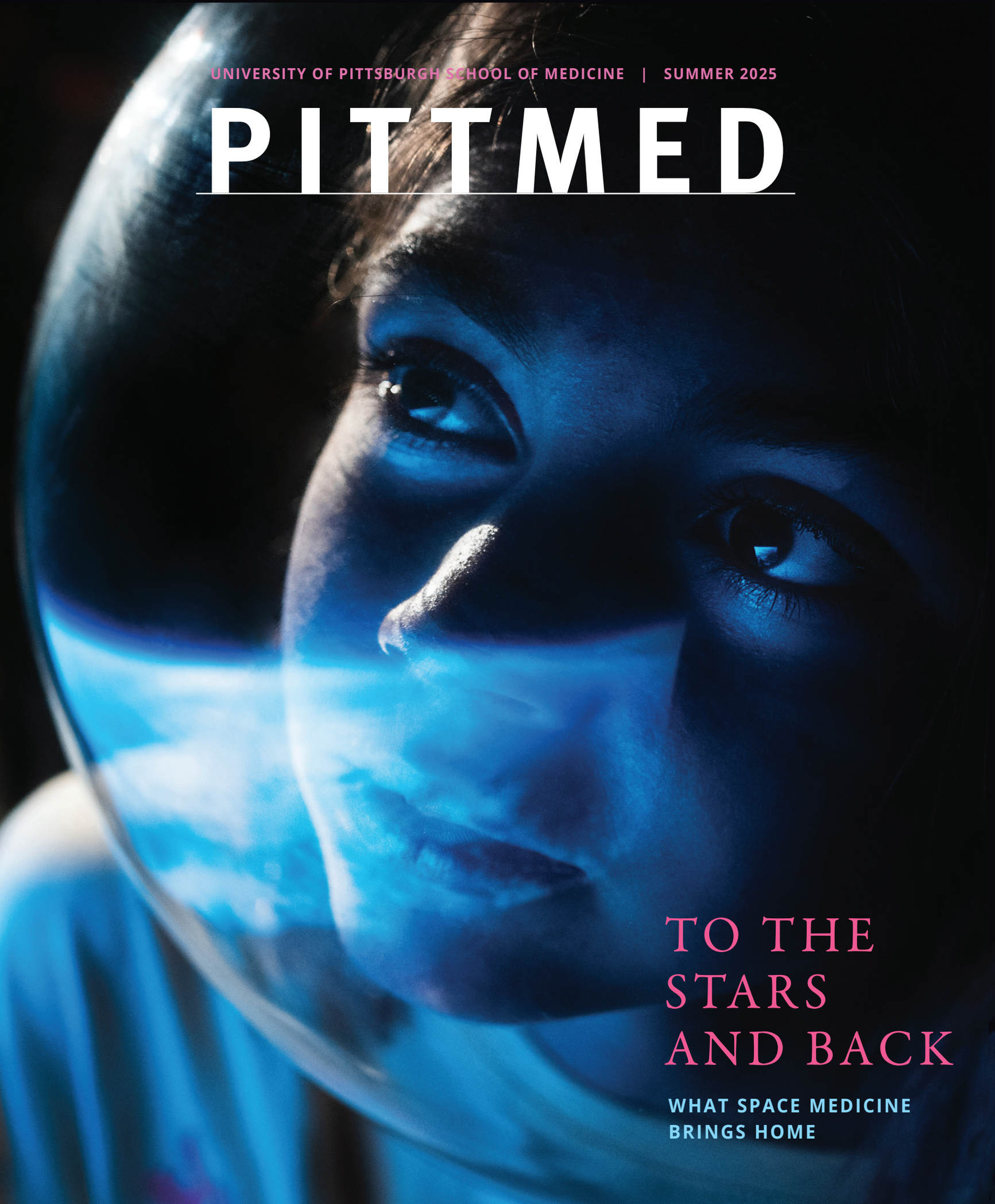
UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE | SUMMER 2025

PITTMED



TO THE STARS AND BACK

WHAT SPACE MEDICINE BRINGS HOME

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CORRECTIONS/CLARIFICATIONS
In our Spring 2025 issue, on page 7, we credited Aimee Obidzinski as the photographer. Rayni Shiring took the photo. In addition, on page 11, we misspelled dynorphin.

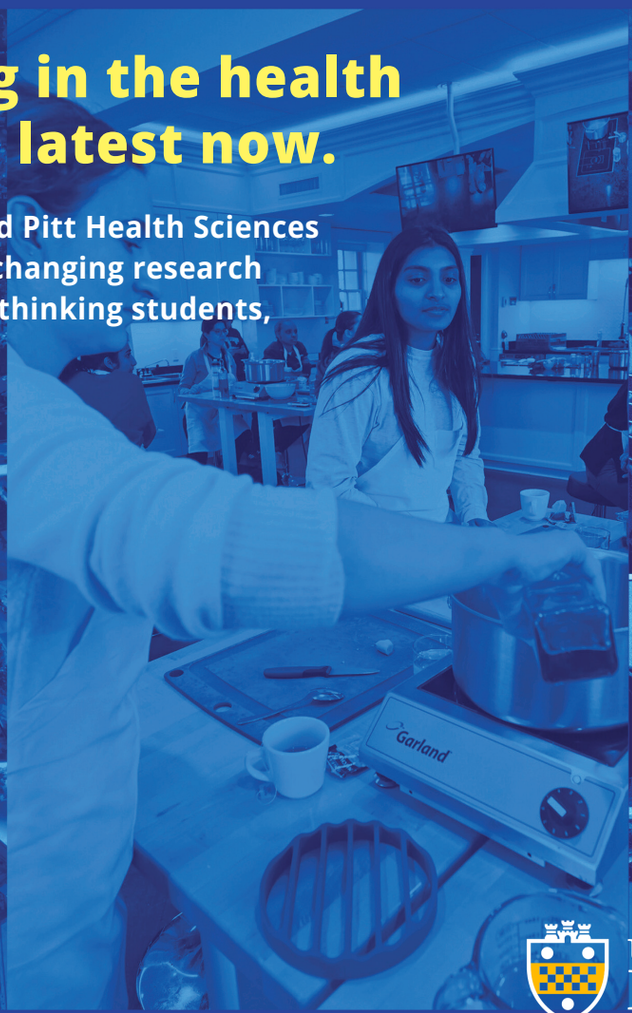
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The heavens, unfastened and open

"and suddenly I saw
the heavens
unfastened
and open,"
—*Pablo Neruda*



AIMEE OBIDZINSKI/UNIVERSITY OF PITTSBURGH

Dear Pitt Med Readers,

More than 400 years after Galileo Galilei first observed individual stars of the Milky Way through a telescope, gazing at the night sky on a clear, dark night still inspires a profound sense of wonder. That holds true for the researchers here at the University of Pittsburgh who have ventured into the growing field of space biomedicine. Some of them are driven by the thrill of solving biomedical challenges that cosmic journeys pose for humans; some find the prospect of contributing to voyages into the great unknown irresistible in itself.

What they all share is a belief that space research won't only benefit those who step aboard spacecraft. As you'll read in our cover story, when we explore how to help people safely travel into space, it also sheds more light on our understanding of what patients face on Earth. Even though the space environment is foreign to what we experience here, our researchers are finding that it offers accelerated models of common health challenges like bone loss, cancer risks and mitochondrial dysfunction—and can point to new avenues to counteract them.

Others here at Pitt are shooting for the stars in other ways. In this issue's "Research matters" roundup (page 10), you'll learn about the many ways that scientific investigations have made a true difference for the health of patients, families and our region at large. I hope you'll take time to read the testimonials from community members; their words drive home how personally meaningful the results of scientific work can be.

When researchers keep the human element in front of their science, their work takes on a greater meaning. A striking example of that can be found in "A delicate dance" (page 25). It tells the story of a new mother who, after suffering a maternal stroke, said she felt "truly seen and heard by a doctor" in the United States for the first time when she received care from Eliza Miller, who is now a professor here at Pitt. Dr. Miller and her colleagues are bridging the gap between neurological and reproductive health for women.

Whether a researcher's ambitions look beyond the Earth's atmosphere, within our own city's clinics or through a microscope, that pursuit doesn't just expand knowledge—it extends hope to those who need it most.

Anantha Shekhar, MD, PhD
Senior Vice Chancellor for the Health Sciences
John and Gertrude Petersen Dean, School of Medicine

PITTMED

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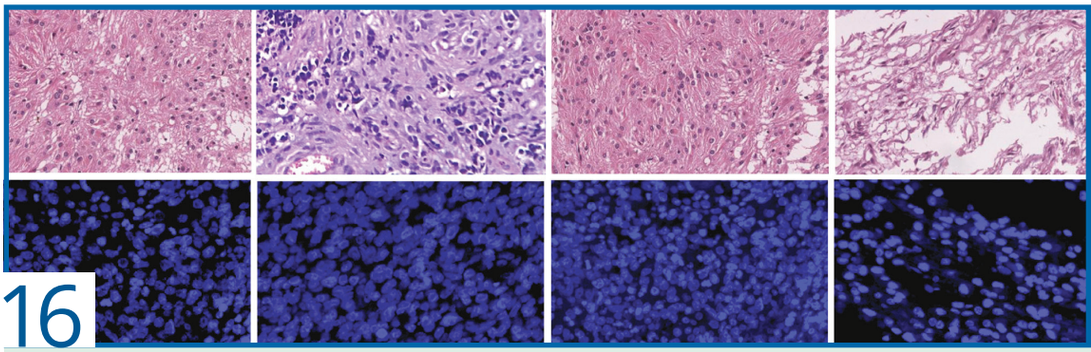
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“Brain cancers in children are very diverse with many, many different tumor types.”

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Why do hiccups happen?

Editor’s note: School of Medicine faculty with clinical duties typically have joint appointments with UPMC or the VA Pittsburgh Healthcare System, the University’s clinical partners.

ABOUT THE COVER At Pitt, space medicine is pretty down to earth. © Getty Images/A. Martin UW Photography, 2025.

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Pitt has entered the latest space race in a big way. And as health sciences researchers strive to safely send humans deeper into the cosmos, they see plenty of ways their work will help patients here on Earth.

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The role of the brain in women's reproductive health is often overlooked. Pitt faculty like Eliza Miller and Page Pennell are bridging the gap through research and better training.

BY KAT PROCYK

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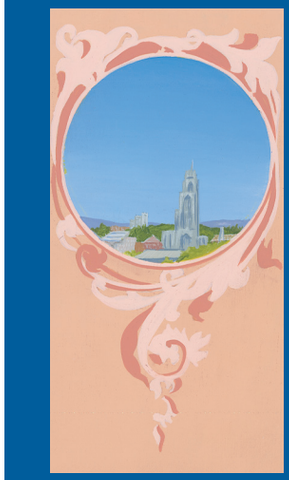
For graduates heading into residency, leaving Pitt Med is bittersweet. Five newly minted MDs reflect on their experience and look ahead to the next step in their careers.

BY MICHAEL AUBELE

CONTRIBUTORS

ALICE ARNOLD ("A delicate dance") is a photographer, educator and filmmaker whose work often begins with research. For her contribution to this issue, she allowed instinct and empathy to guide her. Arnold wanted to capture the quiet bond between a maternal stroke survivor and her son—and a mother's joy in being alive to raise her child after a life-threatening health crisis. Arnold teaches film and media at Hunter College, where she encourages students to approach storytelling with care and intuition and to recognize that images can reflect more than one perspective at a time.

KAT PROCYK ("A delicate dance" and other stories), a senior writer for the University of Pittsburgh School of Medicine, began her storytelling path writing about engineering before realizing she was more interested in medical innovations. With a background in journalism and public policy, she approaches every assignment as a learner first. "I always ask, 'Why does this matter? Convince me like we're having a real-world conversation,'" she says. She's drawn to moments that reveal something big—like a nervous smile in a simulation exercise or a professional dancer's decision to leave the field.





Pitt Health Sciences announced new major AI initiatives and partnerships this spring.

GETTY IMAGES

From sick care to health care

The United States spends more than $3 trillion annually on managing chronic diseases, yet the prevalence and cost of conditions like obesity, diabetes and Alzheimer's disease continue to rise. Early detection and prevention would not only help mitigate these costs but also lead to longer, healthier lives for patients.

A new patient-centric initiative from the University of Pittsburgh School of Medicine and Vizzhy, a global leader in artificial intelligence, aims to enable more proactive approaches to health and to reduce costs. The partnership was announced in May at a signing ceremony and symposium at the University Club. The work will be done through a new AI platform called GAINMED, which will use its own generative (like ChatGPT) and agentic (adaptable and proactive) intelligence to navigate "multiomics" data (genomics, proteomics, metabolomics, etc.). The platform will advance what's known as P5 medicine—care that's predictive, preventive, personalized, precision and participatory.

The initiative will also establish the Pitt-Vizzhy Longevity Labs, in partnership with the sequencing company Illumina, providing laboratory services to expand precision medicine across the United States and globally. By combining data analyzed at Pitt-Vizzhy Longevity Labs with AI, GAINMED will deliver comprehensive care plans, empowering clinicians and patients to make more informed and personalized treatment decisions.

The project's first phase involves recruiting 20,000 participants and 200-plus primary care providers worldwide to garner and sequence samples. Pitt-Vizzhy Longevity Labs will expand across Europe and Asia to support data collection and analysis. One long-term goal is to deliver top-tier health care to underserved populations. "We're using cutting-edge technology to create not only better understanding of diseases and health, but we're also going to be able to provide better care to maintain health," said Anantha Shekhar, senior vice chancellor for the health sciences and John and Gertrude Petersen Dean, School of Medicine.

Pitt Chancellor Joan Gabel said the effort marks an important moment for Pittsburgh—and for patients. "There are challenges that we're all facing, but none more so than those who should be given access to the most innovative ways to receive treatment and care."

Vishnu Vardhan, Vizzhy cofounder, chose Pitt to host GAINMED because of Shekhar's "bold" vision. "We were looking for a partner with not only a vision to transform health care, but with a reach to the top data scientists and doctors in the world to transform health care," Vardhan added. —*Kat Procyk*

FOOTNOTE

Pitt Med is being recognized for more than its research, education and care. Modern Steel Construction magazine highlighted Alan Magee Scaife Hall's West Wing expansion, designed by the firms Payette and MCF Architecture, as "showcasing a blend of architectural and engineering ingenuity." The write-up took note of the building's "complex geometry and dramatic cantilevers on a compact urban site." You can go to the magazine's website to do a digital jigsaw puzzle of the West Wing: **pi.tt/wwpuzzle**





ABOVE: At the Pitt-Vizzhy Longevity Labs and GAINMED ceremonial agreement signing: Dean Shekhar, Chancellor Gabel and the Vizzhy cofounders, Vishnu Vardhan and Harsha Vardhini. RIGHT: About 1,000 people attended the Pitt Med + AI: Transforming Global Health Symposium in person or remotely.

AI-powered partnership to boost disease detection

Pitt's Department of Pathology, recognized as one of the largest and among the best in the United States, analyzes more than 24 million pathology specimens across Pennsylvania each year.

The growing demand for timely, accurate diagnoses requires new tools to keep up. A $10 million partnership between Pitt and the technology company Leidos positions Pitt to lead the way in developing these artificial intelligence–powered tools.

Announced in April, the partnership will advance Pitt's Computational Pathology and AI Center of Excellence (CPACE). The first focus of the five-year partnership will be quicker detection of diseases, notably heart disease and cancer, reducing diagnostic turnaround times and enabling earlier, more effective care management.

Dean Anantha Shekhar, an MD, PhD, said digital pathology will become the "gold standard" for all pathology diagnoses during a joint announcement ceremony with Leidos in Alan Magee Scaife Hall's West Wing auditorium.

"When considering digital versus human pathology—led by highly trained and renowned pathologists—part of the challenge is that no matter how intelligent or experienced you are, it's impossible to retain all relevant information at the moment of diagnosis," Shekhar said. "This isn't going to only change how we think of pathology, but also the ability to collect this information longitudinally across millions of patients."

Liron Pantanowitz, an MD, PhD, MHA and the Maud L. Menten Professor and Chair of Pathology, said emerging technologies designed to augment clinical capacity make it possible for research advances to reach patients sooner and to personalize health care.

AI models can predict cardiovascular disease with nearly 90% accuracy by analyzing and correlating imaging and patient history, leading to early interventions that improve patient outcomes and reduce invasive procedures, saving patients more than $10,000 annually, according to Liz Porter, an MBA and president of Leidos' Health and Civil Sector.

Pitt's Hooman Rashidi, an MD, MS, associate dean for artificial intelligence in medicine, professor of pathology and executive director of CPACE, said Leidos' investment in CPACE will help patients in rural and other underserved areas receive the same early diagnosis and treatment plans as those living near top medical centers. *—KP*



Pantanowitz at CPACE

Pain experts join forces

Four major centers within the School of Medicine, which each approach pain research from a different angle, have now joined forces under the new Pittsburgh Pain Consortium. They're combining their shared expertise to identify new ways to treat and manage pain.

"We all do pain research at Pitt, but we didn't really interact with each other as much as we should or could," says Rebecca Seal, a PhD professor of neurobiology and researcher in the Pittsburgh Center for Pain Research. "We're now unifying under the Pittsburgh Pain Consortium all the pain research that's done at Pitt, and we're even trying to perhaps widen our scope."

The consortium's first undertaking was the inaugural Pain Day, which featured faculty presentations and a poster session about their latest research, Pain Challenge Awards from the Clinical and Translational Science Institute at Pitt, and a keynote speech from David Julius, a PhD of the University of California, San Francisco, School of Medicine and a 2021 winner of the Nobel Prize in Physiology or Medicine. The day's speakers weren't limited to Pitt: Experts from neighboring Carnegie Mellon University and Duquesne University also shared their recent advances.

Now is an exciting time to study pain management, says Benedict Alter, an MD, PhD assistant professor of anesthesiology and perioperative medicine and director of translational pain research in that department. Recent progress in the field, for example, has led to the first new class of drugs to treat pain to be approved by the FDA in more than 20 years. That means new opportunities for study and collaboration to understand how these drugs and others can best help patients. "To accelerate that process, we need interactions among everyone who's doing pain-focused research at every different level," Alter says. *—Andrew Doerfler*



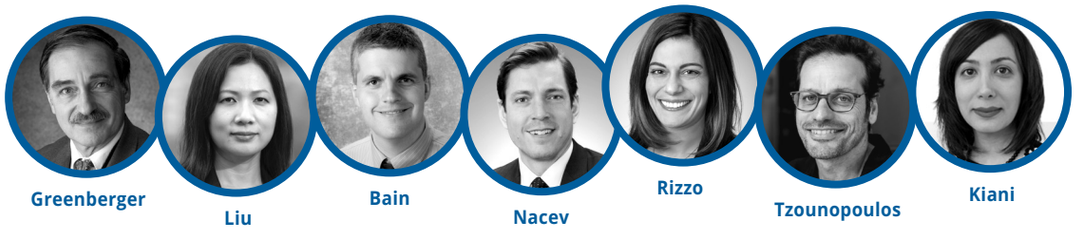




On May 18, Diploma Day, School of Medicine students, joined by jubilant friends and families waving flags, ringing cowbells and holding pictures, gathered at Soldiers and Sailors Memorial Hall and Museum to celebrate the culmination of their years of hard work. The school conferred 140 medical degrees, 66 doctoral degrees, 77 master's degrees and 18 certificates. This is Pitt Med's 138th graduating class. (Learn where the new MDs matched on page 32.)

Graduation photos by Rayni Shiring/University of Pittsburgh.

Faculty snapshots



Joel Greenberger and Yuan Liu have been elected a fellow and a senior member, respectively, of the National Academy of Inventors.

Greenberger is chair emeritus of the Department of Radiation Oncology. He's an MD and was the principal investigator on the University of Pittsburgh Center for Medical Countermeasures Against Radiation, which was one of four such centers in the United States. He now runs multiple other projects to develop radiation countermeasures. His collaborator Peter Wipf, of Pitt's Department of Chemistry, was also named a fellow.

Liu, a PhD, is an associate professor of medicine. She investigates small molecule therapeutic development targeting a protein degradation process (ubiquitin-dependent) in age-related diseases. Three patents have been issued on discoveries made by Liu, with many other patents pending.

William Bain, Benjamin Nacev and Alicia Rizzo received Young Physician-Scientist Awards from the American Society for Clinical Investigation. The award recognizes physician-scientists who are early in their first faculty appointment and have made notable achievements in their research.

All three are assistant professors of medicine. Bain, an MD, studies immunological responses to pathogens and injury in the lungs. Nacev, an MD, PhD, researches how some genetic alterations in chromatin regulators promote cancer and therapeutic approaches to combat it. Rizzo is an MD, PhD whose research focuses on the glycobiology of acute respiratory distress syndrome and sepsis.

Thanos Tzounopoulos received the Dr. Richard J. Bellucci Pioneer Award, recognizing outstanding contributions to hearing research. Tzounopoulos, a PhD, is the director of the Pittsburgh Hearing Research Center, Endowed Professor of Auditory Physiology and vice chair of basic science research in otolaryngology.

Tzounopoulos studies neurons, brain circuits and plasticity in the auditory system. He has identified mechanisms and potential drugs that can lead to new treatments for noise-induced hearing loss and tinnitus.

Samira Kiani, an MD associate professor of pathology, received the Presidential Early Career Award for Scientists and Engineers, among the highest honors that the U.S. government bestows upon scientists and engineers.

Kiani, an investigator of synthetic biology, gene therapeutics and other genomic tools, addresses challenges such as how to make technology like CRISPR safer in clinical applications. She also directs Tomorrow. life, which aims to advance conversations about science, technology and humanity through filmmaking and storytelling. *—Staff reports*



Myron Rolle was this year's Diploma Day speaker.

COURTESY JOHNS HOPKINS ALL CHILDREN'S HOSPITAL.

Overheard From the NFL to the OR

In 2008, **Myron Rolle** was coming off a banner year as a Florida State University football player. His junior season as a safety earned him All-American and All-ACC honors, a finalist nod for the Lott IMPACT Trophy honoring both athletic abilities and personal character, and plenty of interest from NFL scouts.

But Rolle's ambitions didn't solely lie on the football field. From a young age, he aspired to both make the NFL and become a neurosurgeon. And as he was contemplating his next step, he was offered a Rhodes scholarship to study medical anthropology at Oxford University—an opportunity he felt would make him a more well-rounded physician one day. Rolle accepted the scholarship, putting his gridiron dreams on hold.

"If I had to make it tomorrow, I'd make the same decision," Rolle says.

Although he believes the move damaged his draft stock, he was still selected by the Tennessee Titans in 2010. He later spent time with the Pittsburgh Steelers before making the jump to medical school.

Now an MD, Rolle will begin a position as an attending neurosurgeon at Nemours Children's Hospital in Orlando, Florida, in August. He served as the commencement speaker at Pitt Med's Diploma Day on May 18. In an interview, he shared some takeaways from his journey.

What from your experience in athletics have you applied to your medical ambitions?

Discipline, focus, hard work, communication. In the operating room, communicating to figure out how to optimize this setting for the most important person in the room—the patient—is critical.

Mitigating pressure, being coachable and knowing how to adapt and adjust [are also important to both fields]. When COVID hit, I went from being a brain surgeon to being an ER doctor, essentially. I had to learn all these different skills that I did not go into a Mass General Hospital neurosurgical residency to do. I was doing something completely different, but that's just like when a game plan changed from playing man to playing zone in the second half.

What advice do you have for soon-to-be residents who have passions outside of medicine?

I think the days of being in the hospital for 72 straight hours, not sleeping and not doing anything but the work—those days are antiquated. I think hospital systems, hospital care teams, families, even patients expect their providers to have a more robust and holistic experience of life that allows them to connect on a deeper level.

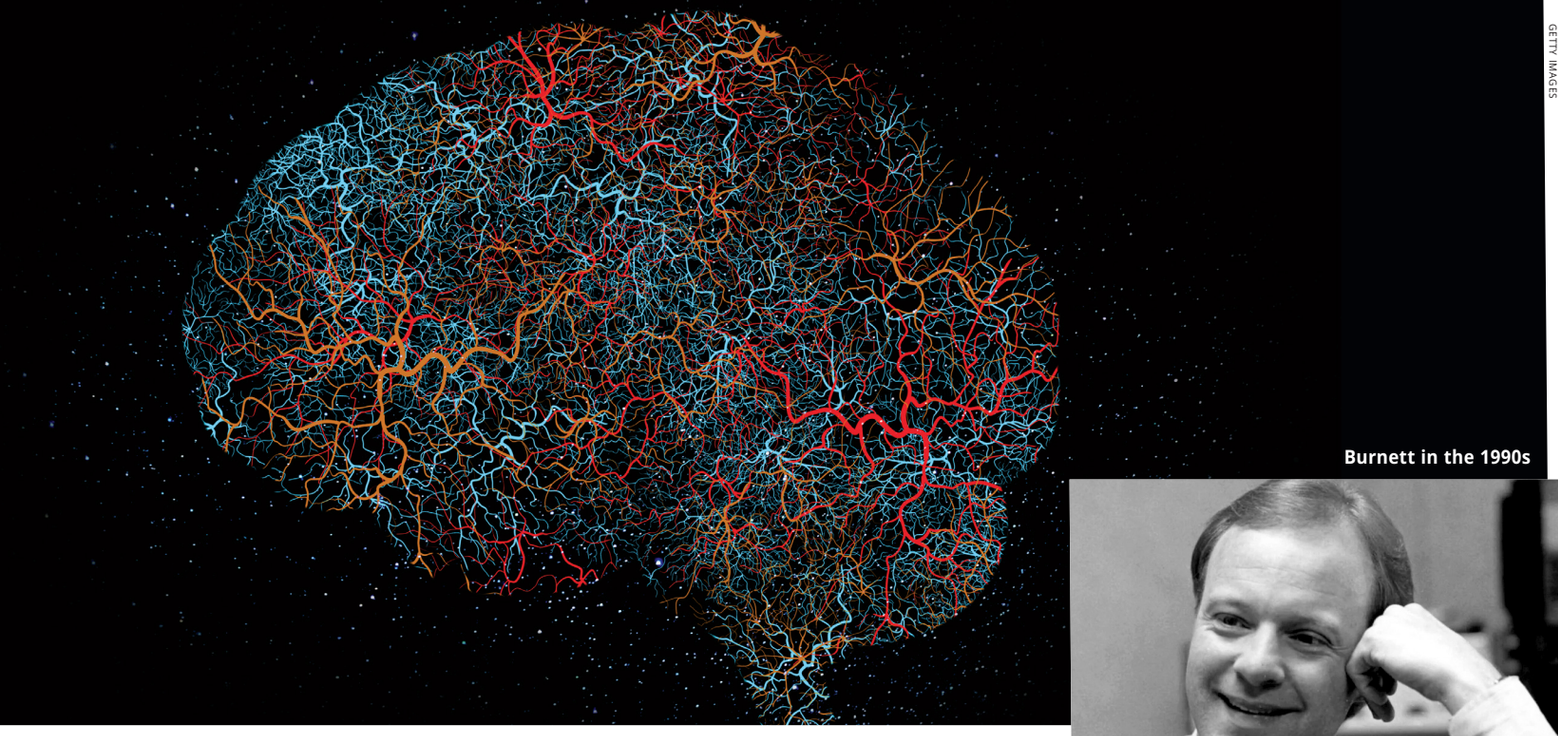
So, for the young graduates who will go on to save many lives, know that you have to fill your cup with the experiences that give you purpose and allow all of that to help you become a better provider, a more patient-centered provider.

Do any memories stand out from your time with the Steelers?

You could tell the Steelers organization is a family. A lot of former players will come back just to practice and hang around the facility. Pittsburgh had a different sort of profundity to its football love and its culture. That not only was within the locker room and the team but also spread to the whole community.

But my experience in Pittsburgh wasn't just with the Steelers. I did a subinternship at UPMC with the neurological surgery department in my fourth year of medical school. It was the hardest internship I've ever done. I was like, "These guys don't stop." I was impressed by the Pittsburgh residents on how well they handled not only complex cases but the volume of complex cases. Anyone who's willing to work, willing to learn from the best and not be sheepish about getting their hands dirty and getting thrown from the frying pan into the fire, then UPMC was the right place to be.

—Interview by Andrew Doerfler, which has been condensed and edited for clarity. Read an expanded conversation at pi.tt/myronrolle



GETTY IMAGES

Burnett in the 1990s

COURTESY KDKA-TV

BRAIN BANK PLEDGES NEARLY DOUBLE WITH JON BURNETT'S DONATION

For decades, thousands of Pittsburghers invited Jon Burnett into their homes almost every day. The longtime KDKA-TV talk show host and weather forecaster charmed audiences over the course of 36 years with his affability and willingness to take on stunts—like jumping out of an airplane. So it's no wonder that the poignant story he shared last year had a big effect on people. In February 2024, Burnett and his family announced his pledge to, on his death, donate his brain to Pitt's National Sports Brain Bank (NSBB), which launched in 2023. A former high school and college football player, Burnett received a diagnosis of suspected chronic traumatic encephalopathy (CTE) after dealing with health challenges that included a diminished short-term memory, a shuffling gait and weakened speech.

A CTE diagnosis can only be confirmed in an autopsy; Burnett's hope was that his gift would allow researchers to learn more about the condition. "I miss being able to start a conversation like ours and see it through to the end and feel like I've accomplished something," Burnett told his KDKA colleague Kristine Sorensen in a segment in February 2024.

As soon as that story ran, commitments to the brain bank began to surge, going from around 100 to 191 in a month, says Julia Kofler, NSBB director and an MD associate professor of pathology.

Burnett died in February 2025 at age 71. The news of his death spurred even more commitments to the brain bank. "His story is a testament to the impact of personal narratives in advancing scientific endeavors," Kofler says.

Soon, brain bank scientists expect to be able to conclusively determine whether Burnett had CTE. Regardless, his gift and those he has inspired will shed light on how traumatic brain injuries affect a wider variety of people.

"Most of what we know so far about CTE has been learned from examining the brains of professional football players," Kofler says. "We need to examine more brains from women, athletes from other sports and from nonprofessional athletes to better understand the disease risk in these populations." Learn more about donating at www.pitt.edu/nsbb. *—AD*

'Invisible wounds'

About a quarter of diabetic foot ulcers don't fully heal after a year. For some patients, the wound remains unhealed even though skin has regrown to cover the wound. In those cases, the new skin is not performing two of its most important jobs—to act as a barrier to pathogens and to keep enough moisture in.

Chandan Sen, director of the McGowan Institute for Regenerative Medicine at Pitt, calls these "invisible wounds." Sen, a PhD professor of surgery, and his team first observed such improperly healed wounds in pigs in 2014. These invisible wounds tend to reopen, he says. Yet, right now, doctors don't have a way of distinguishing whether a wound has healed properly, so they release patients from their care when the wound appears to have closed.

Newly published findings may change the standard of care for diabetic foot ulcers and give doctors a new metric for evaluating wounds. The stakes are high, as about one-third of people with diabetes will get foot ulcers. When the ulcers don't heal properly, patients may face amputation, which happens in about 20% of those cases.

Sen was the principal investigator on the National Institute of Diabetes and Digestive and Kidney Diseases multicenter Diabetic Foot Consortium transepidermal water loss (TEWL) study. The consortium published its results in the journal Diabetes Care in May.

While treating hundreds of patients with foot ulcers across the nation, TEWL clinical research teams incorporated something new: They measured water loss in the skin using a tool that's already on the market—but not designed specifically for wound care. They found that water loss, a mark of a defective barrier function, is followed by high rates of wound recurrence. Sen is now working to develop TEWL diagnostics as a biomarker of recurrence of chronic wounds.

"This has opened the door to a new era in diabetic wound care," says Sen. He would like to prevent amputation and related deaths by helping doctors provide additional care to patients until the wound has properly closed. *—Erica Lloyd*



Before they graduate, med students work with patient actors to learn to de-escalate in the clinic.

They can keep their cool when patients don't

For clinicians, complicated interactions with patients and their families are not an if, but a when. And a first-year physician, who has the least experience handling agitated patients and their family members, is usually the first called when a situation escalates.

Training in verbal de-escalation skills in med school is often less robust compared to other disciplines like nursing, says Jordan See, former educator at Pitt Med, now at the University of Pennsylvania. So in the moment, it's not uncommon for a young doctor to forget what they've learned.

"When you're in a situation like that, emotions are really high," says See, an MD, MS. "It's like being a deer in the headlights."

Since 2023, Pitt Med has taught the CALMER Conflict Curriculum, based on a mnemonic device developed by See with a team that included Reed Van Deusen, assistant dean for human simulation education and MD, MS associate professor of medicine, and Anna Donovan, an MD, MS associate professor of medicine. CALMER stands for calm tone and pace, acknowledge/agree, listen actively, mirror, empower with choices and responsibility. At Pitt Med, it's used in a simulation with a standardized patient (or SP)—someone who's trained to portray a patient or family member and their symptoms or behaviors.

Surveys have shown that students felt more confident after completing CALMER. Penn and the University of Wisconsin have adopted it.

In a recent session at Pitt Med, a group meets a patient's frustrated daughter. After a long drive to the hospital, she learned that her mother's procedure was rescheduled—leading to an extended hospital stay for the patient and a daughter at her wit's end.

When the facilitator announces the beginning of the simulation, the SP comes at the graduating med student full force with pointed fingers, a raised voice and a counterargument to proposed solutions.

The student offers a smile to the SP.

"Do you think this is funny?" the SP says back.

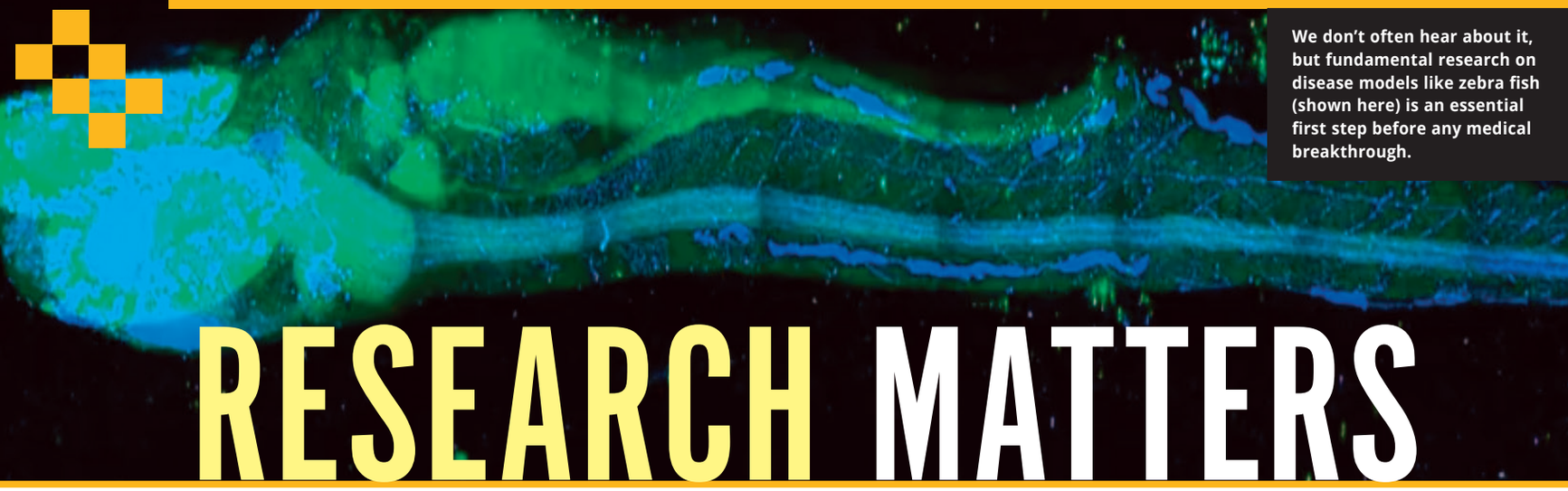
"Time!" calls the facilitator. The SP shuts down in the corner like a decommissioned robot.

"What could you have done better?" the facilitator asks.

The student checks in with peers and reflects, then acknowledges that his body language was defensive and his nervous smile was misread. They try again after another CALMER debrief. The student validates the SP by recognizing her long drive. The SP starts to give in—even offering some information about her mother's living conditions.

"Time," again calls the facilitator. "We're getting somewhere."

—By Kat Procyk, photo by Rayni Shiring



We don't often hear about it, but fundamental research on disease models like zebra fish (shown here) is an essential first step before any medical breakthrough.

RESEARCH MATTERS

DID YOU KNOW?

The University of Pittsburgh's research enterprise has profound human and economic impacts.

With about **400 clinical trials underway**, Pitt has capacity to help more than 250,000 participants.

Thousands of Pitt studies, 3,500 in the health sciences alone, are offering insight into health at both the clinical and more fundamental levels. This is where life-enhancing interventions start out.

Overall, the University's research activities generated, in fiscal year 2023, **$2.4 billion in economic impact** in Pennsylvania.

More than half of Pitt's staff work in roles that support research.

Pitt research supports and sustains **nearly 10,600 jobs in Pennsylvania**.

Hundreds of companies collaborate with Pitt faculty on more than 600 research projects of all types, including clinical trials, basic science and highly focused translational activities.

Pitt ranked No. 20 for granted utility patents among U.S. universities in 2024, according to the National Academy of Inventors. With 102 patents last year, Pitt innovators are translating their inventions into market-readys with tangible impacts, most in the health sciences.

The stature of the Health Sciences at Pitt continues to rise.

Research and development*

Of 914 U.S. universities in 2023:

Top 2% in externally funded research and development expenditures ($1.4B total, $1.2B in life sciences)

Top 10 in 3 life sciences categories

#6 in Life Sciences
#8 in Health Sciences
#9 in Biological and Biomedical Sciences

SOURCE: NATIONAL SCIENCE FOUNDATION HIGHER EDUCATION AND RESEARCH DEVELOPMENT SURVEY, 2023 DATA

Times Higher Education University World Rankings*

Top 6% in Medical and Health of 1,150 universities worldwide
Top 8% in Life Sciences of 1,143 universities worldwide

QS World University Subject Rankings*

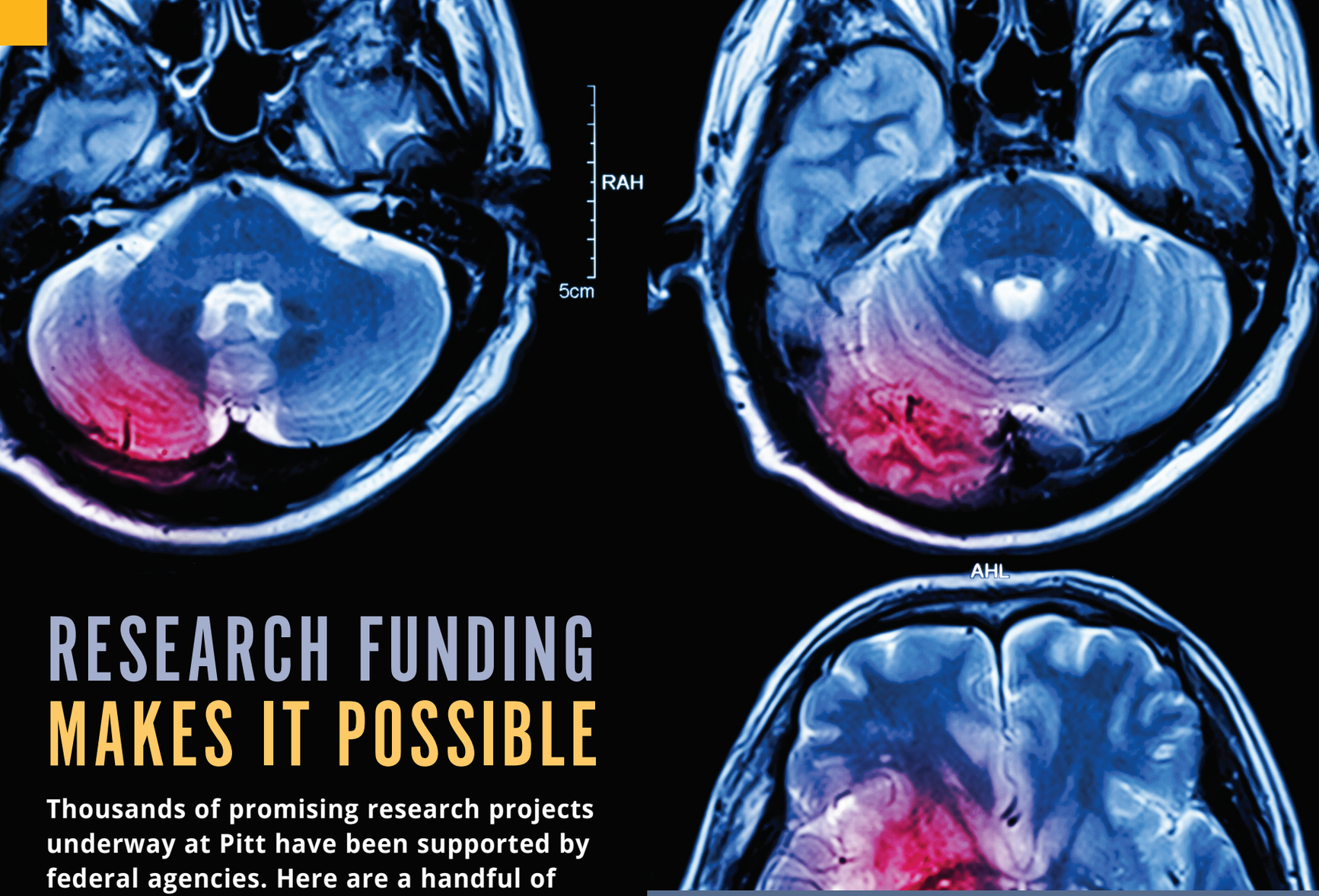
Top 8% in Medicine of 721 universities worldwide
Top 15% in Life Sciences and Medicine of 550 universities worldwide

U.S. News and World Report

Tier 1: Best medical schools for research

***Rankings released 2024**

THIS PAGE: ZEBRA FISH, CENTER FOR BIOLOGIC IMAGING, UNIVERSITY OF PITTSBURGH. PAGE 11, MRI OF BRAIN: GETTY IMAGES.



RESEARCH FUNDING MAKES IT POSSIBLE

Thousands of promising research projects underway at Pitt have been supported by federal agencies. Here are a handful of examples.

Restoring sight

When people lose their vision, the risk of losing their independence is a major concern. But limited sight doesn't have to limit life. Just ask José-Alain Sahel, Distinguished Professor and Eye and Ear Foundation Professor and Chair, Department of Ophthalmology.

Sahel, an MD, is a global leader in vision restoration techniques, known for his breakthrough work in optogenetics and visual prostheses to partially restore sight to the blind. He directs the UPMC Vision Institute. Since the institute's opening in 2023, Sahel and his team have enrolled multiple patients in research studies, several of which rely on assistive technologies.

His patients also use the StreetLab platform, where they are able to mimic real-life settings of home, work and the community in a fully monitored and controlled environment.

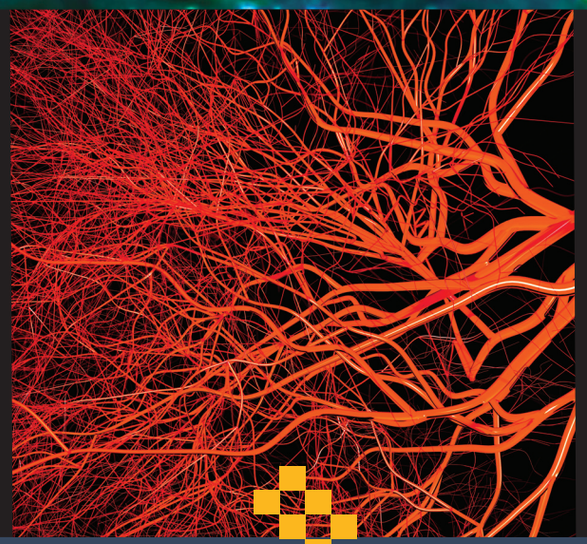
Stroke recovery

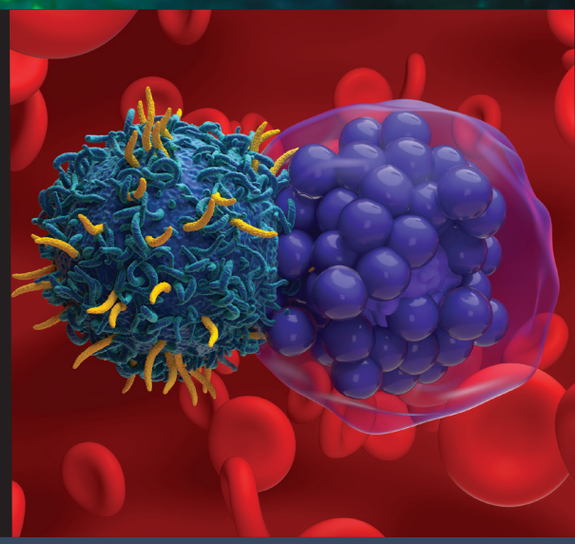
When someone has a traumatic brain injury or a stroke, the connections between the brain's motor cortex and the muscles can be damaged. This makes it hard to move muscles properly, leading to weakness or paralysis.

Pitt researcher Elvira Pirondini, a PhD assistant professor of physical medicine and rehabilitation, has found that deep brain stimulation can quickly improve arm and hand strength as well as function weakened by brain injury or stroke. Her lab is using a brain stimulation technique that's already widely used for treating conditions such as Parkinson's disease. It involves a procedure to place tiny electrodes in specific brain areas to send electrical signals that help control abnormal brain activity.

They tested this on a patient with arm tremors and severe paralysis from a serious motor vehicle accident. When the stimulation was turned on, the patient's arm movement and strength got better right away, allowing the participant to reach, grasp and lift a cup more easily and smoothly.







Personalized care for children

Greek for "hard skin," scleroderma is a rare autoimmune disease that causes the skin—and sometimes internal organs—to thicken and tighten.

Though scleroderma is rare in children, when they get it, the disease tends to be more severe; it's also less understood. For affected children, this can mean years of misdiagnosis, chronic pain and progressive damage to vital organs, particularly in systemic scleroderma, the most aggressive form of the disease. Pediatric rheumatologist Kathryn Torok, an MD associate professor of pediatrics, leads a research lab focused on understanding and improving care for children with scleroderma. Her lab hosts the National Registry for Childhood-Onset Scleroderma, a vital national resource collecting long-term data and biological samples from children with the disease. It also serves as the main biorepository for pediatric localized scleroderma and systemic sclerosis research supported by the Childhood Arthritis and Rheumatology Research Alliance, an organization behind nearly all North American studies in pediatric rheumatic diseases. By studying the immune system and genetics, Torok's team is uncovering what drives scleroderma, how it evolves and how it can be treated more effectively. They are especially focused on identifying signals in blood and skin that could help doctors detect the disease earlier and tailor treatments to each child's needs.

Early Alzheimer's detection

What if we could detect Alzheimer's disease in patients before they show any symptoms? Associate professor of psychiatry Ann Cohen is using positron emission tomography—or PET imaging—to track the telltale markers of disease in the brain. Her imaging work not only helps to determine risk and resilience to Alzheimer's, but it's also being used to study the brains of adults with Down syndrome.

For her contributions, Cohen, a PhD, recently received a top award at the Human Amyloid Imaging Conference. Her latest investigation focuses on patients who have been under-studied in Alzheimer's research, lending more vital insights to the field.

Reducing vascular disease risks

Imagine a pump pushing fluid through a flexible rubber pipe. Now, imagine that pipe accumulating debris inside it. As a result, the pipe stiffens and narrows, making it harder for the pump to push fluid through. Over time, the pump becomes overworked and eventually fails. This exertion is what happens to the hearts of patients with pulmonary arterial hypertension. Because it can take two to four years to diagnose, about half of patients die within five years of their diagnosis—a rate worse than many cancers. In a new clinical trial, Stephen Chan, an MD, PhD professor of medicine and the Vitalant Professor of Vascular Medicine, is testing a noninvasive 3D-imaging tool that can diagnose the condition earlier and treat the disease before it's too late. Medical research breakthroughs like this technology can shift a patient's prognosis from life-threatening to lifesaving.

Innovation in cancer treatments

There's a surprising new cancer treatment that could join the ranks of radiation and chemotherapy: exercise. Kathryn Schmitz, a PhD, MPH Pitt researcher and interim director of the UPMC Hillman Cancer Center, is a leader in this field. Her groundbreaking body of work shows that exercise can help prevent some side effects from breast cancer treatment. Her goal is to make exercise part of the standard protocol for cancer. She's leading three large related clinical trials: One is looking at whether physical activity helps advanced cancer patients, another is testing whether exercise might help older breast cancer patients handle treatments better. Yet another aims specifically to increase physical activity in rural primary care patients for the purpose of cancer prevention.

THIS PAGE: TOP GREEN, CENTER FOR BIOLOGIC IMAGING AT UNIVERSITY OF PITTSBURGH; YOUNG GIRL, BLOOD VESSELS, CART T CELL THERAPY BY GETTY IMAGES. PAGE 13, CAPOGROSSO LAB, UNIVERSITY OF PITTSBURGH.



A woman partially paralyzed by stroke gains function in her arm as part of a Pitt study. On this page, community members share stories of how medical research has given them hope.

RESEARCH FUNDING MEANS HOPE

One patient took

part in a Pitt-Carnegie Mellon University study that has given hope to others who, like herself, have experienced paralysis from stroke. She agreed to undergo experimental surgery in 2021 to temporarily restore function to her left arm. It worked: "The movement was so much easier. To feel like you have control is such a surreal experience, especially after going nearly a decade without moving your arm or your hand.

"That very first day in the lab, I opened and closed my hand for the first time in the nine years since my stroke. My husband and my mom were there, and when I opened that hand, there were just tears of joy. I probably cried every day in the lab for four weeks."

MORE FIRSTHAND ACCOUNTS:

Another community

member, whose son had a stroke in utero, resulting in cerebral palsy, has her eye on the paralysis research mentioned above to help his mobility someday. And there are other breakthroughs she's hopeful about: "The main option for loosening some of the tight and painful contractions from cerebral palsy has been Botox. But holding down a screaming toddler to inject multiple huge needles every 3-4 months for temporary results is traumatizing, not to mention the long-term side effects. Research coming out of Canada on another technique offers amazing results; however, we cannot gain access to this breakthrough via insurance until studies back it up for pediatrics. Without clinical studies, life-changing therapies and medical interventions [at sometimes $20,000 a round] are inaccessible and would cause bankruptcy for families with special needs children."

"Our daughter was a thriving, joyful teen

until she wasn't. In her first week at a new school, she largely stopped talking. By late winter, she withdrew from everything, refusing to leave her room for anything—staring off into space, practically catatonic. The girl (who has Down syndrome) who once would often proclaim, spontaneously, 'You are so beautiful,' was using a vulgar word to refer to everyone the rare times she would talk. Doctors decided she had a severe case of depression and anxiety. The first round of SSRIs [selective serotonin reuptake inhibitors] made her worse, angrier. Her eyes were empty. It was hell. I worried we'd never get our daughter back. Her psychiatrist, on the faculty at Pitt, who specializes in children with disabilities, prescribed another SSRI, and after months, we saw a little progress. Then, she re-emerged. Now, the loving, engaged kid is back. I missed her so much.

"I don't know if we would have ever gotten here without that SSRI. It's my understanding that class of drugs was developed by U.S. researchers (including immigrants from Germany, Scotland and Hong Kong) at Eli Lilly using techniques from a Johns Hopkins lab. I'm so grateful to them all."

"Ten years ago, I had a 4-year-old,

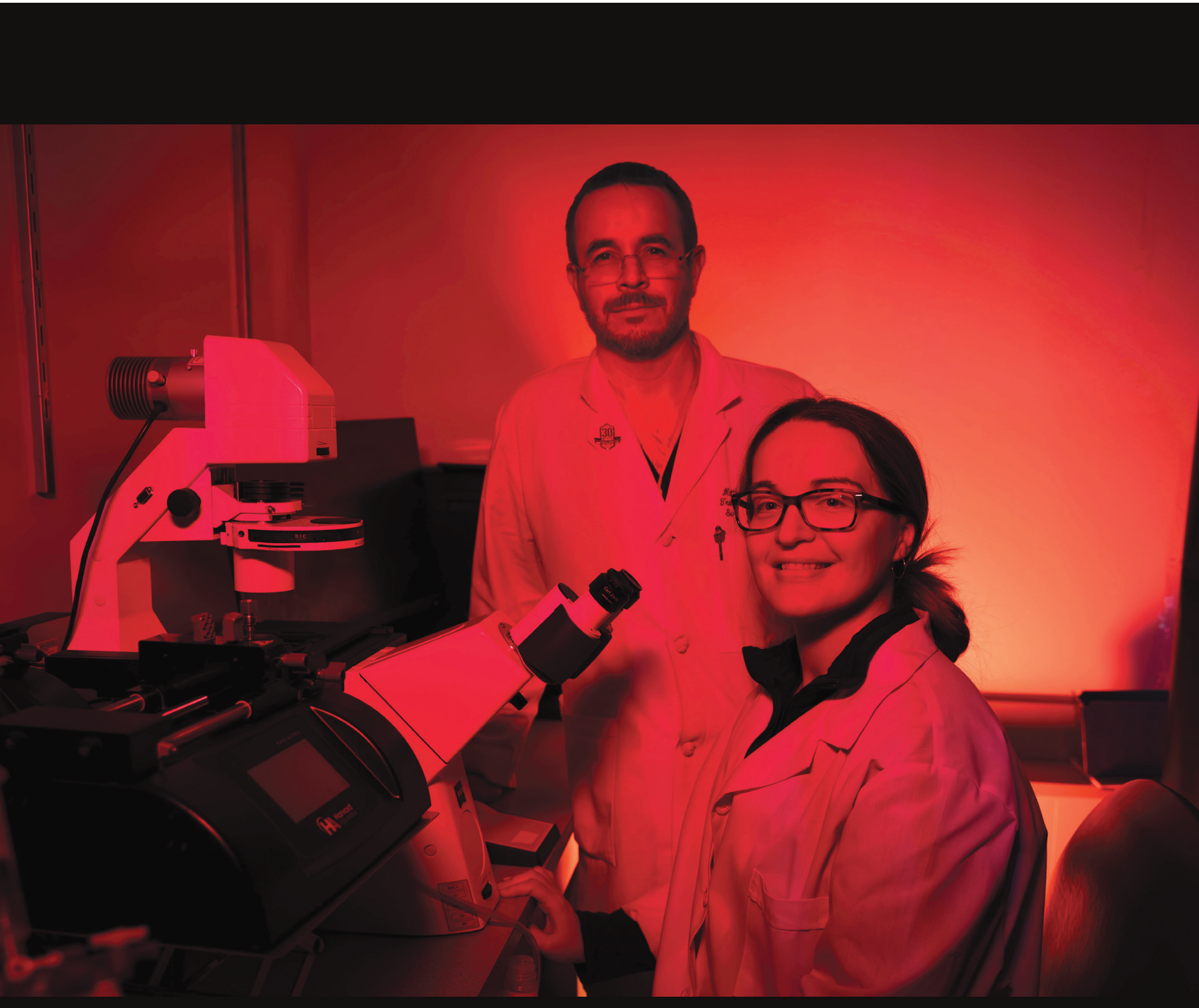
a 2-year-old and a baby. We went camping, and my husband contracted Lyme disease. The night before we closed on our new house, he rushed to the ER with chest pain and was admitted to the cardiac ICU with Lyme carditis. The amazing doctors at UPMC St. Margaret were able to quickly figure out a protocol to save him, knew which antibiotics he needed and set up ongoing care. My husband is healthy and here with us today because of research into cardiac health, infectious diseases and so much more. We participated in a trial for a Lyme vaccine, which was built from incredible mRNA research. We have so much hope that this vaccine will prevent other families from experiencing this trauma."

Some patient details have been changed to preserve privacy.

The United States has led the world in biomedical advances for decades. We've come far indeed—progress in medicine and public health has helped expand the average lifespan considerably. At the same time, we know that millions still face trying health challenges or struggle as they care for family members. Many are desperate. They are looking to research to find solutions. Let's not lose momentum now.

Share stories of promise from Pitt:

More university research stories:



Matthew Neal and Elizabeth Andraska are studying whether red light could protect certain patients from dangerous blood clotting.

RED LIGHT ON CLOTTING

INFRARED LIGHT ASSOCIATED WITH CARDIOVASCULAR PROTECTION

BY ALLISON HYDZIK

Scientists have long connected light exposure to health outcomes. The rising and setting of the sun influence metabolism, hormone secretion, even the flow of blood. In fact, heart attacks and stroke are more likely to happen in the morning hours than at night. Elizabeth Andraska, an MD, MS assistant professor of surgery at the University of Pittsburgh, and her colleagues wondered whether light could have an impact on the blood clots that lead to these conditions.

They found that humans and mice exposed to long-wavelength red light had lower rates of blood clots that can cause heart attacks, lung damage and strokes. Their findings, which need to be verified through clinical trials, were published in January 2025 in the Journal of Thrombosis and Haemostasis.

This enhanced understanding could lead to interventions that reduce blood clots in veins and arteries, two leading causes of preventable death worldwide.

To test their hypothesis, the team exposed mice to 12 hours of either red, blue or white light, followed by 12 hours of darkness, in a 72-hour cycle. They then looked for differences in blood clots among the groups. The mice exposed to red light had nearly five times fewer clots than the mice exposed to blue or white light. Other variables—activity, sleep, eating, weight and body temperature—remained the same among the groups.

The team also analyzed existing data on more than 10,000 patients who had cataract surgery and received either conventional lenses that transmit the entire visible spectrum of light or blue light–filtering lenses, which transmit about 50% less blue light. They discovered that cancer patients who'd received blue light–filtering lenses had a lower risk of blood clots compared to their counterparts with conventional lenses. This is especially notable because cancer patients have nine times the risk of blood clots compared to noncancer patients. (The difference in clotting was not statistically significant in patients with diabetes.)

"The light we're exposed to can change our biological processes and change our health," says lead author Andraska, who is a vascular surgeon at UPMC.

"These results are unraveling a fascinating mystery about how the light to which we're exposed on a daily basis influences our body's response to injury," says senior author Matthew Neal, the Watson Family Professor of Surgery and codirector of the Trauma and Transfusion Medicine Research Center at Pitt and a trauma surgeon at UPMC.

"Our next steps are to figure out why, biologically, this is happening, and to test if exposing people at high risk for blood clots to more red light lowers that risk. Getting to the bottom of our discovery has the potential to massively reduce the number of deaths and disabilities caused by blood clots worldwide," says Neal, an MD.

Their study indicates that the optic pathway is key—light wavelength didn't have any impact on blind mice, and shining light directly on blood also didn't cause a change in clotting.

In the January 2025 study, the team observed that red light exposure is associated with less inflammation and activation of the immune system. For example, red light–exposed mice had fewer neutrophil extracellular traps—abbreviated as "NETs"—which are web-like structures made by immune cells to trap invading microorganisms. They also trap platelets, which can lead to clots.

The mice exposed to red light also had increased fatty acid production, which reduces platelet activation. Because platelets are essential to forming clots, this reduction naturally leads to less clot formation.

Understanding how red light is triggering changes that lower clotting risk could also put scientists on the track of better medications or therapies that could be more potent and convenient for patients than continuous red-light exposure.

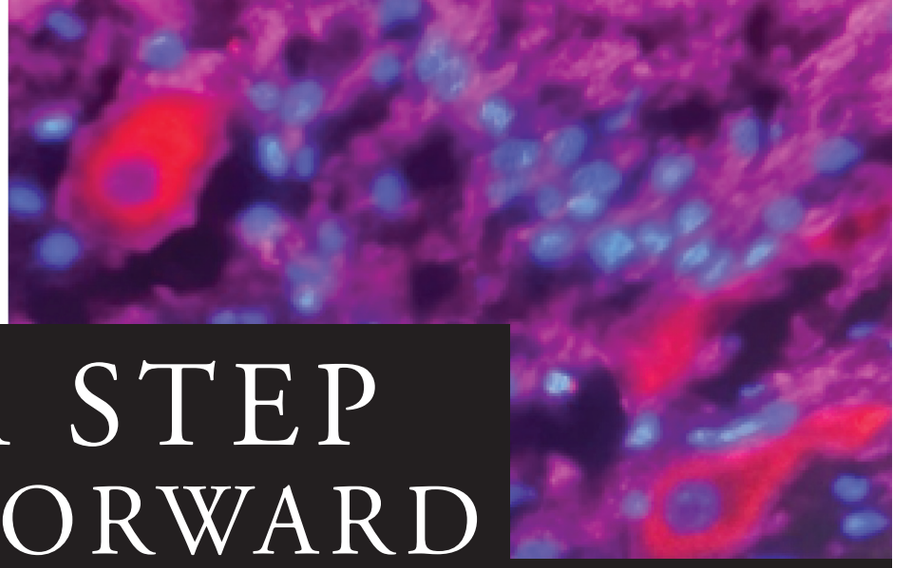
In preparation for clinical trials, the team is developing red-light goggles to control the light exposure study participants receive; they're also investigating who's most likely to benefit from red light. Andraska wonders if they might be able to help people who are at high risk of developing thrombosis avoid it.

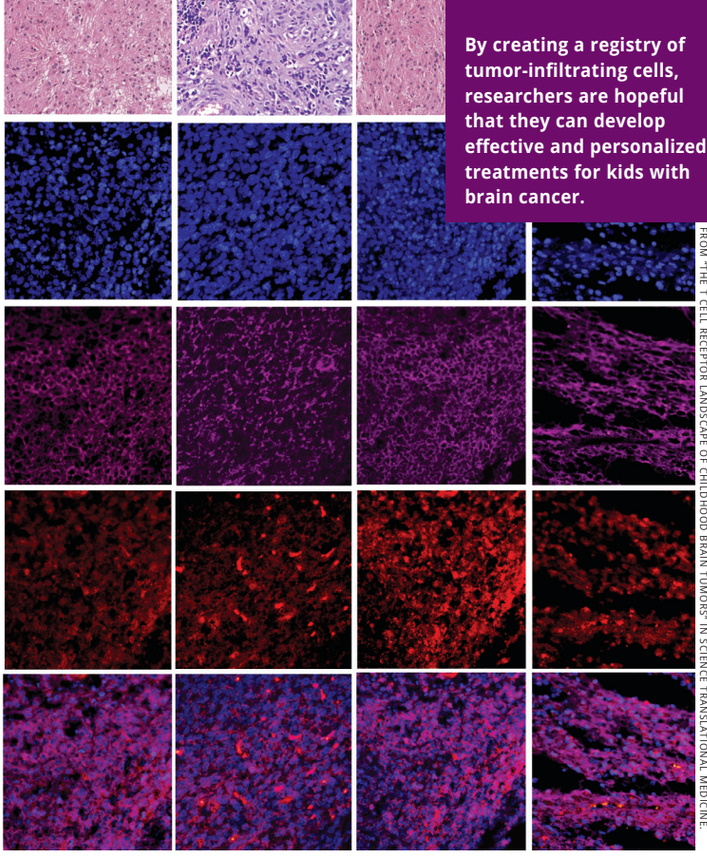
In another study from Pitt in 2016, led by Matthew Rosengart, an MD, MPH now at Washington University in St. Louis, researchers found that blue light—at the other end of the visual spectrum—actually protected mice from sepsis, where the immune system is overactive. Andraska and Neal did not look at the effect of red light on sepsis.

The relationship between light and health is neither simplistic nor straightforward, but Andraska imagines it could be used to great benefit:

"Our findings could lead to a relatively inexpensive therapy that would benefit millions of people." ■

PHOTO: TIM BETLER/UPMC





By creating a registry of tumor-infiltrating cells, researchers are hopeful that they can develop effective and personalized treatments for kids with brain cancer.

FROM "THE T CELL RECEPTOR LANDSCAPE OF CHILDHOOD BRAIN TUMORS" IN SCIENCE TRANSLATIONAL MEDICINE.

A STEP FORWARD

FOR TREATING BRAIN CANCER IN CHILDREN

NEW TUMOR CLASSIFICATIONS COULD HELP.

BY CHRISTINA FRANK

Immunotherapy, a class of treatments that harness the power of the body's own immune system to fight disease, has been a game-changer in improving the prognosis of some pernicious cancers throughout the past two decades. Thanks in part to immunotherapy, the five-year survival rate for acute lymphoblastic leukemia, the most common type in children, has increased to 90%.

Scientists have been studying the potential of immunotherapy for treating pediatric brain cancers, which have surpassed leukemia as the leading cause of cancer deaths in children.

Because children's brains are still developing, conventional therapies like surgery, chemotherapy and radiation, mainstays in treating adults, can be risky in children. Furthermore, many of these tumors arise in critical, often inoperable, regions of the brain, such as the brain stem. Immunotherapy presents an alternative—but there is still more work to be done to make it more effective for a wider range of tumors.

"The issue with brain cancers in children [versus adults] is they are very diverse with many, many different tumor types, and each one of them needs to be treated differently," says Itay Raphael, a PhD research assistant professor of neurological surgery at the University of Pittsburgh. "A big challenge with immunotherapy is finding specific targets, or antigens, on the cancer cells that the immune system can recognize and attack without harming healthy cells. Kids' brain tumors don't always have a lot of these clear targets."

Using 1,000 pediatric brain tumor samples collected through the Children's Brain Tumor Network, a medical research consortium of 35 medical centers, Raphael and his colleagues at the School of Medicine and UPMC Children's Hospital of Pittsburgh sought to understand how the children's immune systems were interacting with these cancers. The results of the study were published in Science Translational Medicine in March.

The scientists looked at the tumor-infiltrating lymphocytes (TILs), a subset of immune cells known as T cells, that had infiltrated the tumors. The presence of TILs within a tumor indicates that the immune system has recognized targets on cancer cells, called antigens, as foreign and has sent immune cells to attack them. The TILs then multiply, in a process called clonal expansion, to kill the cancer. The study was the first to look at the T cell "clonal repertoire" and expansion in this sample group.

Because of how varied brain tumors and their antigens are, understanding the tumor's molecular composition can help clinicians personalize each patient's treatment. In a type of adaptive immunotherapy called TIL therapy, these T cells could then be extracted, engineered and amplified in the lab, and then reinfused into the patient to mount a more robust and targeted anti-tumor response.

The information gathered from analyzing the T cells was also used to classify brain tumors based on the body's cancer-fighting immune response and, ultimately, to tailor cancer therapies to each patient's unique immune response.



Kohanbash



Raphael

Traditionally, these cancers are categorized based on the characteristics of the tumor cells themselves, including their genetic mutations and appearance. This research suggests that analyzing the immune response within the tumor could provide additional crucial information, potentially helping doctors better predict how a patient will respond to immunotherapy and modify treatment strategies accordingly.

Pitt physicians are now evaluating the feasibility of doing clinical trials to test the intervention, notes Raphael.

"We're trying to make the safest drugs for the safest treatment for the patients," says Gary Kohanbash, a PhD associate professor of neurological surgery and immunology at Pitt and a coauthor of the study.

"This represents a step forward in developing immunotherapies for these patients that are personalized. These are such complex tumors, and they're so different between patients. This [new knowledge] takes us closer to being able to address pediatric brain tumors more thoughtfully, carefully and better." ■



GETTY IMAGES

BEFORE THE TANGLES

BIOMARKER TESTS DETECT EARLY ALZHEIMER'S PATHOLOGY.

BY ANASTASIA GORELOVA

Years before tau tangles show up in brain scans of patients with Alzheimer's disease, small amounts of the clumping-prone tau protein in its misfolded pathological forms litter the brain, cerebrospinal fluid and, potentially, blood.

A biomarker test developed at the University of Pittsburgh can detect those early stages of tau-tangle formation, research published in Nature Medicine in February 2025 suggests.

The cerebrospinal fluid biomarker test correlates with the severity of cognitive decline, independent of other factors, including brain amyloid deposition. That means it opens doors for early stage disease diagnosis and intervention.

Most biomarker efforts have focused on early detection of amyloid-beta changes, because they often precede tau abnormalities in Alzheimer's disease. However, the clumping of tau protein into well-ordered structures referred to by pathologists as "neurofibrillary tangles" is a more defining event for Alzheimer's disease as it is more strongly associated with cognitive changes.

"Early detection is key to more successful therapies for Alzheimer's disease since trials show that patients with little-to-no quantifiable insoluble tau tangles are more likely to benefit from new treatments than those with a significant degree of tau brain deposits," says Thomas Karikari, a PhD assistant professor of psychiatry at Pitt and senior author of the study.

Many older adults who have amyloid-beta plaques in their brains will never go on to develop cognitive symptoms of Alzheimer's disease. Because of this, the diagnostics framework developed by the Alzheimer's Association specifies the three neuropathological pillars necessary to diagnose the disease: combined presence of tau and amyloid-beta pathology and neurodegeneration.

In a quest for early and accessible biomarkers for Alzheimer's disease, Karikari's earlier work showed that a brain–specific form of tau, called BD-tau, can be measured in blood and reliably indicates the presence of Alzheimer's disease-specific neurodegeneration. Karikari also showed that specific forms of phosphorylated tau in the blood can predict the presence of brain amyloid-beta without the need for costly and time-consuming brain imaging.

But these tools largely detect amyloid pathology, so the issue of early detection of tau still looms large. While tau-PET remains a reliable and accurate predictor of tau burden in the brain, the test's utility is limited by availability, low resolution, high cost, labor and sensitivity. At present, tau-PET scans can pick up the signal from neurofibrillary tangles only when a large number are present in the brain, at which point the degree of brain pathology has become pronounced and is not easily reversible.



Karikari

In this latest research, using the tools of biochemistry and molecular biology, Karikari and team identified a core region of the tau protein that is necessary for neurofibrillary tangle formation.

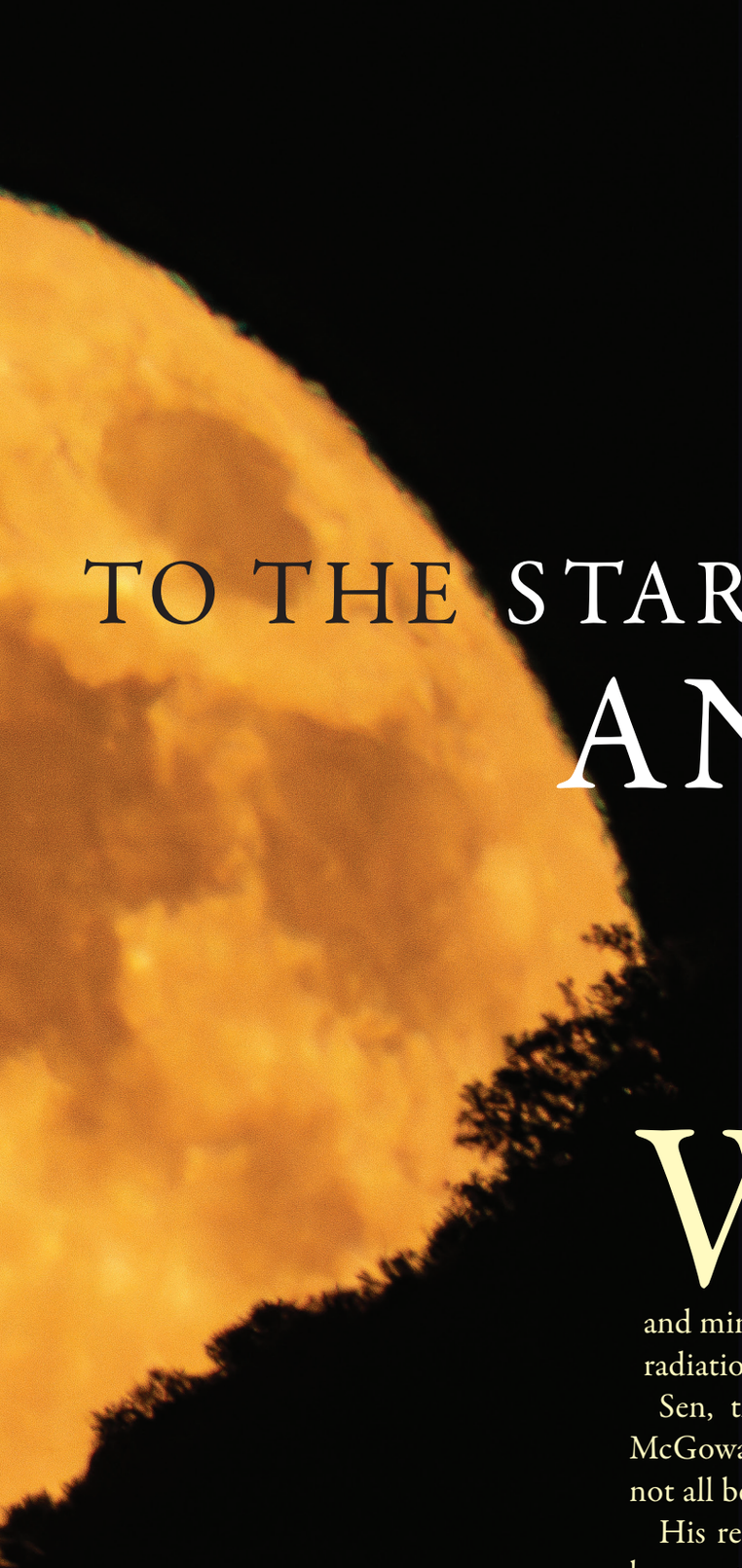
"Amyloid-beta is a kindling, and tau is a matchstick. A large percentage of people who have brain amyloid-beta deposits will never develop dementia. But once the tau tangles light up on a brain scan, it may be too late to put out the fire and their cognitive health can quickly deteriorate," says Karikari.

"Early detection of tangle-prone tau could identify the individuals who are likely to develop Alzheimer's-associated cognitive decline and could be helped with new-generation therapies."

In other recent work, Karikari was the senior author of a study that independently validated a new blood test platform that can simultaneously measure more than a hundred biomarkers of Alzheimer's disease. Published in the journal Molecular Neurodegeneration in October 2024, the study suggested the platform might improve the ability of clinicians to capture the multifaceted nature of Alzheimer's pathology and streamline early disease diagnostics.

"Alzheimer's disease should not be looked at through one single lens," says Karikari. ■





TO THE STARS AND BACK

WHAT SPACE MEDICINE BRINGS HOME

BY ANDREW DOERFLER

When most of Chandan Sen's colleagues in biomedical research think about sending humans farther and farther into space, they see the body and mind breaking down: bones deteriorating, cells pummeled by radiation, mental health sent spiraling by tedium and isolation.

Sen, the PhD, MS director of the University of Pittsburgh McGowan Institute for Regenerative Medicine, wonders if it might not all be bad news up there.

His regenerative medicine lens primes him to look for ways to harness the body's intrinsic abilities to defend and heal itself—and he sees opportunity in the stars.

Sen says he doesn't think of himself as "a space biomedicine person," but: "My motivation to enter into this area has been that I view space as an extension of extreme environments like deep sea or high altitude." Those situations put intense stress on the body, but they have also been shown to unlock adaptive responses that help people cope and survive.

Sen published a paper in 2024 that offered some early support for his thinking. He and his team analyzed skin samples from 17 mice who had spent time on the International Space Station after a SpaceX flight contracted by NASA, which launched in 2016.

In about a third of the mice, the environment appeared to trigger a surprising genomic plasticity—the genes in their skin cells began to behave, in some ways, like stem cells. The "responder" mice showed enriched angiogenesis, the creation of new blood vessels, possibly a mark of natural resilience to the conditions of space.

Their findings suggest that certain individual genomes might be better suited for spaceflight than others. (Sen nicknamed the rodents who showed the resilience his "astronaut mice.") But they also point to environmentally driven genomic changes in space that Sen hopes could be captured to benefit people. After all, no small number of researchers, Sen included, have dedicated their careers to inducing stem-like qualities in non-stem adult cells for their regenerative benefits.



Beheshti



Sen

"When you think of the limits of the human body, those limits and functioning that we know today are specific for terrestrial conditions," he says. But when you put the body into an entirely different environment, he suspects, the limits and mechanisms of functioning do not necessarily stay the same. "One could leverage those changes to undo disease processes."

Sen is thinking far into the future—he doesn't yet know what about space causes the genomic plasticity the study found or whether humans will show it, too (though his team has found some encouraging data from astronauts). His glass-half-full thinking on the effects of space on the human body sets him apart from even many of his collaborators.

But he is hardly alone in his optimism that space exploration will confer biomedical benefits to those of us here on Earth.

Pitt's School of Medicine has entered the latest space race in a big way. Its researchers are sending samples into orbit, analyzing multi-omics data from astronauts, simulating cosmic experiences on the ground and collaborating across disciplines to find out how human bodies can best handle spaceflight.

Most of these scientists did not train or ever expect to study people in space. At the heart of their interest in the field is the hope that their findings will deepen understanding of what patients experience here—and present new options to help them.

In many cases, for example, factors at play during spaceflight, such as microgravity and exposure to radiation, have effects on the human body that offer accelerated models of a wide range of diseases and conditions, which could in turn quicken tests of countermeasures.

"Space is not only for the pure exploration of it, which I think is key, but it's also going to help humanity with all the technology and biomedicine we'll produce from it," says Afshin Beheshti, a PhD professor of surgery and of computational and systems biology. He joined Pitt to become the director of the Center for Space Biomedicine, which launched in 2024 under McGowan as part of the new University-wide Pitt Space initiative.

The same principle has long been part of NASA's mission, too. The agency says it "ensures inventions for space find practical uses closer to home" and takes that into account when considering projects for funding.

Things that work well in the extreme space environment often become excellent tools in more ordinary conditions. "Someone told me it's like Formula 1 racing," says Clifton Callaway, an MD, PhD Distinguished Professor of Emergency Medicine who holds the Ronald D. Stewart Chair of Emergency Medicine Research. "Not everyone is going to have a Formula 1 car, right? But everybody's car is going to benefit from [advancements like] better tires with better rubber, better fluids that lubricate the engine."

Technologies developed or improved thanks in part to NASA research speak for themselves: CAT scans, portable ultrasounds, prosthetic limbs, needleless injection systems, invisible braces and retainers, and assistive technology and rehabilitation tools (and, of course, Velcro).

A major arm of Beheshti's own space

PAGE 18, STRAWBERRY MOON: BODRUMSURF/GETTY IMAGES. PAGE 21, STARRY BACKGROUND: GETTY IMAGES. ROUNDTABLE PHOTO: COURTESY PACAST.



Pitt has entered the latest space race in a big way. In May, Beheshti (far right) represented the University in a roundtable discussion with Lt. Gov. Austin Davis, legislators and others about making Pennsylvania a hub for space research, industry and education.

medicine research looks for ways to help the mitochondria in human cells better withstand exposure to radiation as people soar to new destinations in the solar system. When these energy-producing organelles start to function incorrectly, it can lead to a cascade of wide-ranging consequences for health, especially the immune system.

Beheshti and his collaborators published a paper in Cell about four and a half years ago analyzing data on physiological markers from astronauts of past space missions. They concluded that dysregulated mitochondria are likely a "central hub" for many of the downstream health consequences the astronauts face. It could explain, for example, why astronauts see a significantly increased recurrence of herpes viruses like chickenpox.

He and collaborators—including Robert Schwartz, a hepatologist at Weill Cornell Medicine—traveled to the NASA Space Radiation Laboratory at Brookhaven National Laboratory on Long Island to blast 3D organoids with radiation. Their "organs-on-chips" are made up of living human tissue that mimic the functionality of the liver. At the NASA Space Radiation Laboratory, the team tested the effects of doses of radiation from missions to the moon and Mars.

While science fiction and comic books have imagined how cosmic radiation could impart superpowers via mutations (see the Fantastic Four), the reality isn't quite as fun. When a human spends a year in space, Beheshti explained in a recent talk, ionizing radiation will hit every cell in their body, damaging DNA and leading to catastrophic breakdowns in cell function. "That would be a very short Marvel movie," he says, joking. "Space is not turning out to be a very sexy place to go."

That hasn't dampened his enthusiasm. Through his gray goatee, he speaks animatedly about findings from his team's organoid studies that suggest taking widely available dietary supplements could help protect astronauts' mitochondria. Kaempferol, a flavonoid found in foods like grapefruit and leafy greens, seems to help restore the organelle's function and boost signaling. (He has worked with the Japanese company Otsuka to test its modified, more potent kaempferol supplement.)

Beheshti hopes his work can help send humans farther into space. But boosting mitochondrial function offers clear advantages for the earthbound, too. Asked for examples, Beheshti reels off several areas where the organelles are known or thought to play an important role—rare mitochondrial diseases, neurodegenerative diseases, chronic fatigue syndrome, aging itself—but then speaks even more expansively.

"The broader answer to your question is probably every disease," he says with a laugh. "When you become a 'mitochondriac' like me, everything in the clinic's related to it."

JOURNEY
INTO THE UNKNOWN

Beheshti fell into space medicine by accident. A physicist and systems biologist by training, he pursued his postdoctoral work with an investigator who got a NASA grant to study cancer risks associated with spaceflight. That set Beheshti on a path that eventually led to a wide-ranging space medicine research portfolio and a position at NASA Ames Research Center in California before he came to Pitt.

Part of his charge as director of the Center for Space Biomedicine is to spread the word that the field welcomes biomedical researchers who, like him, didn't originally intend to look to the stars in their research.

"A lot of people are interested in helping out, but they don't know how to get involved," Beheshti says. The field, he notes, is more open than they might expect—truly a new frontier, with unanswered questions extending to nearly every area of human health. "Anything you start looking at might not have previously been done [in space] before."

The time is ripe to join in. The consulting firm McKinsey and Company estimates the global space industry will be worth $1.8 trillion by 2035, nearly tripling in size from $630 billion in 2023. The surge of commercial spaceflights offers more chances for researchers to not only send samples or animal models to space, but also to analyze biological data from new kinds of space travelers. Unlike astronauts, who are typically in the highest percentile of physical fitness, space tourists will tell us more about what it's like for the average person to go into orbit.

Meanwhile, recent flights are taking astronauts farther into space than they have traveled since the Apollo missions; eyes are set on Mars in perhaps the next decade. A lot of new knowledge will be necessary to make it there in one piece, and Pitt is positioning itself to be a major player.

"Afshin is going door to door, not only in medicine, but also in engineering and other related fields, to recruit people's interest," Sen says. "I think that the vastness of our health system and the vastness of the landscape of our expertise in multiple disciplines [at Pitt] suit us to do very well." A connector by nature, Beheshti usually has dozens and sometimes 100 coauthors on his papers.

Pitt is reaching beyond campus. It has joined the Keystone Space Collaborative, a nonprofit organization that serves the space industry in Ohio, Pennsylvania and West Virginia. And in May, Beheshti represented Pitt in a roundtable discussion with Lt. Gov. Austin Davis and legislators about making Pennsylvania a hub for space research, industry and education.

The recent push is not the University's maiden voyage—its contributions to space research and education go back to the analysis of moon rocks brought back by the Apollo 11 mission and, earlier, to the work of Samuel Pierpont Langley, the 19th century inventor, aviation pioneer and Pitt professor of astronomy who led the Allegheny Observatory.

But the new Pitt Space initiative, with biomedicine as one of three major core areas, intends to reach further. The goal is to encourage the kind of multidisciplinary collaborations that more ambitious space exploration requires. Experts in medicine, engineering and bioengineering, and data analysis and modeling as well as others are on board. To succeed, Pitt's research stars need to align.

"You might answer a question in one area, but then you'll realize that the solution that you propose doesn't work with the engineering. Or you find out, oh, it's not stable in the in the radiation environment," says Pitt's Kate Flickinger, a PhD, MS and principal physiologist of the Applied Physiology Lab in the Department of Emergency Medicine who was recently named a fellow of NASA's Translational Research Institute for Space Health (TRISH). "You have to work together for every challenge that you have to address."

Flickinger also didn't think space would factor into her career plans, even though she's long been fascinated by it.

"I was obsessed with the moon when I was little. I asked my dad to get me the moon," she says. "If you had told 3-year-old Katie that I was going to be doing space medicine, it would've blown my mind. It still blows my mind."

BIG SLEEP

Flickinger came to work at Pitt's Department of Emergency Medicine in 2012 after her undergraduate studies. She loved the environment so much that she went to graduate school at Pitt to stay in the department. Her work involved studying ways to lower body temperature in different settings. At first, her focus was on firefighters who needed to cool down after battling blazes.

"A lot of this research has an immediate terrestrial application. The space application is just the extreme case. If you work it out in the extreme case, then it's got tremendous benefits for everyday medical care."



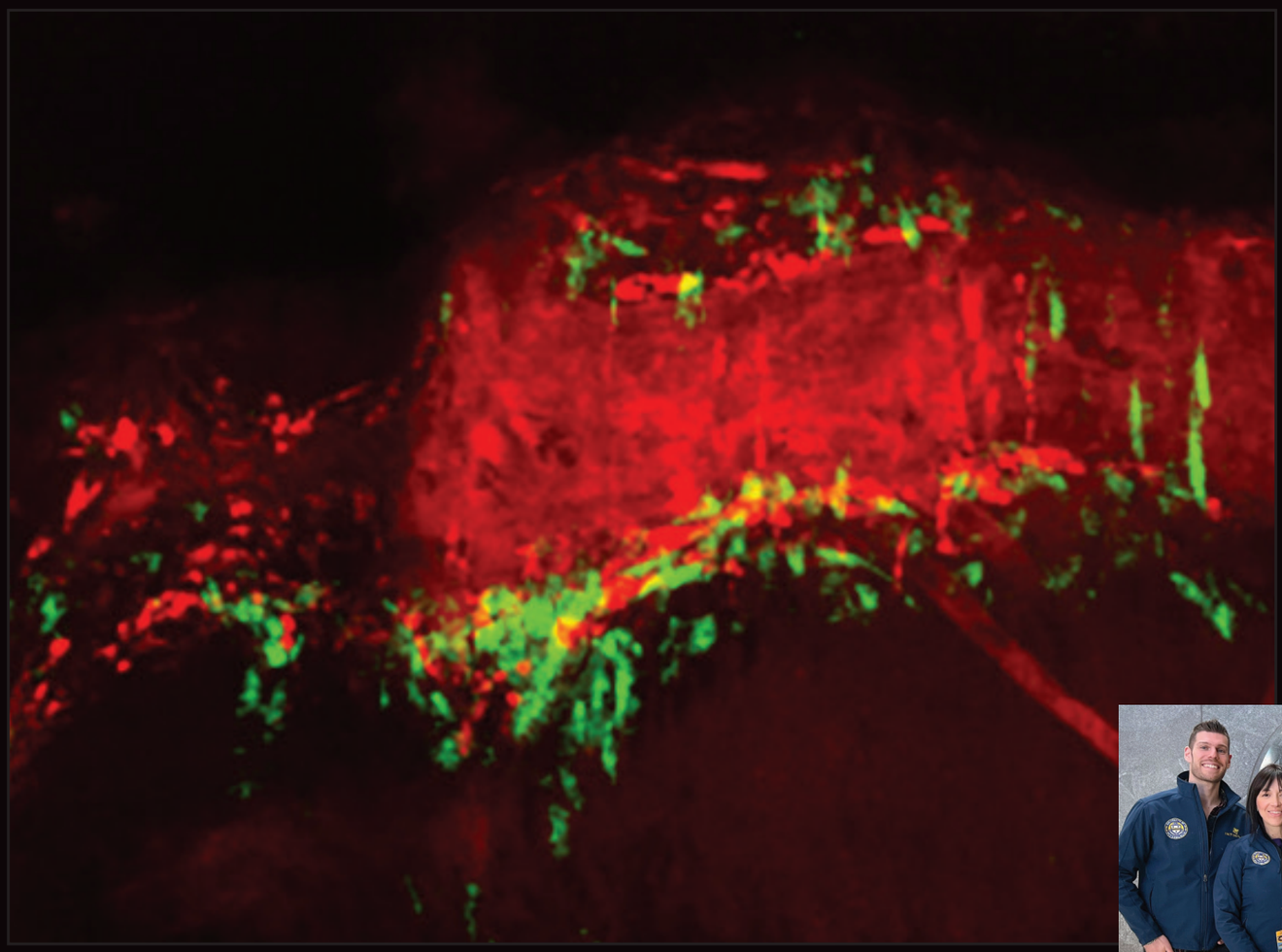
Flickinger



Callaway

But emergency rooms also use targeted temperature management for cardiac arrest patients because of its neuroprotective effects. Hoping to extend those benefits to other kinds of patients, Flickinger and her colleagues studied drugs that could lower body temperature while also reducing shivering to keep the metabolism low.

It didn't take long for the team to notice that the same strategies they were working on could also help put humans into a hibernation-like state—and that could be useful in space, as filmgo-





LEFT: Intini's lab sent mice to space to study bone stem cells, shown in green (Courtesy Intini). BOTTOM: (From left) Lab members Luigi Mancinelli, Roberta Di Carlo, Intini, Xuehui Geng and Taiana Campos Leite in their mission photo (Courtesy International Space Station National Laboratory).

ers have seen in "2001: A Space Odyssey" and the "Alien" franchise.

"It was always just like a far-fetched idea that we had," recalls Callaway, the emergency medicine professor and vice chair who is also part of the Applied Physiology Lab. "But lo and behold, a few years ago, NASA had a request for proposals to see if this was something that could facilitate long-duration space missions."

"We thought, 'This was made for us,'" says Flickinger.

Reducing the metabolic rate of astronauts would allow them to eat less and breathe in less oxygen—and, in turn, expel less waste and carbon dioxide that would need to be dealt with. All of this would make for less payload aboard spacecrafts and less expensive missions. Increased hours spent sleeping also could ease the psychological burden of a long-distance trip.

"If you're going to Mars, that's a nine-month trip where you are stuck in a tin can with not a lot to do," Flickinger says.

With the funding from TRISH, the team developed a five-day protocol that attempted to simulate what metabolic reduction and cold sleep might look like on a spaceship. They had research participants here on Earth sleep for 20 hours each day after taking a drug called dexmedetomidine—which they'd previously found effectively lowers metabolic rate and body temperature while suppressing shivering. The participants spent the other four hours of their days exercising, eating and taking cognitive exams. (They also took some time for themselves to do things like making calls and showering.)

Unlike many of the famous sci-fi depictions, the team's approach wouldn't need a hibernation pod, which would be a heavy and expensive addition to any space mission.

"A bear in the winter doesn't have a pod. The ground squirrel doesn't need a pod," Callaway says. "You just need the proper pharmacology to let the body have a lower metabolic rate."

But spending 20 hours a day sleeping also presents drawbacks for astronauts, like the loss of muscle mass as they spend hours in an idle state. And scientists don't yet know how to safely put people into true hibernation for days, weeks or months.

The researchers are now poring through the mountain of data from their protocol to figure out how to address these challenges and others. They expect, for example, that translating this to a long-term space mission will require a cocktail of drugs to keep tolerance at bay and abate side effects of higher doses of a single drug.

Still, successfully running the protocol was an important step toward making quasi-hibernation in space a reality. And Callaway already sees ways to apply the work in the clinic for patients who could benefit from lower body temperature and metabolism after cardiac arrest, stroke or traumatic brain injury.

"A lot of this research has an immediate terrestrial application," he says. "The space application is just the extreme case. If you work it out in the extreme case, then it's got tremendous benefits for everyday medical care."

FEEL IT IN YOUR BONES

On a sunny November afternoon in 2022, Giuseppe Intini anxiously awaited the launch of the SpaceX CRS-26 RR25. Gathered at Kennedy Space Center near Cape Canaveral with lab members, family and NASA engineers and administrators, he and his team had sat tight through several delays and three weeks in Florida leading up to it.



Amorim

When another delay looked likely, Intini's 11-year-old son, who had been there for a week, begged, "God, please launch! I don't want to be in Florida any longer."

Seconds later, his prayer was answered—and Intini's anxiety turned to exhilaration.

"Oh, that was probably one of the most exciting days of my life," says Intini, a DDS, MS, PhD associate professor of dental medicine who has a secondary appointment in the School of Medicine. "I have a video in which you can hear me screaming—of happiness, obviously. It was a very emotional time."

Intini's team was sending 40 mice on the mission to study bone loss, a major concern as NASA hopes to have people live and work on the moon and to send people to Mars. Previous research has found that stem cells in bone become blocked in space.

"They're not able to move forward and differentiate, making new bone," Intini says. Even one or two years after a mission, data show that astronauts do not necessarily recoup the lost bone fully. "So the idea was to understand, what is it that makes these cells stuck in space?"

Floating in microgravity means that astronauts' bones aren't experiencing the same impact they do on Earth, which likely is part of what keeps them from stimulating new growth.

"They don't walk, they don't run—all those things we do on Earth," says Tânia Amorim, a PhD postdoctoral researcher in Pitt's Aging Institute, who also studies bone loss in space and was not part of Intini's team. "They are adapting to a new environment, and that adaptation interferes with the bone metabolism as we know it here."

To figure out countermeasures, Intini's team wanted to examine individual bone cells and see the pathways involved. To do that, they performed single-cell RNA sequencing on bones, including the skull, femur and teeth ("Because, don't forget, I'm in the dental school," Initini says with a smile) of the mice after they splashed back down to Earth.

Intini was also studying the feasibility of "bone super glue" called Tetranite, developed by a colleague he knew during his time at Harvard University, to repair fractures and encourage bone regeneration through injection. It could have major advantages in a setting like space where traditional surgery isn't possible. (Intini does not have a financial stake in the company that makes Tetranite.)

The experience of working with NASA was unlike any research Intini had ever done. After two years of planning, his team transported "an entire part of the lab" to Florida, where they spent three weeks, to conduct experiments after the mice returned. Some of the equipment was shipped, but three lab members rented a van to drive down sensitive instruments—among them, a $45,000, 12-pound device used to partition cells, which they couldn't risk damaging.

At one point after the launch, Intini traveled to Houston to guide astronauts in space as they handled the research team's materials. "They had to give me special permission to enter this room where there are all these communications with the International Space Station," Intini says.

While he expects their first findings on the stem cell work won't be published for another year or so, his team has made progress identifying pathways and coming up with countermeasures. Part of what excites him is that the experiment could present an accelerated model of the bone loss from osteoporosis and aging for patients here on Earth.

The team's results on the bone super glue, meanwhile, have been submitted for publication, and Intini sees even more immediate potential for it as a minimally invasive option to repair fractures on Earth.

"They're now moving into clinical trials," Intini says. "This is a material that is going to be, if it works in humans, extremely useful."

ACROSS THE UNIVERSE

During Amorim's PhD studies, she took part in a program at the International Space University, headquartered in France. It was there that she became fascinated by the way space research brings disciplines together to make improbable visions a reality.

Amorim says she sees the same collaborative, multidisciplinary spirit at Pitt, where she's based at the Aging Institute while also part of the Pitt Space initiative: "I feel like I have the perfect environment to establish my research agenda."

Beheshti would be glad to hear it. His plan is to make Pitt an international hub for space medicine research and education. To that end, he's developing a global certificate program for space biomedicine to train the next generation of space medicine experts, with Pitt serving as a central institution connecting others like Weill Cornell, University of California, San Francisco, and Oxford University. A PhD program in space biomedicine is also in the works.

Amid the space industry's rapid growth, Sen sees it as a university's obligation to train conscientious scientists to have a seat at the table, especially as humanity starts to consider colonizing surfaces beyond Earth, to ensure that dark frontier is not dark when we get there.

The emerging field makes Flickinger hopeful. The excitement around space science and exploration seems to bring different people together in an often-polarized world, she says:

"It's a way for people to get together and dream." ■

Even one or two years after a mission, data show that astronauts do not necessarily recoup the lost bone fully. "So the idea was to understand, what is it that makes these cells stuck in space?"



Labor turned out to be the easy part of having a child for Nandar Godoy-Dinneen. Her case illustrates the brain's profound link to reproductive health. (Photo by Alice Arnold)

A DELICATE DANCE

THE ROLE OF THE BRAIN IN WOMEN'S REPRODUCTIVE HEALTH IS OFTEN OVERLOOKED.

BY KAT PROCYK

After two miscarriages, Nandar Godoy-Dinneen was about to deliver her first child at age 40 in 2020 at a New York City hospital. Her pregnancy had been difficult, with nausea and fatigue consuming most days. Given her age and the potential complications, Godoy-Dinneen, an architect, sought the best obstetrician in the city to guide her through it.

However, the doctor-patient relationship had become increasingly impersonal, especially as virtual appointments became the norm during the COVID-19 pandemic. Care teams were pushed to their limits as gurneys packed hallways, children's hospitals were converted to ICUs and refrigerated trucks held bodies.

As her baby's arrival neared, Godoy-Dinneen's blood pressure was well within normal range. But her blood pressure had always been a little lower than average.

"The baby was fine," Godoy-Dinneen recalled.

"It was just my age they were concerned about. Nothing else."

Labor itself turned out to be the easiest part. Godoy-Dinneen and her husband opted for a natural birth, and while the delivery required forceps and resulted in a third-degree tear, everything else went smoothly.

She was stitched up and sent home the following day, unaware that the tear would save her life in the days to come—and be the catalyst for a long journey to understand what nearly broke her brain.

WHEN IT COMES TO THE BRAIN, SEX MATTERS

Godoy-Dinneen ended up experiencing a severe stroke. It's with cases like these that we learn how deeply the brain, that seemingly squishy and drab organ, plays a role in women's health.

Side by side, a man's brain and a woman's brain look nearly identical to the untrained eye, with minimal anatomical differences.

Yet, neurological conditions can affect women and men differently. In Alzheimer's disease, for example, women are more likely to experience cognitive decline, memory loss, language difficulties and issues with social interactions more rapidly. Men, on the other hand, are more susceptible to Parkinson's disease and amyotrophic lateral sclerosis; and although multiple sclerosis is more common in women, it tends to be more severe in men.

"The brain is a vital component of women's health," says Eliza Miller, an MD, MS, who is the newly appointed division chief of women's neurology and associate professor of neurology at the University of Pittsburgh.

However, women's neurology is still considered a niche specialty, notes Miller, a globally recognized leader in women's cerebrovascular health and recommended to hold Pitt's endowed chair in women's brain health.

"Unfortunately, many young neurologists lack specialized training in reproductive physiology—leading to significant knowledge gaps and unnecessary fear in how to navigate neurological problems women are faced with."

PREGNANCY AND THE BRAIN

Pitt's Department of Neurology is one of only two neurology departments in the United States with dedicated divisions of women's neurology. The other is at Brigham and Women's Hospital in Boston. Page Pennell, an MD, was an active contributor to the development of the women's neurology program at Brigham before she joined Pitt as neurology chair and Henry B. Higman Professor.

Pennell recognized the importance of considering sex as a biological variable in the expression of neurological diseases early in her research career.

"Sex influences so much of what we study in neurology," Pennell says. "A simple example many people are familiar with is menstrual migraines, which tend to worsen around menstruation. That's just one sign of how hormones and brain receptors interact in powerful ways. Another major gap I saw was in how we treat neurological disease during pregnancy. We didn't have enough information on how to protect both maternal health and fetal safety, and that's an area I've been deeply passionate about throughout my career."

Pennell focuses her research on epilepsy during pregnancy. Her studies delve into how hormonal fluctuations and reproductive phases influence seizure activity; she also studies the pharmacokinetics of anti-seizure medications. Pennell has led several studies on these subjects, including Maternal Outcomes and Neurodevelopmental Effects of Antiepileptic Drugs (MONEAD), which have informed clinical guidelines, including those of the American Academy of Neurology, for managing epilepsy in pregnant and breastfeeding individuals.

Pitt researchers, notably Pennell and Miller—collaborating with others in psychiatry, maternal-fetal medicine and cardiology—are exploring whether certain neurological disorders in women may be influenced, signaled or exacerbated by the many physiological changes that occur during pregnancy and other reproductive phases, as well as other sex-specific factors in women. They're still not entirely sure how it may all be linked.

Pitt's division was established by Autumn Klein, who was an assistant professor of neurology, pioneer in women's neurology and the founder of Brigham's division, before her early death in 2013. Klein envisioned Pitt's division as an interdisciplinary unit that integrates neurology with subspecialties such as obstetrics and gynecology. The division was then led by Janet Waters, former clinical associate professor of neurology, until her retirement in 2024.





FROM TOP: **Eliza Miller and Page Pennell (Miller photo by Rayni Shiring/University of Pittsburgh. Pennell photo by Corrina Raznikov.)**

"Having a division already established in the School of Medicine is a unique strength for both the care of women with neurologic disorders, as well as an important part of our training and teaching for our students, residents and fellows," Pennell says.

Pennell was determined to continue the flagship program under the leadership of someone with a history of making discoveries about women's brain health and how it can be improved. She recruited Miller, who had previously collaborated with University researchers in neurology, obstetrics and gynecology, psychiatry and epidemiology through her multicenter cohort studies.

Miller sees the foundations set by Klein, Waters and Pennell as blueprints for her clinical and educational missions. But it's her patients who serve as the inspiration for her research. That work focuses on cerebrovascular complications of preeclampsia, a pregnancy condition related to high blood pressure and protein in the urine that can increase

the risk of stroke and other adverse pregnancy outcomes. Miller employs physiological studies and epidemiological approaches in her search for new understanding that will keep her patients and others healthy. As of March 2025, she had published more than 45 research papers and 35 book chapter reviews and editorials on the subject. She founded the Mothers Center Neurovascular Clinic at Columbia University, which provided coordinated treatment of patients with cerebrovascular complications during pregnancy and postpartum.

Godoy-Dinneen started seeing Miller just a few days after the birth of her son, Nigel.

Her tear became sore, and she'd started running a fever. She returned to the emergency department and was admitted with an infection.

Her blood pressure started to rise—higher and higher—and she was diagnosed with and treated for preeclampsia.

"I feel like my blood pressure was high from the beginning [of the pregnancy]," recalls Godoy-Dinneen, whose baseline was low.

"I try to warn people that they may be like me—'Maybe you're not by the book. Know your baseline.'"

Godoy-Dinneen, who was born in Quito, Ecuador, comes from a family of doctors. So when her head started to pound and she lost vision in her right eye, she texted her brother, a surgeon in Ecuador. He consulted with a neurologist friend who suggested she demand an MRI.

But with the pandemic taking over New York City hospitals, it was hours before she got the test. More than four hours later, Godoy-Dinneen woke up in the ICU with several doctors surrounding her bed.

She had an intracerebral hemorrhage—the most dangerous type of stroke, which causes more than half of preeclampsia-related deaths.

"I stayed in the ICU for like a week," Godoy-Dinneen says.

"With chaos of the pandemic inside the hospital and the George Floyd protests happening on the New York City streets below, I didn't have any visitors. It felt post-apocalyptic. It wasn't just the stroke that was traumatic—it was the loneliness."

After discharge and reuniting with her family, Godoy-Dinneen met with Miller, who ran a series of tests to understand the mechanisms that led to Godoy-Dinneen's stroke. Miller's team attributed it to reversible cerebral vasoconstriction syndrome, a rare complication of preeclampsia that's most often seen in the postpartum period. It's rare and a large focus of Miller's research, but she learned far more from Godoy-Dinneen's story than her diagnosis.

"Nandar was really the only person who identified that she was having a neurological emergency that needed immediate evaluation and treatment," Miller says. "Another thing was how, even though she had a really excellent recovery from the physical standpoint, she had a really hard time recovering from the psychological standpoint. It was extremely traumatic, and she was severely anxious after her stroke, which is totally understandable and also very common, I find, especially in young stroke patients."

MIND AND BODY

Over the next few years, Miller plans to expand Pitt's division into a multispecialty care unit by mentoring junior clinicians and University researchers at all levels, growing the fellowship program from one to two fellows per year, improving education in women's health in neurological residencies, recruiting and retaining top faculty, and strengthening interdepartmental collaborations in women's health research through Pitt's existing infrastructure. She will contribute to the development of curriculum and treatment guidelines for women's neurology, which are just now emerging. In

MENOPAUSE AND THE BRAIN



Thurston

Many women entering menopause "feel like they're not getting enough information, feel like they're not getting help from their providers about this very important time of life," says Rebecca Thurston, a PhD professor of psychiatry, psychology, epidemiology and clinical and translational science at the University of Pittsburgh, who is the Pittsburgh Foundation Professor of Women's Health and Dementia as well as director of the Center for Women's Biobehavioral Health Research.

Menopause historically has been poorly researched and not discussed openly enough, says Thurston, who as a principal investigator on three major menopause studies wants women to know that's changing: "We fly under the radar screen, but there's a wealth of science and fresh research going on here [at Pitt]." The most recent is the MenoBrain study. Funded by a $7.5 million grant over five years from the National Institutes of Health, the longitudinal study will follow 224 women entering perimenopause. Thurston says it's "the most comprehensive study of women's brain health during perimenopause."

"Brain fog is reported by 40% of women transitioning through menopause, and it's something we don't understand because there's been no large, longitudinal study of the brain changes of perimenopause," says Thurston. She adds that MenoBrain seeks to elucidate "what's happening with your brain and what's driving that. Is it due to hormone changes? That might be one thing, but you also have sleep deprivation, and you have mood changes and vascular changes."

A key component of the research involves Pitt's 7-T MRI, an ultra high–field, high-strength imaging tool that lets researchers visualize various parts of delicate tissue like that in the brain. (T stands for the magnetic flux density unit Tesla.) With this technology, Thurston and her team will learn more about vascular changes in the brain—changes that put women at risk for stroke and dementia.

Pitt has also launched or played a central role in menopause research such as the Study of Women's Health Across the Nation (SWAN), which has followed 3,302 women since 1996, tracking the physical, biological, social and psychological changes they go through, and the MsHeart and MsBrain studies that each follow about 300 women, investigating cardiovascular and brain health.

"Pitt is the hub of menopause research," says Thurston. And "women are clamoring for this information." *—Michael Aubele*

2024, the American Academy of Neurology published its curriculum for women's neurology. This curriculum, of which Waters was a coauthor, outlines core competencies across five key subspecialties of neurology: headache, cerebrovascular diseases, demyelinating diseases, epilepsy and neuromuscular diseases. Miller's end goal is to position Pitt at the forefront of this growing specialty and develop more holistic, integrated treatments to improve women's brain health.

"We are set up to lead this field," Miller says. "A lot of this work is already happening in different divisions and places across the University, but centralizing and formalizing this work would benefit our patients in the long term."

Miller's goals for Pitt and UPMC mirror the treatment she provided for Godoy-Dinneen. She coordinated treatment with other care providers, including an obstetrician and a psychiatrist.

Her relationship with Godoy-Dinneen spanned beyond doctor-patient. Godoy-Dinneen has Miller's personal contact information, and, for the first time since receiving medical care in the United States, Godoy-Dinneen felt "truly seen and heard by a doctor—not as just another patient on a chart, but as a human being in distress, searching for recovery."

Yet, she decided against further testing. Miller compassionately obliged.

"I didn't need any more answers and felt confident the pregnancy caused the stroke," Godoy-Dinneen says. "I decided to make the most of the eight months I had at home during the pandemic and made up for lost time with Nigel and my husband. I was so close to losing that time entirely."

DANCER BECOMES
A BRAIN EXPERT

Miller's path to becoming a physician was anything but conventional. She became a mom to twins first.

Her career as a professional dancer took her to New York City, but when she learned she was pregnant, she left the "struggling artist" life behind.

"Being a dancer is a tough life," Miller says. "I'd always been interested in the body, and I thought there was one thing that might be easier than being a dancer: going to medical school."

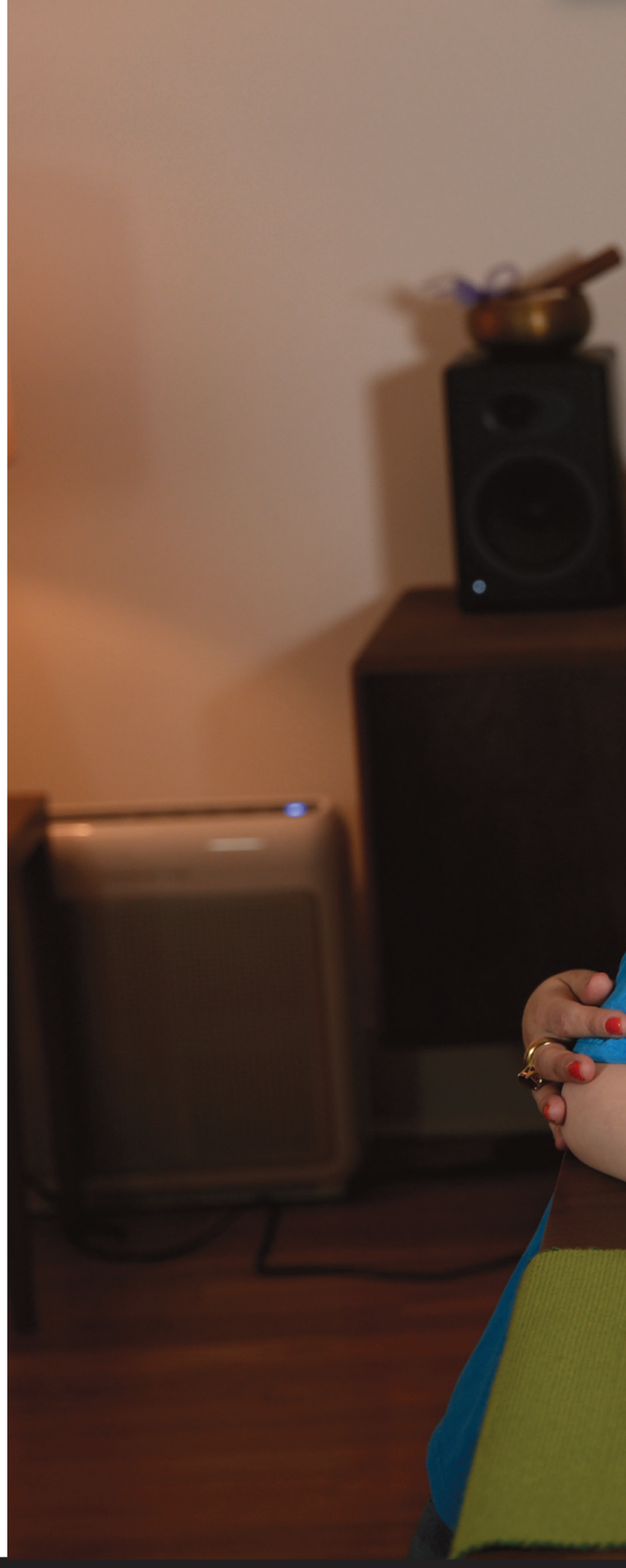
She returned to school at the City College of New York and then went to medical school at Columbia University—having another baby along the way. She also earned a degree in patient-oriented research at Columbia University's Mailman School of Public Health. The patients she's cared for with pregnancy complications motivate her to do all she can.

"I think about my patients every day," Miller says.

"Nandar had a long journey but recovered. There are other women I have taken care of in the hospital who had terrible outcomes, severe disability or death. When you see a young mother suffer or die like that, it changes you. I couldn't just move on from that. And it's like, 'Wait, how did this happen? Isn't someone going to do something about this?'

"And then I thought, 'I can at least try to do something. Even if I fail, at least I will know I didn't just shake my head and say, That's awful.'

"At least I tried to make a difference." ■





Godoy-Dinneen with her son, Nigel. Both are healthy now. "There are other women I have taken care of," says Miller, "who had terrible outcomes. . . . When you see a young mother suffer or die like that, it changes you. I couldn't just move on from that." (Photo by Alice Arnold)



Match Day, Diploma Day, wedding day: a 2025 spring whirlwind for Erik Jaklitsch.

UNIVERSITY OF PITTSBURGH/RAYNI SHIRING

THE NEXT STEP TO THEIR

‘BEST DREAMS’

BY MICHAEL AUBELE

Match Day, Diploma Day, wedding day: a 2025 spring whirlwind for **Erik Jaklitsch**.

As class president, Jaklitsch emceed the first on March 21 and learned that he will begin his clinical training at Yale University–New Haven Hospital, his top choice for residency. He graduated May 18 from the University of Pittsburgh School of Medicine and only a few days later married Veronique Falkovich in his native New York.

On Match Day, Jaklitsch said that his pending wedding was what occupied most of his thoughts, though the excitement of embarking on his professional journey wasn’t far behind.

The anticipation of beginning their careers as physicians, and learning where those careers would begin, was overwhelming enough on Match Day that many of Jaklitsch’s classmates were brought to tears after discovering where they’d matched.

“You may have realized your dreams today, but even if it’s not everything you’ve dreamed of, remember that it’s just the next step to your best dream,” Dean Anantha Shekhar, an MD, PhD, said as the Class of 2025 waited to open the envelopes that contained their match.

“You will have many more great dreams ahead of you.”

Leading up to and on Match Day, we asked five graduating students about beginning the next phase of their professional journey, and what they will miss the most from their med school days. One thing was clear: Leaving Pitt Med behind was going to be bittersweet.



Q: How eager are you to wrap up med school?

A: "In September or early fall, I was an 11 out of 10—just waiting to be done," says **Akanksha Chilukuri**, who will specialize in diagnostic radiology and has matched to the University of Illinois–Weiss Memorial Hospital in Chicago for her transitional year and Mount Sinai Hospital in New York for her radiology training. "But now that I'm much closer to the end, I want to hit pause and really soak in the moment. There's a sense of nervousness, you know, of finally being a physician. But also, saying goodbye, I think that's a little unnerving."

A: "Personally, I've checked out at this point. It was just a matter of the countdown to Match Day. But I will say it's been exciting—to get to this point," says **Oluleke Falade**, 30, who matched to Florida International University for general surgery.

"For me, it's more about the new chapter," Falade says.

"Because I'm a nontraditional student, a lot of my peers are well into their careers. I literally just saw someone the other day who became the vice president of a major company. I'm excited to just see where my career goes—how I end up learning and slowly improving every day . . . to see how I grow into a professional."

A: "It's as high as a seven out of 10 because the med school process is indeed trying and challenging and crazy, and I'm also so excited about residency," says **Jaklitsch**, who will go to Yale for dermatology. Jaklitsch is passionate about detecting skin cancer after watching his mother undergo Mohs micrographic surgery for facial skin cancer.

"I think for those reasons there's a lot to be excited about to move on. But it's certainly not a 10 because so much of my identity, I think at this point in my life, comes from being a Pitt Med student, in all the best ways.

"So, to hang that up and move on poses a challenge as well."

Q: Your favorite Pitt Med memory?

A: "One of the highlights for me was on my med rotation," says **Amanda Conwell**, who matched to UPMC Children's Hospital of Pittsburgh/Pitt for pediatrics. "I was at the VA, which has this program called My Life, My Story, where you get to sit down with a veteran. You're not talking about medical stuff; you're talking about their life. And then you write up a page or two from the veteran's perspective, and you give it back to them. It's also put into the patient's chart. So, I met a really neat patient who had this interesting life story where he'd been in Europe during World War II. He was part of the resistance as a young man. Just hearing the story about how he ended up in Pittsburgh and lived his life [was inspiring]."

Conwell says she went into med school "very undifferentiated" in terms of which specialty she wanted to pursue.

"So throughout the first couple years, I was just learning, soaking up as much information as I could, but really waiting until third year where you get to have this sampling platter of all the clinical specialties. Pediatrics stood out, because I really loved the patients, and the people that I worked with were all lovely and amazing. I also really liked working with families."

A: "For me, it was really exciting starting our second year because that's when all of our classes went back to in-person instead of virtual," says **Jordann Lewis**, a Long Island native who matched to Vanderbilt University Medical Center for medicine–pediatrics. "It was good being able to see my classmates and friends every day and spend more time at the medical school. You know, I think a lot of my overall good memories were spent there."

Q: What was an unexpected learning experience?

A: "There was a patient who came in with shortness of breath and chest pain very early on in one of my clinical rotations, and I didn't think to include pulmonary embolism on my differential, which is probably the one thing that should trigger in your mind when you hear that sort of thing," Jaklitsch says. "It was at the start of my third year, which is too late to make that mistake but is also a med student thing to do.

"It was a welcome-to-medicine moment, but I was lucky to be surrounded by a jovial and enthusiastic group of learners on my team who made sure the patient was evaluated thoroughly. They were committed to doing intense patient care but also poking fun at each other while doing it so that we could create a learning environment where we were comfortable with being wrong and making mistakes."

A: "You know, everyone has their own way of doing things, and that has been something that has definitely been important to learn," Lewis says. "I don't think there's been one big moment, but I think all the little pieces of advice that people have given me along the way will shape the way that I practice."

Q: What will you miss most about Pitt Med?

A: "The people," Conwell says. "I built up a really amazing network of mentors and people who really are invested in helping me become the best version of myself that I can be. But they'll just be down the street."

A: "I think I'll miss Pittsburgh and my friends," Chilukuri says. "The good thing is that a lot of them are moving to New York with me. So, I get to take a lot of the good parts of Pitt Med with me."

A: "Pitt Med's community is really incredible," Jaklitsch says. "I have to say that my friends that I've made here—they're some of my favorite people in the world. And so many of them have been so successful and are so excited about where they're going. I hate to be apart from them." ■

For more Match Day coverage, visit matchday.pitt.edu.

MATCH RESULTS 2025

Pitt Med's Class of 2025 had a 99% successful residency placement. They'll be embarking on their journeys across the United States. Fifty-one students are staying in Pennsylvania, with 41 of those starting residencies in the UPMC network. The leading specialties for this year's cohort are internal medicine, anesthesiology, psychiatry, pediatrics, general surgery and emergency medicine.

Ashima Agarwal
Palisades Medical Center, N.J.
Transitional Year
& NYU Grossman School of Medicine
Dermatology

Nishant Agrawal
St. Clair Health, Pa.
Internal Medicine

Anmol Almast
NewYork–Presbyterian Brooklyn Methodist Hospital
Preliminary Surgery
& University of Rochester/ Strong Memorial Hospital, N.Y.
Radiology – Diagnostic

Okechukwu Aloziem
Beth Israel Deaconess Medical Center, Mass.
Anesthesiology

Oluwatosin A. Aluko
UPMC Medical Education, Pa.
Family Medicine

Melissa Alvarez
Allegheny General Hospital, Pa.
Psychiatry

Eishan Ashwat
Mayo Clinic, Minn.
General Surgery

Kayleigh Askin
St. Clair Health, Pa.
Internal Medicine

Daniel R. Awad
NYU Grossman School of Medicine
Internal Medicine

Marinelle Azar
Beth Israel Deaconess Medical Center, Mass.
Internal Medicine

Courtney Baldwin
McGaw Medical Center of Northwestern University, Ill.
Emergency Medicine

Zainab Adeola Balogun
University of Michigan Health
Otolaryngology (Research Pathway)

Nick Bergum
University of Chicago Medical Center, Ill.
Anesthesiology

Brianna LaNay Blake
Wake Forest Baptist Medical Center, N.C.
General Surgery

Adoma Boateng
NewYork–Presbyterian Hospital/ Weill Cornell Medical Center
Psychiatry

Nia LaVette Buckner
UPMC Medical Education, Pa.
Preliminary Surgery

Simon Cao
UPMC Medical Education, Pa.
Internal Medicine

Kasey Cargill
UT Health Houston, Texas
Preliminary Medicine
& MD Anderson Cancer Center/ University of Texas
Radiation Oncology

Emely Tatiana Carmona
University of Colorado
Preliminary Medicine
& University of Colorado – Aurora
Ophthalmology

Shannon Nicole Cason
Mount Sinai Morningside West, N.Y.
Obstetrics and Gynecology

Annika Lauren Chang
UPMC Medical Education, Pa.
Transitional Year
& UPMC Medical Education, Pa.
Ophthalmology

Audrey Yuen Chang
Vanderbilt University Medical Center, Tenn.
Orthopaedic Surgery

Richard Chao
NewYork–Presbyterian Hospital/ Columbia University Irving Medical Center
Anesthesiology

Eva Chau
Rutgers Health/Community Medical Center, N.J.
Transitional Year
& Massachusetts General Hospital, Mass.
Radiology – Diagnostic

Jeffrey Chen
UPMC Medical Education, Pa.
Preliminary Medicine

Akanksha Sri Satya Chilukuri
Weiss Memorial Hospital, Ill.
Transitional Year
& Mount Sinai Hospital, N.Y.
Radiology – Diagnostic

Sarah Jiangbin Clifford
UPMC Medical Education, Pa.
Vascular Surgery

Owen D. Clinger
UPMC Medical Education, Pa.
Transitional Year
& UPMC Medical Education, Pa.
Ophthalmology

Shannon Conway
Northwestern University/ Lurie Children's Hospital, Ill.
Pediatrics

Amanda N. Conwell
UPMC Medical Education, Pa.
Pediatrics

Elizabeth Copp
UPMC Medical Education, Pa.
Pediatrics

Corbin W. Darling
Baylor College of Medicine, Texas
Psychiatry

Richelle Nicole DeBlasio
New York–Presbyterian Hospital/ Columbia University Irving Medical Center
Pediatrics

Deesha Desai
University of Central Florida/HCA Florida Ocala Hospital
Transitional Year
& UPMC Medical Education, Pa.
Dermatology

Julia DiNicola
University of Chicago Medical Center, Ill.
Obstetrics and Gynecology

Nandini Kamlesh Doshi
NYU Grossman School of Medicine
Internal Medicine (Research Track)

Nerone Kiyoshi Omari Opinaldo Douglas
UPMC Medical Education, Pa.
Plastic Surgery – Integrated

Soukaina Eljamri
UPMC Medical Education, Pa.
Internal Medicine

Oluleke Falade
Florida International University
General Surgery

Michelle Alexandra Falconi
UPMC Medical Education, Pa.
Internal Medicine (Geriatric Track)

Saurab Faruque
Barnes-Jewish Hospital, Mo.
Transitional Year
& Hospital of the University of Pennsylvania
Radiology – Diagnostic

Annella Marie Fernandez
Cleveland Clinic, Ohio
Anesthesiology

Muhammad Feroze
Wellington Regional Medical Center, Fla.
Internal Medicine

Meredith Rosa Flanagan
Allegheny General Hospital, Pa.
Orthopaedic Surgery

Cara Maya Fleseriu
Mass General Brigham
Otolaryngology

Stephen John Flinn Jr.
University of North Carolina
Urology

Breauna Shanice Franklin
Beth Israel Deaconess Medical Center, Mass.
General Surgery

Andrew Jackson Frear
West Virginia University
Orthopaedic Surgery (Research Pathway)

Jenna Gale
Brigham and Women's Hospital, Mass.
Preliminary Medicine
& Mass General Brigham
Neurology

Luke Anthony Giannetta
UPMC Medical Education, Pa.
Pediatrics

Basil Hashimi
UCLA Medical Center
Internal Medicine

Eli James Hay
UPMC Medical Education, Pa.
Anesthesiology

Victoria Ann Heinrich
Yale University/New Haven Hospital, Conn.
Medicine – Pediatrics

Michael Stuart Helkowski
Allegheny General Hospital, Pa.
Preliminary Medicine
& UPMC Medical Education, Pa.
Radiology – Diagnostics

Jonathan Ho
Johns Hopkins Hospital, Md.
Neurological Surgery

Ruby Andrea Holland
Brigham and Women's Hospital, Mass.
Anesthesiology

Nnamdi Ihejirika
Lehigh Valley Hospital, Pa.
Emergency Medicine

Emily In
UC San Diego Medical Center, Calif.
Neurology

Kartik Iyer
Virginia Mason Franciscan Health, Wash.
Radiology – Diagnostic

Erik Louis Jaklitsch
Arnot Ogden Medical Center, N.Y.
Transitional Year
& Yale University/New Haven Hospital, Conn.
Dermatology

Swetha Purnima Jasti
UPMC Medical Education, Pa.
Internal Medicine (Women's Health Track)

Crandall Jones
UPMC Medical Education, Pa.
Anesthesiology

Jonathan Joseph
Nationwide Children's Hospital, Ohio
Pediatrics

Nicolina Jovanovich
UPMC Medical Education, Pa.
Anesthesiology

Courtney Leigh Judkins
Cook County Health and Hospital System, Ill.
Emergency Medicine

Nuzhat Kabir
Baylor College of Medicine, Texas
Internal Medicine

Kevin Mattias Kahru
UC San Diego Medical Center, Calif.
Psychiatry

Elizabeth Kairis
UPMC Medical Education, Pa.
Internal Medicine

Nicolás Matheo Kass
UPMC Medical Education, Pa.
Plastic Surgery – Integrated

Nikita Kedia
NYU Grossman School of Medicine
Internal Medicine (Research Track)

Olesia Kellezi
University of Michigan Hospital
Internal Medicine

Matthew Ryan Kesinger
Capital Health Regional Medical Center, N.J.
Emergency Medicine

Nathan Lewis Kindja
UPMC Medical Education, Pa.
Neurology

Stephen Kisty
University of Minnesota
Urology

Michael Knapp
Baylor College of Medicine, Texas
Medicine – Pediatrics

Isabella Jia-An Lao
UPMC Medical Education, Pa.
Anesthesiology

Mikhaila Layshock
Nationwide Children's Hospital, Ohio
Pediatrics

David Lembersky
Johns Hopkins Hospital, Md.
Internal Medicine

Jordann Nicole Lewis
Vanderbilt University Medical Center, Tenn.
Medicine – Pediatrics

Alice Lin
UPMC Medical Education, Pa.
Preliminary Medicine
& Penn State Hershey Medical Center, Pa.
Dermatology

Maxwell Lohss
University of Michigan Health
Interventional Radiology

Sarah Anne Lopez
Oregon Health & Science University
Emergency Medicine

John C. Majewski
Ohio State University Medical Center
Internal Medicine

Philip Mannes
Hospital of the University of Pennsylvania
Anesthesiology

Elyse Gwendolyn Mark
UPMC Medical Education, Pa.
Psychiatry (Research Pathway)

Sayna Matinrazm
UPMC Medical Education, Pa.
Psychiatry

Aditya Milun Mittal
University of Utah Health
Neurological Surgery

Arjun Mittal
Beth Israel Deaconess Medical Center, Mass.
Internal Medicine

Joseph Mocharnuk
UC San Francisco, Calif.
Plastic Surgery – Integrated (Research Pathway)

Ananya Mukundan
University of Chicago Medical Center, Ill.
Internal Medicine

Pallavi Devi Muluk
Mount Sinai Hospital, N.Y.
Internal Medicine

Peter J. Nelson
Rutgers New Jersey Medical School
Medicine – Pediatrics

Hector M. Nieves-Rosado
St. Clair Health, Pa.
Internal Medicine

Caitlin O'Brien
Christ Hospital, Ohio
Family Medicine

Kathleen O'Connor
UT Southwestern Medical Center
General Surgery

Chiazam Omenyi
Inova Fairfax Hospital, Va.
Pediatrics

Keily Ortega
University of Illinois
Preliminary Medicine
& UPMC Medical Education, Pa.
Dermatology

Tate A. Overbey
UPMC Medical Education, Pa.
Psychiatry

Daniel Pan
Trinity Health – Ann Arbor Hospital, Mich.
Transitional Year
& University of Michigan Health
Physical Medicine and Rehabilitation

Kevin Pravin Patel
West Virginia University
Psychiatry

BaDoi Phan
Sutter Health, Calif.
Transitional Year
& Stanford Health Care, Calif.
Anesthesiology

Maneka Tayo Okahara Puligandla
UC San Francisco, Calif.
Pathology

Michael Dante Pupi
UPMC Medical Education, Pa.
Psychiatry

Adriana Leigh Racki
Allegheny General Hospital, Pa.
Preliminary Medicine
& UPMC Medical Education, Pa.
Radiology – Diagnostic

Haris Rahman
UPMC Medical Education, Pa.
General Surgery

Raghav Ramraj
Cape Fear Valley Health, N.C.
Transitional Year
& NYU Grossman School of Medicine
Anesthesiology

Rashmi J. Rao
Brigham and Women's Hospital, Mass.
Internal Medicine

Michael Raver
SUNY Downstate Health Sciences University
Urology

Paul Rodriguez Jr.
UPMC Medical Education, Pa.
Anesthesiology

Samantha Morris Rosen
Loyola University Medical Center, Ill.
Internal Medicine

Madeline Motyka Ross
NYU Grossman School of Medicine
Internal Medicine (Research Track)

Robert Joseph Scherer
UPMC Medical Education, Pa.
Preliminary Medicine
& UPMC Medical Education, Pa.
Anesthesiology

Katarina Safran Schneiderman
Rapid City Hospital, S.D.
Family Medicine

Romano Sebastiani
UPMC Medical Education, Pa.
Orthopaedic Surgery

Zachary Alan Sedor-Schiffhauer
Advocate Health Care, Ill.
Emergency Medicine

Amy Sentis
University of Colorado
Internal Medicine (Research Track)

Meena Sethuraman
UPMC Medical Education, Pa.
Obstetrics and Gynecology

Ashti Milan Shah
Yale University, Conn.
Urology

Stavan Vijay Shah
Ohio State University
Preliminary Medicine
& Ophthalmology

McKenzie Sicke
University of Utah Health
Emergency Medicine

Anya Singh-Varma
NewYork–Presbyterian Hospital/ Weill Cornell Medical Center
Obstetrics and Gynecology

Charlotte N. Stahlfeld
UPMC Medical Education, Pa.
General Surgery

Fritz Steuer
UPMC Medical Education, Pa.
Orthopaedic Surgery

Lauren Burnette Stumpp
UPMC Medical Education, Pa.
Pediatrics

George Michael Tankosich
UPMC Medical Education, Pa.
Physical Medicine and Rehabilitation

Melody T. Trudgen
Wright State University, Ohio
Neurology

Aiyedun James Uzamere
SUNY Brooklyn
Emergency Medicine

Maxwell Bond Wang
UC San Francisco, Calif.
Neurological Surgery

Rachel Weger
Greater Lawrence Family Health Center, Mass.
Family Medicine

Hillary A. Wehry
Johns Hopkins Hospital, Md.
Anesthesiology (Research Pathway)

Chris Wei
McGaw Medical Center of Northwestern University, Ill.
Neurological Surgery

Taylor M. Williams
UPMC Medical Education, Pa.
Family Medicine

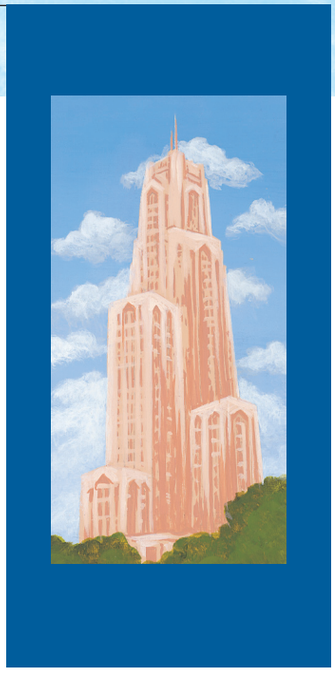
Andrew C. Wills
UPMC Medical Education, Pa.
Anesthesiology

Stephen Worrell
Allegheny General Hospital, Pa.
Preliminary Medicine
& Thomas Jefferson University, Pa.
Radiology – Diagnostics

Jia Yu
Johns Hopkins Hospital, Md.
Internal Medicine

Arman Zarnegar
UPMC Medical Education, Pa.
Transitional Year
& UPMC Medical Education, Pa.
Ophthalmology

Casey Zhang
Hospital of the University of Pennsylvania
Plastic Surgery – Integrated



TRIO FORGES THE SAME PATH

Crandall Jones, **Andrew Wills** and **Paul Rodriguez**, all of the Class of 2025, aren't sure when they got so close. Maybe it happened while they were playing basketball as first-years, though Jones' theory is that he "probably stumbled into a small group room while [the other two] were studying."

At some point though, "everybody was just inseparable," he says. Now, they'll all be doing an anesthesiology residency at UPMC.

Rodriguez agrees: "It was instant chemistry."

After three-odd years, says Wills, "I consider these people family."

From pickup basketball games in Trees Hall to karaoke nights and the first time Rodriguez saw snow, these friends have made Pittsburgh their own. Rodriguez says he found real community at Pitt Med. "The reason I came to Pittsburgh, not just because of the amazing med school, is I felt so supported here despite not knowing a soul," he says. "I [soon] felt like I did have a family away from home."

They all fell in love with anesthesiology during their clinical rotations. Wills loves making patients feel safe and comfortable before daunting surgeries. He once jammed out to Cyndi Lauper with a nervous young patient to help her feel more at home. Jones fondly remembers the "comedic duo" that delivered him anesthesia during a procedure of his own. And Rodriguez says anesthesiology feels like you're "living for" the patient through their most difficult times. "I think the patient is communicating with you what their needs are" even when they're under, he says.

Though nervous about their busy schedules, the friends say they're ready for the challenge.

"I'm looking forward to going into the trenches with these guys," says Wills.

Says Jones, "I'm just excited for what we're going to be and what we're going to become." *—Livia Daggett*



After years of friendship at Pitt Med, new grads (from left) Paul Rodriguez, Andrew Wills and Crandall Jones stick together in residency. (Photo by Rayni Shiring/University of Pittsburgh)

MAA SAYS (MEDICAL ALUMNI ASSOCIATION DISPATCHES)

MORE MENTORSHIP, PLEASE



Shetty (right)

Neha Shetty (Class of '27) led a tour of Alan Magee Scaife Hall's West Wing for Pitt Med's Class of 1970 at last year's Reunion Weekend and Homecoming, during which several of those alumni reminisced about their student rotations on Native American reservations. Some moved near reservations after medical school and dedicated their practices to serving those communities.

"They helped me to see that a lot of global health and community health is also local," says Shetty, a student representative for the Medical Alumni Association (MAA). "It was eye opening. I've been curious about how to incorporate community health and global health into my future practice." She also organized a community health fair last summer for Pittsburgh's Bhutanese community.

Shetty is helping to expand MAA's Help Our Students Thrive (HOST) program, which offers mentorship for first- and second-year students and spare bedrooms for third- and fourth-years when they travel for residency interviews.

She'd like more students to have a chance to benefit from the experience and wisdom of alumni, docs like the Class of '70 graduates she met. So far, Shetty has worked with MAA staff to connect 70 classmates with alumni mentors. (See page 37 announcement to volunteer.) She herself is eager to meet more alumni, particularly those devoted to community health. *—Cara Masset*

STEP UP: PITT MED TRIVIA



GETTY IMAGES/CAMPWILLOWLAKE

Can you answer these without going online?

(We encourage you to call doctors-in-the-know for consults.)

1. Noah Wyle, former "ER" star and now lead in the Pittsburgh-based hospital drama "The Pitt," has ties to the city. His mother and father met while attending universities here. What were they?
   - **A. Pitt and Carnegie Mellon**
   - **B. Pitt and Point Park**
   - **C. Carnegie Mellon and Chatham**

2. True or false: The artificial intelligence firm Vizzhy has invested heavily in Pitt. The company recently pledged millions toward exciting new major global health partnerships here, including the creation of the Vijayalakshmi Innovation Center in Women's Health Analytics and Research (VIHAR). It was named in honor of the founders' sister.

3. This Pittsburgh neighborhood, just steps from Pitt Med, nurtured a number of local and legendary jazz artists, including Art Blakey, George Benson, Kenny Clarke, Stanley Turrentine, Mary Lou Williams and Walt Harper. Was it . . .
   - **A. Oakland**
   - **B. North Side**
   - **C. Hill District**

4. In this issue, we learn the story of Naoto Ueno (Res '93), director of the University of Hawai'i Cancer Center. Hawai'i Gov. Josh Green (Res '00) also trained here. The governor is a . . .
   - **A. Family medicine doctor**
   - **B. Ophthalmologist**
   - **C. Pediatrician**

Done? Now check our inside back cover to find out if you aced this one. And if you have an idea for a Pitt Med-related trivia question, send it our way; we're all ears: medmag@pitt.edu.

SPOTLIGHT

A NEW FOCUS

After 38 years as an ophthalmologist and retina specialist, **Joseph Fammartino** (MD '76) turned his focus to a lens of the nonocular variety—the camera. His 2024 photo book, "Next Please," is the product of 20-plus years photographing what he describes as often underappreciated subjects.

"Seeking out old-style men's barbershops really had nothing to do with a life's aspiration to acknowledge barbers," Fammartino says. Instead, he was intrigued by the "unsung heroes" of communities across America. In these barbershops, there's no pretense. Barbers create essential forums for honest talk about everything from politics to heartbreak. Says Fammartino, "They were people that listened, but didn't really repeat."



Fammartino

Only once in all his interviews did Fammartino ask someone for a haircut. He would later dedicate "Next Please" to that barber, Angel Delgadillo, who was 91 years old when he gave Fammartino a cut and a straight-razor shave. Fammartino drove back to Northern Arizona from his home in Santa Fe last summer to deliver the book to Delgadillo, now 98. "It was a special moment," he says.

Fammartino remembers Pitt fondly, where he completed both his MD and his bachelor's. "My exposure and my abilities were enhanced by the wonderful way Pitt Med structured clinical at that time, learning from the fellows and the residents and then the attendings," he says. "It had a significant impact for me."

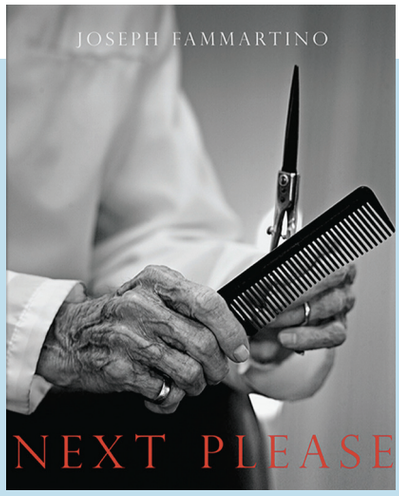
After completing a retinal fellowship at Mass Eye and Ear, he started a practice that grew to four locations, three in Ohio and one in western Pennsylvania. He moved west and became head of an eye department in Albuquerque. But six years ago, Fammartino suffered a severe hemorrhagic brain injury that forced him to retire as a surgeon.

"It was a significant, dramatic change in my life," he says. During his recovery, assembling the book was therapeutic, he says.

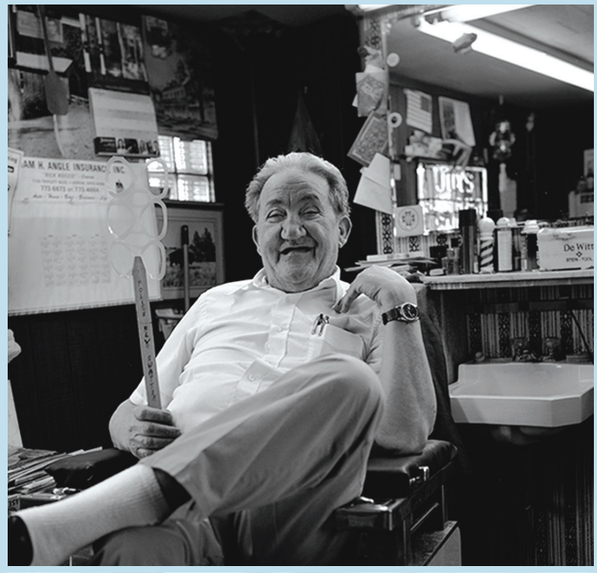
He's since kept medicine in his life in other ways. This March, he returned from Bolivia—his and his wife's 32nd medical mission in South America. Fammartino is medical director for one of the projects of the Canada-based nonprofit Medical Ministry International, which aims to build self-sustaining medical centers in developing areas and has provided direct care to more than 125,000 people. "That still keeps my head cranking," he says.

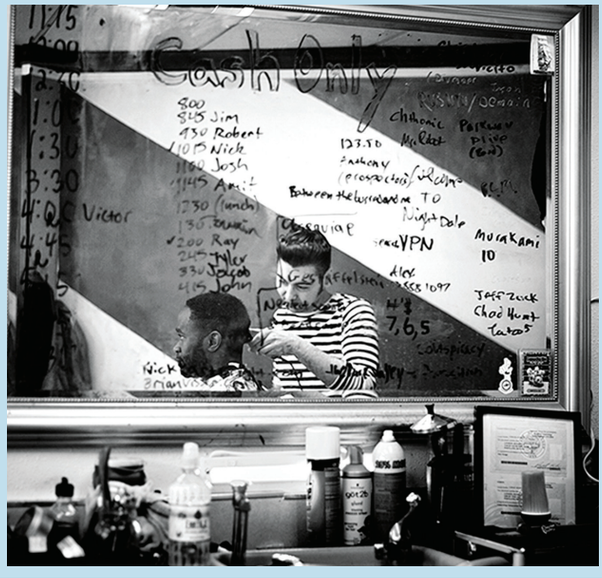
Does his black-and-white, dreamlike portrait style have anything to do with his career?

"Clearly, I've always been intrigued as to what isn't being seen," Fammartino says. "People with retinal diseases have significant, devastating reduction in vision, and they don't regain it back totally. Maybe that's why I [shoot] most of my images blurred." *—LD*



"Next Please," a photo book by Joseph Fammartino, came out in 2024.






Prajakta Sonalker

SPOTLIGHT

ADAPTABILITY:
SONALKER TRANSITIONED FROM PHARMACOLOGY TO LAW

Prajakta Sonalker didn't know how to break it to her graduate advisor that her career plans were headed outside of research. She was studying molecular pharmacology at Pitt Med and loving it, but postdoc options were in short supply in the early 2000s, so she started to explore alternatives. That's when she crossed paths with a pharmacology PhD who loved her job as a patent attorney. After their conversation, Sonalker (PhD '06) borrowed a stack of books on patent law: "I read them cover to cover." She realized, "This is what I want to do with my life."

In Sonalker's first week of law school, her father passed away suddenly. Deferring her admission, she says, wasn't an option: Education was what her father valued most for his children. "I felt that if I did that, I'd be letting him down," she recalls. She worked through her grief, juggling school and a full-time job at New York University's technology transfer office. A good night's sleep often meant one or two hours. But at the end of that year, she ranked second out of 171 students.

"If I can get through that, I can do anything," she remembers thinking. "So, when I approach cases or difficult situations at work, they don't scare me."

Though "dynamic" might not be people's first thought when they hear "patent law," Sonalker says the legal world is always changing. The skills she used at the bench at Pitt Med—adaptability, critical thinking, breaking down complex questions—made her career a natural progression from a doctoral program that emphasized innovation and interdisciplinary connections beyond "classic" pharmacology. "That's what grad school prepares you [for]," she says. "At the end of the day, it's not so much the techniques that you learn, but it's the ability to understand things as they are evolving and then being able to use them in whatever field you're in."

Now a partner at Venable, Sonalker works with pharmaceutical and biotech clients and nonprofits to "protect and defend their innovations." Patent applicants must make public the technical details behind their innovations. In this way, patents can allow researchers to understand developments in the field, advancing science and medicine. She explains, "Once you've described your invention, people are like, 'OK, let me see how I can make it better.'"

These days, success for Sonalker doesn't just look like winning trials, though with years of prep behind each win, it's no wonder those are her proudest professional moments. It also means solving problems for clients, mentoring high schoolers and offering the next generation of lawyers the support she wished she'd had.

"We're all people first," she says. "That's what really gives me joy on a day-to-day basis—being able to help people, however big or small that may be." *—LD*

MENTORS NEEDED!

The Help Our Students Thrive (HOST) program connects alumni with students who are looking for guidance and support as they plan the next chapter of their lives. You can support the students through virtual or in-person mentoring sessions, cover letter and resume reviews and travel accommodations for residency interviews. Our students are as passionate and motivated as ever; your support can give them a leg up to realize their full potential.

RINALDO BELLOMO

AUG. 8, 1956–MAY 6, 2025

Rinaldo Bellomo, MD, PhD (Fel '94), a towering figure in critical care research, fiercely curious physician-scientist and mentor whose influence spanned the globe and earned him one of Australia's most prestigious honors, died unexpectedly in May.

Bellomo joined the University of Pittsburgh's Multidisciplinary Critical Care Training Program as a fellow in 1992. He collaborated closely with Michael Pinsky, an MD professor of critical care medicine, producing seven peer-reviewed papers on circulatory shock and acid-base physiology—and foreshadowing a remarkable career.



Bellomo

Returning to Melbourne, where he'd earned his medical degree at Monash Medical School, Bellomo became director of intensive care research at Austin Health and reshaped the landscape of critical care. As cofounder of the Australian and New Zealand Intensive Care Research Centre, he championed large-scale clinical trials that transformed global standards for managing sepsis, acute kidney injury, trauma and clinical deterioration.

His clinical insights and academic drive led to more than 2,000 peer-reviewed publications, more than 180 book chapters and editorship of Critical Care and Resuscitation. For seven consecutive years, Clarivate Analytics named him one of the world's most influential scientific minds. He became the most cited and published medical researcher in Australian history.

His impact extended beyond scholarship. He believed in compassionate care with continuous inquiry. "Patients are not just cases, they are people with stories," he said on the Mastering Intensive Care podcast. That philosophy grounded his mentorship as much as his bedside care, inspiring a generation of investigators to pursue big questions with both discipline and humility.

In 2018, he was named an Officer of the Order of Australia for distinguished service to medicine. Those who knew him best recall his quiet encouragement, steady presence and ability to elevate both the science and the room.

Colleagues say his legacy lives on in the lives he touched, the trials he designed and the wisdom he seeded in ICUs around the world. —*Samri Samuel*

MICHAEL W. GROFF

MAY 21, 1966–APRIL 12, 2025

JYOT "JOY" SAINI

APRIL 20, 1967–APRIL 12, 2025



Groff (left) and Saini

At a Pitt Med house party in 1989, partygoers witnessed the sparks of a new relationship between first-year classmates Michael W. Groff (MD '93) and Jyot "Joy" Saini (MD '93).

"They were a perfect match from the start," says Michael's younger brother, Yram J. Groff (MD '95, Res '00, Fel '01), who tagged along that day.

Michael and Joy relished med school life and enjoyed giving pointers, study aids and steady encouragement to Yram when he enrolled after them. They were, he says, natural mentors who would go on to serve as "guiding lights" for colleagues, patients and family members.

After Pitt Med, Michael and Joy both matched in New York—neurosurgery at Mount Sinai Hospital for Michael and ob/gyn at NewYork-Presbyterian Hospital for Joy. In 1996, they married at a "fabulous" wedding in India, Yram says, and would grow "a beautiful family" with three children: Jared, Karenna and Anika.

Joy was among the first surgeons in the country to become board certified in pelvic medicine and reconstructive surgery for women. She pursued urogynecology research, founded Boston Pelvic Health and Wellness in Wellesley, Massachusetts, and was named a fellow of the American College of Obstetricians and Gynecologists.

Michael became a nationally known neurological surgeon who held leadership roles with the American Association of Neurological Surgeons and served on the faculty of Medical College of Wisconsin, Indiana University and Harvard Medical School. Last year he was appointed executive medical director of neurosciences at Rochester Regional Health.

The Groff brothers were raised with twin passions for medicine and aviation. Their father, 92, is a psychiatrist and pilot, and Yram is a clinical instructor of orthopaedic medicine at Pitt. Michael enjoyed piloting planes to conferences—or simply to grab lunch somewhere, often with Yram so they could talk about everything from surgical biomechanics to pride in their accomplished children.

In April 2025, Michael and Joy, as well as Karenna and her boyfriend, James Santoro, and Jared and his girlfriend, Alexia Couyutas Duarte, died in a plane accident. The Groff Family Memorial Fund was established by the Neurosurgery Research and Education Foundation, which Michael chaired, in honor of the "family's long-standing commitment to education, research, innovation and collaboration." —*Cara Masset*

IN MEMORIAM

'50s

JOHN DELLER, MD '57
APRIL 30, 2025
GERALD JOHNSTON, MD '56, PHD
APRIL 5, 2025
COLIN KAMPERMAN, MD '55
MARCH 14, 2025
DONALD MRVOS, MD '55, RES '62
APRIL 5, 2025

'60s

ROBERT B. GREER III, MD, RES '67
MARCH 27, 2025

'70s

NEAL BORNSTEIN, MD, RES '75
FEB. 28, 2025
WILLIAM SMITH JR., MD '72, RES '76
MARCH 15, 2025

'90s

RINALDO BELLOMO, MD, PHD, FEL '94
MAY 6, 2025
MICHAEL GROFF, MD '93
APRIL 12, 2025
JYOT SAINI, MD '93
APRIL 12, 2025

FACULTY

ROBERT G. KROHNER, DO
MARCH 11, 2025
WILLIAM MARKLE, MD
MAY 13, 2025
QINGDE WANG, MD, PHD
MAY 21, 2025

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EXPERT. SURVIVOR. UENO NEGOTIATES CANCER WHILE CARING FOR OTHERS WITH THE DISEASE.

BY MICHAEL AUBELE



Naoto Ueno

COURTESY UNIVERSITY OF HAWAII CANCER CENTER

There's no humor in it, but there is a sense of unfortunate irony: Naoto Ueno (Res '93), an MD, PhD and leading cancer expert, became a two-time cancer survivor.

Now the director of the University of Hawai'i Cancer Center, Ueno's personal cancer journey began in 2007 while he was the executive director of the Morgan Welch Inflammatory Breast Cancer Research Program and Clinic at the MD Anderson Cancer Center in Texas. "I felt a mass in my left thigh," he says. It turned out to be a malignant soft tissue sarcoma. "Everything moved at lightning speed," he says of the treatment he received.

Not long after that cancer treatment, Ueno was diagnosed with a blood disorder that can evolve into leukemia, which was the case for him. He enrolled in a clinical trial at MD Anderson testing the efficacy of what's known as an IDH2 inhibitor, though it wasn't effective for him. "The only way for me to find a cure was through unrelated allogeneic stem cell transplant," he says.

"I was a bone marrow transplant physician trained at Pitt. I knew it in and out," Ueno says, adding that he carried out extensive research after his diagnosis to make sure he had the right donor and that he was getting the treatments he wanted.

He effectively shot himself in the foot.

"It just drove more anxiety," he says.

"Finally, I decided to let the doctor do his job. I told him, 'You do what you think is best. I'm done trying to be the doctor of myself.'"

Ueno's cancer is in remission now, and he says that his energy levels have returned and he's content in both his personal and professional lives. "Life is not black and white," he says. "I'm happy where I am. And if I didn't go through this, I'd probably have a very different way of approaching life."

During his training at Pitt Med in the early '90s, and before that, Kyoto-born Ueno navigated life more scientifically, making calculated decisions, notably regarding his career path. He notes that he became a doctor in large part because he excelled in the sciences in school, so medicine seemed practical to pursue.

At Pitt, more than a decade before his experiences with the disease, he concluded he "needed to do something to help people who have cancer." He initially thought of getting into something "holistic," such as hematology. But then came an exposure to transplant medicine, which he says was "part of the DNA" at Pitt. He recalls being most fascinated by bone marrow transplants and patient outcomes, thinking to himself, "Oh my God, you can cure aggressive cancer!"

Under the tutelage of John Kirkwood, an MD and Pitt Distinguished Service Professor of Medicine, and Edward Wing, an MD, former Pitt professor of medicine and now professor emeritus at Brown University, Ueno decided to pursue cancer research.

"Naoto has been in touch over the years since his fellowship, and I've been thrilled to watch his rising career," says Kirkwood, who's contributed to the development of a dozen therapies for advanced melanoma and treatments to prevent the disease and its relapse.

"It has been especially rewarding to see our trainees become leaders in cancer research at multiple major cancer centers across the U.S."

Ueno, known for conducting early phase clinical trials related to aggressive breast cancer, has focused much of his efforts on finding a cure for the deadliest and most aggressive type—inflammatory breast cancer.

"My research focuses a lot on drug development," he says. "I'm looking for a way to cure this disease.

"With inflammatory breast cancer, there is redness and swelling, and it's often mistaken as an infection. Looking at it at the genetic level, though, it's not much different than regular breast cancer. In investigating the surrounding tumor microenvironment, I'm trying to dissect what's going on. The microenvironment is much more complex, and we want to understand that complexity; how can that be translated into a better form of treatment?"

Ueno says his goals for the University of Hawai'i Cancer Center include continuing to enhance its reputation. The university is launching a more robust academic program, and, in 2027, a medical oncology fellowship.

Cancer care in Hawai'i faces challenges, however. Poverty and geographic isolation make getting access to care difficult for some residents. And those who can afford to often leave the island for treatment on the mainland.

Despite those realities, Ueno says the center is making strides in reaching people who struggle for access and making sure all residents of Hawai'i are confident in the care they receive. ■



BRIANA JACKSON/GETTY IMAGES

There's no proof that doing a headstand cures hiccups.

FOR REAL! TWEEN SCIENCE



You're at a birthday party, and you just washed down a big slice of cake with a can of soda. Then, you feel your chest get tight with air.

Uh oh.

Hiccup! . . . Hiccup! You try holding your breath.

Hiccup!

Why is this happening? Scientists aren't totally sure. They think it's a reflex, like how you might kick your leg without thinking about it when someone hits your knee.

Your diaphragm, a dome-shaped muscle that separates your chest from your belly, causes a hiccup when it spasms; these twitches just happen without your control. When you hiccup, air rushes in suddenly. Your voice box closes, and your vocal folds contract, which makes that "hic" sound. As for why hiccups happen in the first place, that remains a mystery. They don't have a clear evolutionary purpose.

You've probably heard all sorts of ideas for getting rid of hiccups, like drinking cold water, having someone startle you, doing a headstand or all of the above, at once. (Don't try this at home!) Unfortunately, there's no scientific evidence that these tricks work. The best way to handle hiccups is to see if there's a pattern linked to when you get them. If you find yourself hiccupping after eating too quickly, drinking a bubbly beverage or eating something spicy, try avoiding those triggers.

Hiccups sound funny, but they become painful if they last a while. "Intractable" hiccups are cases that don't go away like they normally would. If your hiccups don't stop within a few days, it's a good idea to see a doctor.

Have you ever tried to pass off a loud burp as a hiccup? Well, we've got some bad news: Hiccups are a muscle spasm, yet burps are actually puffs of air traveling back up through your throat from your stomach. So, though hiccups aren't exactly refined, burps can smell! *—Livia Daggett*

Special thanks to Kendrea Garand, a PhD, CScD associate professor in the School of Health and Rehabilitation Sciences and speech-language pathologist, for helping us become better hiccup handlers.

CALENDAR

WHITE COAT CEREMONY
JULY 25
Carnegie Music Hall

NEW PHD STUDENT CEREMONY
SEPTEMBER 18
Alumni Hall

REUNION AND HOMECOMING WEEKEND
SEPTEMBER 19-20
For more information: Alex Rigby at +1-412-789-5866 or hsalumni.pitt.edu

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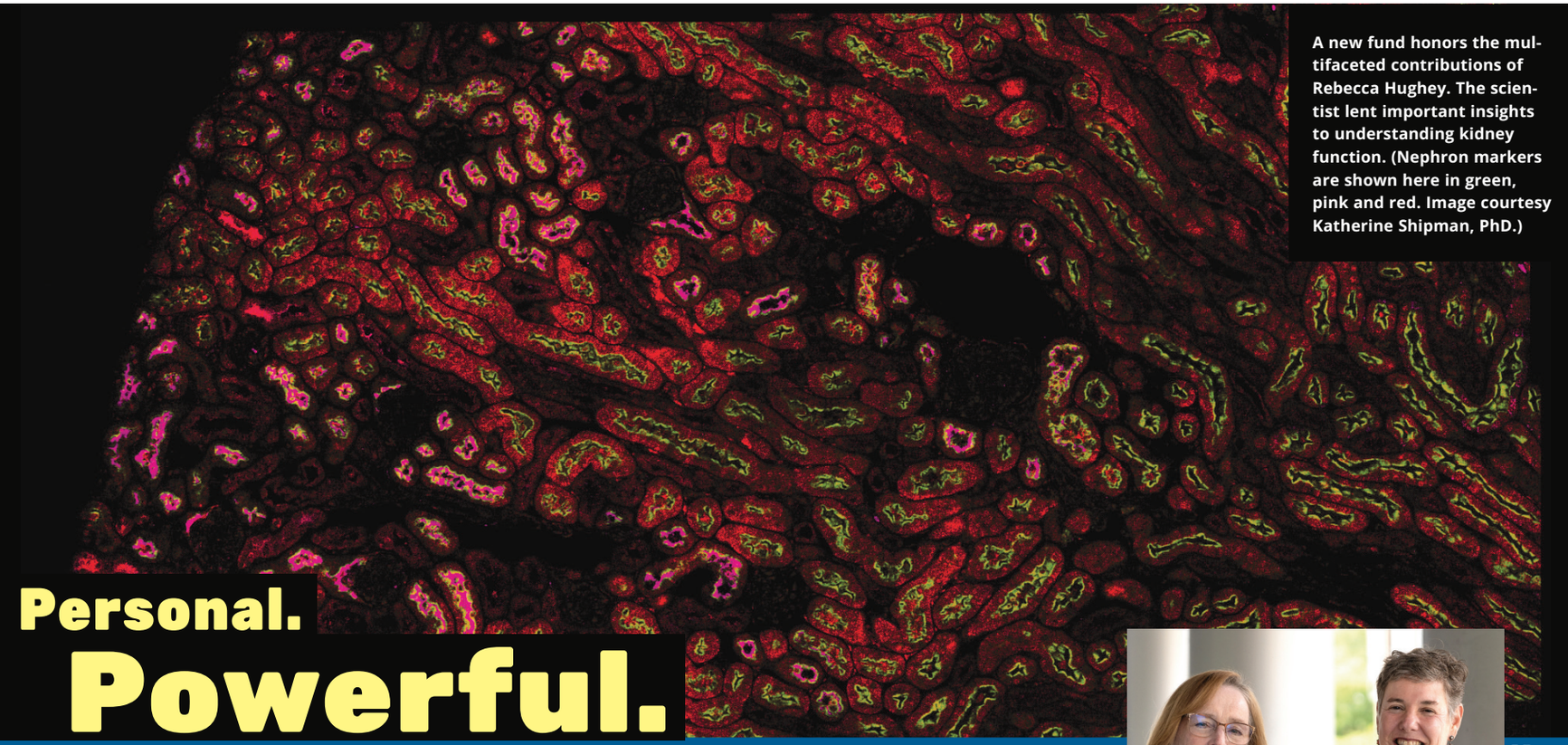
Pitt Med Trivia *(from page 35)*

Answers:
1. C – Carnegie Mellon and Chatham
2. False, the center is named for their mother
3. C – Hill District
4. A – Family medicine doctor

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A new fund honors the multifaceted contributions of Rebecca Hughey. The scientist lent important insights to understanding kidney function. (Nephron markers are shown here in green, pink and red. Image courtesy Katherine Shipman, PhD.)

Personal. Powerful.



RAYNI SHIRING/ UNIVERSITY OF PITTSBURGH

Hughey (left) and Weisz

Her father intended for her to become a teacher, and though she sensed it wasn't her calling, Rebecca Hughey started down that path. This was the early 1970s, and Hughey followed that route until student-teaching high school seniors—when she was only 20 herself—turned her off to it. She pivoted to science, a longstanding passion. "I enjoyed [the sciences] all four years of high school. My bachelor's is in biology secondary education."

Her parents, who both worked in banking, hadn't pictured a research career for her; yet when Hughey told her father she planned to enroll in a Pitt PhD program, he said that if she completed it, he would send her on a trip to anywhere she wanted.

She earned that PhD in biochemistry in 1976 and informed her father she wanted to go to Hawai'i. True to his word, he financed the trip for Hughey and her husband.

A professor emeritus of medicine, Hughey spent more than 40 years in the Division of Renal-Electrolyte at Pitt. She was its first woman PhD faculty member. Among Hughey's influential studies, one involved elucidating the role of the transmembrane mucin MUC1 (found lining the digestive tract and elsewhere) in kidney function, says Ora Weisz, a PhD professor of medicine in Renal-Electrolyte. And during a long collaboration with the division chief, Tom Kleyman, an MD, Hughey characterized enzyme cleavage sites of the epithelial sodium channel, an intricate instrument in the regulation of blood pressure. "She made critical contributions," says Weisz. "She initiated projects that half our division is working on." Her studies led to insights on proteins related to the regulation of oxidative stress and to genetic kidney disease as well as to hypertension and sodium balance.

After joining the division in 1995, Weisz noticed the many ways Hughey lifted others—like holding annual picnics at her home, encouraging celebrations of her colleagues' accomplishments and maintaining a stash of chocolate in the office. Weisz grew accustomed to daily lunches with Hughey, and their routine continued until Hughey retired in 2023. In honor of her good friend—her contributions both to science and to the morale of the division—Weisz and her husband, James Creiman, established a fund in Hughey's name. It will be used to continue to enhance morale and well-being of division faculty, staff and trainees. Weisz's generosity inspired Hughey and her husband, Charles Hughey, to make yearly donations to the effort, too, with plans to match Weisz's gift. Her influence lives on.

"When Ora told me about the fund, I was stunned," says Hughey. "Me! Of all things—to put it in my name was just amazing."

To make a gift to the medical school:
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Or call Jen Gabler: 412-864-5547