.S. House of Representatives.

Raul Ruiz was 17 when he banged out a contract on a manual typewriter, polished his dress shoes, borrowed a briefcase, and bought an itchy navy suit two sizes too big. “I wanted one to grow into as an investment for medical school interviews,” he explains.

Then he proceeded to walk door-to-door in the hot desert sun, talking to business owners and store clerks alike. In exchange for his neighbors’ financial support, Ruiz stipulated that he would earn an MD and return to his underserved Southern California community. “This was my life goal and mission,” says Ruiz. “I was inviting people to invest in their future.”

Ruiz never aspired to elected office, but for a kid raised in a trailer and coached to offer solutions, not complaints, the trajectory seems inevitable. Born in Mexico, Ruiz was reared by an aunt and uncle, migrant farm laborers who worked the fields of California’s Coachella Valley. The family couldn’t afford health insurance, yet that wasn’t the biggest obstacle to accessing medical care. The region had just one doctor for every 9,000 residents. No matter where Ruiz turned, it was hard to miss the desperate medical needs of his neighbors in the low-income, predominantly agricultural, and increasingly Latino community.

With pledges of support from his neighbors plus $2,000 in hand, Ruiz attended UCLA, graduated magna cum laude, and earned three graduate degrees from Harvard (an MD, as well as master’s degrees in public policy and public health). He did a few stints abroad as a public health worker in Mexico, El Salvador, and Serbia; completed his emergency medicine residency at Pitt; and returned home in 2007. Ruiz was elected to the U.S. House of Representatives in 2012 and reelected in 2014, 2016, and 2018.

“My heart and soul were in the community,” he says, “with my patients, with the people in the greatest need for health care and facing the greatest barriers. When we live in a society that is healthy and productive, we all benefit. The bottom line of a health care system is to produce a healthy population. That’s how we should measure our success in health care.”

“MY HEART AND SOUL WERE IN THE COMMUNITY, WITH MY PATIENTS, WITH THE PEOPLE IN THE GREATEST NEED FOR HEALTH CARE AND FACING THE GREATEST BARRIERS. WHEN WE LIVE IN A SOCIETY THAT IS HEALTHY AND PRODUCTIVE, WE ALL BENEFIT. THE BOTTOM LINE OF A HEALTH CARE SYSTEM IS TO PRODUCE A HEALTHY POPULATION. THAT’S HOW WE SHOULD MEASURE OUR SUCCESS IN HEALTH CARE.” — RAUL RUIZ, MD
**Alumnae Address Race, Bias, and Otherness in Medicine**

The School of Medicine diversity office—over the decades led by William Wallace, Carolyn Carter, Nancy Washington, Paula Davis (who is now assistant vice chancellor for diversity), and, for the past several years, Chenits Pettigrew—has been home base for generations of students seeking friendship, guidance, and assurance that they belong. In April, Pitt Med hosted a dialogue with Pitt alumnae who are now diversity and inclusion officers at schools and hospitals around the country. Current med student Nia James, who is president of Pitt’s Student National Medical Association, moderated the conversation that touched on the stakes of unconscious bias, student dilemmas, and what’s working well at their institutions.

### A DIALOGUE ON DIVERSITY AND INCLUSION

| **NJ:** Is there a part of your job that surprises you? |
| **MLP:** I need to continue to check myself about where my bias lies. |
| **SH:** Lots of schools have made it pretty far being well intentioned. To really continue to push issues forward, there need to be standardized ways of accomplishing things—and metrics for evaluation. |
| **MM:** I am often surprised that not everyone believes in the importance of diversity in the healthcare workforce, especially given that the population of the patients that we are caring for is becoming increasingly diverse. |
| **NJ:** What is trending in the world of diversity and inclusion offices? |
| **SBB:** There is a significant conversation that’s ongoing around supporting learners and faculty with disabilities. The idea that you have to be perfect is a real barrier to both seeking wellness and seeking accommodation. |
| **SH:** Students are coming in with more experience dealing with social justice. Think about the key events that took place in their formative years with Trayvon Martin and the inappropriate deaths of black males. This has been in their lives for as long as they remember, and it’s really hard as faculty to keep in mind that they do think about things differently. We’re going to have to bridge that gap, because they’re going to continue to want to talk about it. |
| **MM:** We’ve been seeing an uptick in patients who display biases against our students and physicians for a variety of reasons, whether it’s because they belong to a certain racial group, ethnic group, gender group, or sexual identity group. Now we are working to develop standards to educate and empower our students to combat the biases they are facing. |

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**Sherri-Ann Burnett-Bowie**  
(MD ’97) Associate Director, Center for Diversity and Inclusion, Massachusetts General Hospital Faculty Assistant Dean, Student Affairs, Assistant Director, Office of Recruitment and Multicultural Affairs, Harvard Medical School

**Nia James** (Class of ’21), President, Student National Medical Association, University of Pittsburgh

**Margaret Larkins-Pettigrew**  
(MD ’94, Res ’98) Director and Endowed Professor, Center for Clinical Excellence and Diversity, University Hospitals Cleveland Medical Center

**Mia Mallory** (MD ’94) Associate Dean of Diversity and Inclusion, University of Cincinnati College of Medicine

**Stephanie White** (MD ’08) Diversity Liaison for Student/Resident Advising, Geisel School of Medicine at Dartmouth College

From top: Burnett-Bowie (SBB), James (NJ), Larkins-Pettigrew (MLP), Mallory (MM), White (SH)
**SW:** If faculty members hear their students encountering something, they need to speak up for them at the time and not just ignore it, because that can be very demeaning. Students are in a difficult place because, in most situations, their grades and evaluations depend on their actions, and they don’t necessarily know what the attending would think if they verbalized their concerns.

**N.J. Are there challenges that may be more significant than what you already listed?**

**MLP:** I still feel that we can talk about all the “isms” that exist in our world today—as it relates to our LGBT population, our women—but at the end of the day, the people who are dying in my field [obstetrics and gynecology] are black women and black babies. Part of our responsibility is to recognize that unconscious bias does kill, and it can kill at the bedside.

**SBR:** Physicians and health care providers—not just physicians—sometimes need convincing that we have bias because there’s such empathy that’s inherent in the choice to provide relief of suffering. Sometimes people make the mistake of thinking, I can’t be biased because I’m in this pursuit… There is so much upheaval in our geopolitical context that it’s a hard time to be a student who is concerned about social justice. I have sent out e-mails about what I think are really heartbreaking national tragedies—after Charleston [church massacre], after Orlando [gay nightclub massacre]—where I share that I’m struggling with what has transpired, and that I would anticipate that they would be struggling as well, and that there are resources here to help them.

**SW:** Students really want change, like, yesterday. They are much more social-justice minded, and they’re pushing academic medicine educators to think about how we’re doing everything within the classroom, clinics, and medical school environment.

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Pitt’s Tsinghua Scholars, Class of 2018

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A highly innovative global partnership connecting the University of Pittsburgh School of Medicine with the top science and technology university in all of China reached an important milestone in 2017. That summer, 13 Chinese medical students who previously spent two years in Pittsburgh as part of Pitt’s Tsinghua Scholars Program graduated from the Tsinghua University School of Medicine and became the first Pitt-Tsinghua Scholars to earn their medical degrees. Initiated in 2012 to elevate the training of Chinese physician-scientists, the Tsinghua Scholars Program allows medical students at this most prestigious of Chinese universities to undergo a rigorous, two-year biomedical research training program in Pittsburgh.

Yigong Shi, PhD, the vice president of Tsinghua University who left an endowed professorship at Princeton University to return to his native China in 2008, explained the rationale for the program: “The traditional teaching method in China emphasizes passive listening and memorization. Students seldom raise critical questions and comments. I have been advocating for active learning in the classroom ever since I returned to China …. The strength of the Chinese educational system is clear: Students receive comprehensive and sound knowledge in mathematics and natural sciences. The weakness is also evident: The system does not encourage innovation!”

The historical agreement between Pitt and Tsinghua University has been renewed for a second five-year term. The Tsinghua Scholars program currently has 92 alumni and 41 active scholars on Pitt’s campus, where they work in the laboratories of some of Pitt’s most accomplished biomedical researchers.

Also in 2012, the School of Medicine began a collaboration with China’s prestigious Central South University Xiangya School of Medicine. Under the 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 clerkships. As of November 2018, 25 of these medical students are on campus, and 11 have recently returned to Changsha to graduate from medical school after their two years in Pittsburgh. In 2014, Xiangya Hospital formed a partnership with UPMC to establish an international medical center, which has improved access to high-quality care for patients in the region since opening in 2015.

Building on the successful collaboration, Pitt and Tsinghua are considering the formation of a combined MD/PhD program, which would be modeled after the highly successful Medical Scientist Training Program at Pitt and other U.S. medical schools. If implemented, it would be China’s first such dual-degree program.