

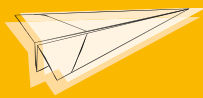
UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE | SPRING 2023

PITTMED



OUTSIDE INFLUENCES

HEALING STARTS WITH CONNECTION



OP-ED: MAMMOGRAMS ARE ESSENTIAL, AND SO IS HEALTH LITERACY

This past year, I was fortunate to be chosen for an Albert Schweitzer Fellowship, in which I was tasked with continuing an established project dedicated to improving the health literacy of underserved women at our city's Birmingham Free Clinic. This project aims not only to educate women on the basic aspects of breast cancer and arm them with the knowledge needed to seek informed care, but also to provide them with vouchers for free mammograms across the city. There is an immense underutilization of screening tools, particularly among women in minority groups. And despite the many advances that have been made to treat breast cancer, women are still dying of the disease.

At the free clinic, my goal is to assuage patient worries and provide women with the knowledge they need to make informed decisions about their health.

Our efforts aren't just about improving the use of mammograms, but helping patients understand how often they should be making use of them. I once talked to a patient who underwent mammograms every six months in her native country. Mammograms are not without risk, so performing one twice a year without a history of breast cancer can be burdensome to the patient's health and wallet. Scenarios like this make the need for improved health literacy imperative.

This is a call to action for an increase in programs like ours to enhance access to early detection, particularly for underserved

women. Through such efforts, patients are strengthened with knowledge about breast health, making them confident about their medical decisions.

Zainab Balogun, MS (Class of 2025)

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SAVE THE DATES

ESPECIALLY CLASS YEARS

FROM THE **3**S AND **8**S

ALUMNI REUNION WEEKEND + HOMECOMING

OCT. 13-15, 2023

When reunion time rolls around this fall, memories will be made and revisited. The Medical Alumni Association will host special gatherings this year for School of Medicine classes ending in 3s and 8s, but that shouldn't stop other alumni, with their families and friends, from taking the opportunity to reconnect. This year's reunion weekend coincides with the University's homecoming celebration, which means there will be plenty to do and see. Reserve Oct. 13-15 for some good times back at your alma mater.

Check here for information as updates and registration links become available:
www.maa.pitt.edu/alumni-events

“When the untapped potential of a student meets the liberating art of a teacher, a miracle unfolds.”

—Mary Hatwood Futrell



Dear Pitt Med Reader,

The traditional approach to medical education is designed so that young students will develop the scientific knowledge and clinical skills necessary to become excellent physicians or physician-scientists. However, to truly prepare the next generation of Healers, Activists, Innovators and Leaders at Pitt Med (HAIL to Pitt), we must go beyond. We agree with the American education icon Mary Hatwood Futrell: Liberating a medical student's or research apprentice's full potential leads to extraordinary outcomes. Our new curriculum at Pitt Med is being built around this principle, such that our students not only excel in foundational knowledge of medicine but also reason beyond rote learning to become adept problem solvers, innovators and team leaders.

The new curriculum, which will launch this fall for the entering class (stay tuned for more coverage), is designed to support the development of these characteristics; yet I should also mention that students with these capacities tend to be attracted to our school already. Here are some illustrative examples:

The medical students featured in our cover story, including Nicole Alindogan, Kathleen O'Connor and the many others who are working with student leaders from across the health sciences, have learned a team-based practice of medicine rather than a traditional physician-centric approach. These young people are showing us that students seem to be uniquely suited to the very patient-centered work of street medicine, and they are bringing that valuable perspective back to the clinic.

As described in another article in this magazine, Jonathan Alder, an assistant professor of medicine, would not have gone down the research path that led to an explanation of what's happening in the telomeres of melanoma patients if it hadn't been for the insistence of Pattra Chun-on, a student in his lab. (See “The long game,” page 13.)

In another example, Physician Scientist Training Program students Ashti Shah and Anya Singh-Varma also talked their advisers into letting them pursue a project. As one of their professors put it, they ended up creating “a truly novel way of looking at molecular behavior in the liver over time.” Ashti and Anya also demonstrated that teamwork is a natural approach to problem-solving.

I'm very proud of our students and can't wait to see where they take us next.

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

PITTMED

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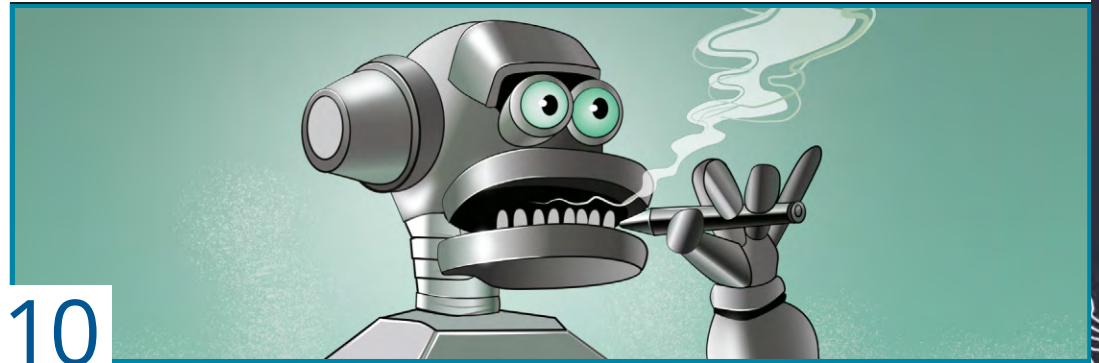
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10

“We are concerned that vaping is seen as a completely safe thing to do, especially among young people.”

DEPARTMENTS

OF NOTE 4

A balancing act in teen brains.
At the table: Sydney Sharp.
Faculty snapshots.
All of Us returns results.
Insights from the chancellor.

FIGURES 9

Heads up on new noninvasive and noncontact technology.

INVESTIGATIONS 10

Robot exposes vaping's risks.
New power of positive thinking,
with help from ketamine.
Melanoma's long game.

ALUMNI NEWS 34

Musings to heal, comfort and guide.
A huge help for students.
Trivia: How well do you know Pitt Med?
Practical implications: Ken Schaffner
RIP: Bruchez, Crichlow, Pfishner

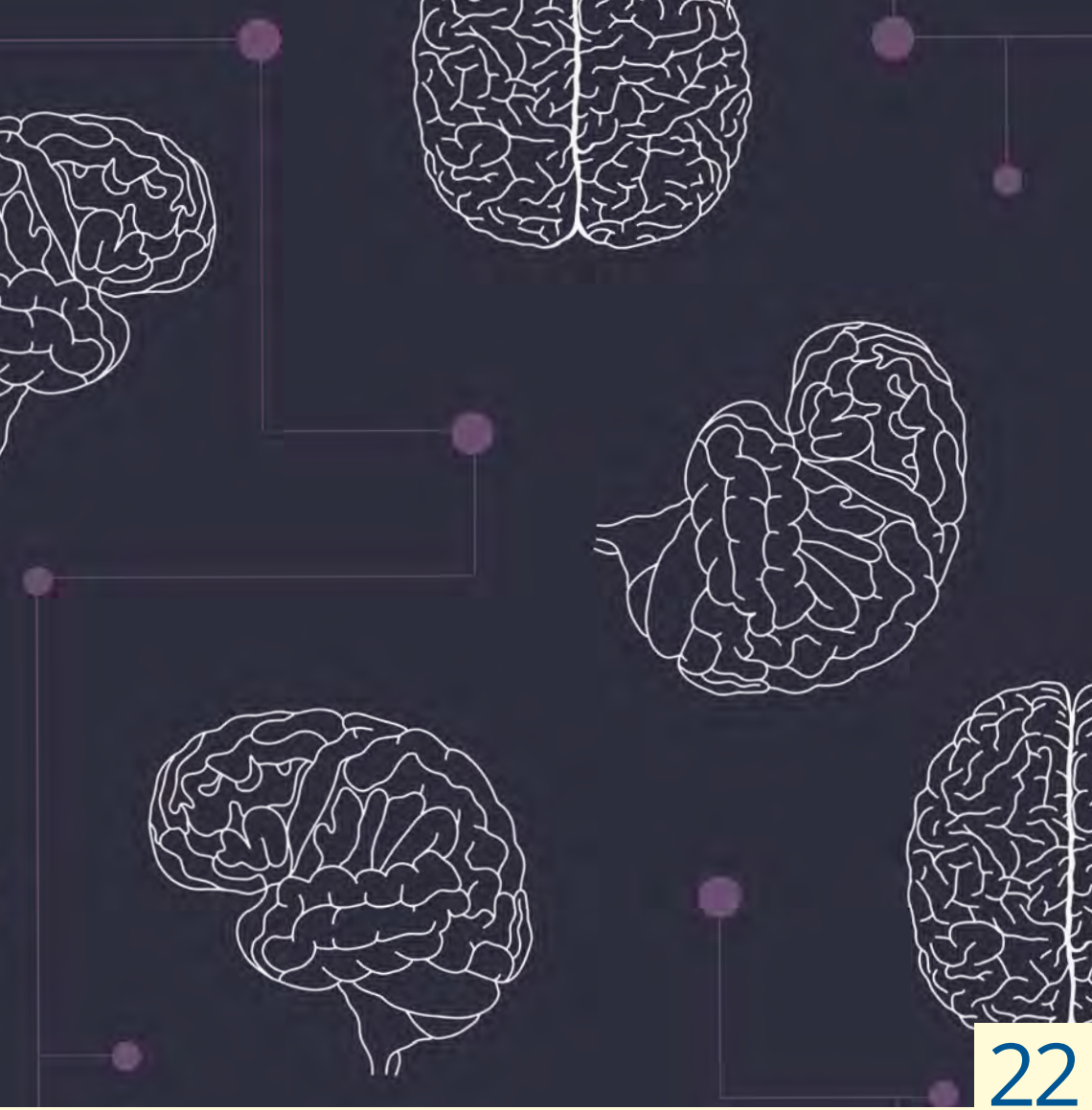
FOR REAL! 40

Where'd our fur go?

ABOUT THE COVER The student group Street Medicine at Pitt makes a point of listening to people without homes. Members allow people they encounter on rounds to guide what services they provide. Photo by Martha Rial, © 2023.

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22

For the furless among us: Somewhere along the chain of evolution, there was probably an advantage to nature fussing with the follicles.



40

FEATURES

Outside influences

Students and providers learn that they often need to disregard their initial impulses to effectively serve people who are unhoused.

COVER STORY BY ANDREW DOERFLER

14

The grayest of gray matters

Pitt is building a critical mass of researchers to take on Alzheimer's disease.

BY ANITA SRIKAMESWARAN

22

Drawing from experience

A comic art course helps students offer the best of themselves.

BY MICHAEL AUBELE

28

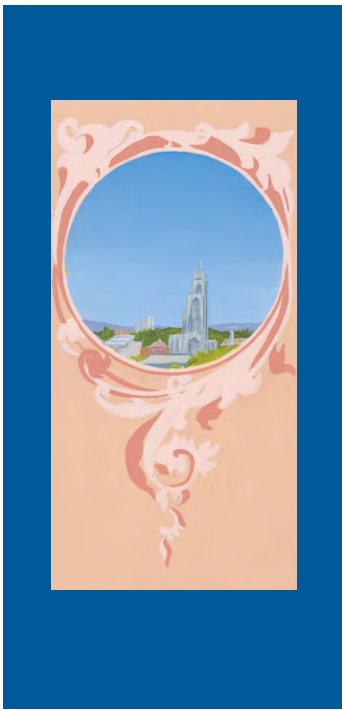
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Writer **ANDREW DOERFLER** [Cover story] got his start contributing to The Boston Globe, where his assignments included fact-checking stories about biotech breakthroughs . . . and setting people up on blind dates for the "Dinner with Cupid" column. After developing an interest in science writing while working at the University of Florida, he joined Pitt Med's team as senior editor in 2022. His first Pitt Med feature, about a student-led street medicine program, focuses on the importance of humanity in health care. Says Doerfler, "This patient-centered approach really prioritizes listening."

MARTHA RIAL'S [Cover story photography] career in photojournalism began with a love of storytelling. The Pittsburgh native's assignments have taken her from Haiti to central Africa, where her work documenting the lives of Burundian and Rwandan survivors of the 1994 genocide earned her a Pulitzer Prize. She appreciated the fact that students from a range of disciplines participate in the street medicine efforts she covered for Pitt Med. Growing up in a family with public health nurses, Rial says, "It's important for me to document the work of all kinds of caregivers. If we're going to tackle this problem [homelessness], we need as many caring people as possible."

OF NOTE

*Devoted to noteworthy happenings
at the medical school*



PAVETTE

FOOTNOTE

“Both schizophrenia and addiction threw my musical ambitions off track,” says guitarist David Baird. Recently, though, playing in a band with others with schizophrenia has offered him long-term structure, rich relationships and the chance to perform in front of an audience. The group, called Infinity, was formed by Baird and fellow musicians Susan Padilla, Anne Alter and Barry Mills, with support from Pitt psychiatrist K.N. Roy Chengappa and Flavio Chamis, a conductor and composer. In November, Infinity performed at the 39th Pittsburgh Schizophrenia Conference.

Check out a short documentary about the band:
pi.tt/pittinfinityband

PITT NO. 3 IN NIH FUNDING

The National Institutes of Health is backing Pitt Med researchers in a big way. NIH grants to the medical school in fiscal year 2022 surged from an already enviable \$475 million to \$550 million. The increase in 2022 follows a \$33 million jump in NIH funding in fiscal year 2021.

“The last two years’ major increases are thanks to the innovation and dedication of our Pitt Med faculty and staff,” says Anantha Shekhar, Pitt’s senior vice chancellor for the health sciences and John and Gertrude Petersen Dean of the School of Medicine. “We’re further cementing our place among the top academic medical institutions in the country.”

The numbers place the University of Pittsburgh as the No. 3 ranked recipient of NIH funding for 2022, up from No. 11 in 2021. The University as a whole landed \$675 million in NIH awards, a 13% increase from the previous year. The School of Medicine, whose NIH grants make up 81% of the University’s total, moves from No. 11 to No. 6.

Pitt Med researchers also excelled in receiving especially large awards: Grants of \$10 million or more increased from 6 in 2021 to 11 in 2022, while grants from \$5 million to \$10 million grew from 13 to 20. All of Pitt’s awards in these high-dollar ranges went to the School of Medicine. —*Staff reports*



GETTY IMAGES

New insight on why teens are likely to take so many risks.

A balancing act in teen brains

Teens often make choices that confound the adults in their lives. Sometimes they might seem to inhabit a different universe, where consequences are an afterthought in the pursuit of new, exciting experiences. Recent findings from Pitt scientists point to one possible reason for the divide: A critical period of neuroplasticity in the adolescent brain.

As described in a paper published in *Progress in Neurobiology*, the researchers looked at the balance of two brain chemicals—glutamate and gamma-aminobutyric acid (GABA)—in the prefrontal cortex. Neurons use glutamate to send activation, or excitatory, signals across their branches, while GABA dampens them and inhibits brain activation.



Luna

Using high-resolution live brain imaging on 144 participants, the researchers found that as adolescents age toward adulthood, glutamate levels taper off, and the two neurotransmitters come into balance.

The research, supported by the National Institutes of Health and the Staunton Farm Foundation, offers new understanding about adolescents' heightened sensation-seeking, which allows them to gain the new experiences needed to specialize the brain (that is, engage and solidify its circuitry) in adulthood. But it can also lead to potentially life-threatening, risk-taking behaviors that begin with the onset of puberty. What's more, major mental illnesses such as depression and schizophrenia often first emerge during this time.

"This paper provides biological evidence for what we have all suspected regarding adolescent behavior," says senior author Beatriz Luna, a PhD, the Staunton Professor of Pediatrics and Psychiatry and Distinguished Professor of Psychiatry and Psychology at Pitt. "Adolescence is the time when cognition becomes specialized in supporting the transition to adulthood and determining lifetime brain development trajectories." Yet that development can be derailed, as in the case of mental illness, she adds.

Critical periods of neuroplasticity—when the brain is especially sensitive to changes—involve high excitatory function in relation to inhibitory function, which signals that neural systems must reorganize to regain balance. Scientists have previously identified critical neuroplasticity periods during infancy and childhood, but this study offers the first evidence of profound plasticity in the frontal cortex during adolescence.

"It's important to study foundational changes in the brain that drive the transition from adolescence to adulthood," says lead author Maria Perica, a PhD candidate in clinical psychology at Pitt. "Incomplete knowledge about normative brain development limits our understanding of what drives some of the changes we see clinically." —*Staff reports*

SOWA ELECTED TO NATIONAL ACADEMY OF MEDICINE



Sowa

Gwendolyn Sowa, an MD, PhD, who is the Endowed Professor of Physical Medicine and Rehabilitation, as well as chair of that department and director of the UPMC Rehabilitation Institute, has been elected to the National Academy of Medicine.

Sowa codirects the Ferguson Laboratory for Orthopaedic and Spine Research at Pitt, where she leads a diverse group of scientists working together to develop treatments for spine conditions and low back pain. The clinician scientist also holds joint appointments in orthopaedic surgery at the med school and in bioengineering in the Swanson School of Engineering.

"This is an incredible honor, and I am humbled to be in such great company," says Sowa. —*Staff reports*



UNIVERSITY OF PITTSBURGH

Overheard with Chancellor Gallagher Magic happens when a university turns outward.

This summer, Patrick Gallagher will step down as Pitt's 18th chancellor, after nine years in the role. Under his leadership, Pitt has strengthened its status as one of the nation's premier public insti-

tutions for higher education and research, including being named a top public school in the nation by U.S. News & World Report.

The former director of the National Institute of Standards and Technology came to the University after two decades in public service, drawn by what he calls the "best mission on the planet"—i.e., making the world a better place through knowledge and understanding. For Gallagher, fulfilling Pitt's mission has meant bringing different people together to address problems in new ways. During his time as chancellor, Pitt has formed new partnerships focused on innovation, entrepreneurship and community engagement. Those alliances have expanded the reach of the University's research breakthroughs and expertise.

Such partnerships are especially important in the health sciences, which Gallagher calls "a heartbeat of the University." The outgoing chancellor spoke with Pitt Med to reflect on his tenure and the unique opportunities universities present.

Editor's note: As we went to press, the University announced that Joan T.A. Gabel will succeed Gallagher as Pitt's 19th chancellor.

Nine years later

Chancellor Patrick Gallagher announced in April 2022 that he plans to step down this summer. Gallagher's tenure saw Pitt evolve as much as the world around it. Facing new challenges and rising toward new ambitions, the University made major strides. We highlight several here.

KEY:

- Expanded mission
- Access and affordability
- Health and safety
- Infrastructure investments

AUGUST 2014: Patrick Gallagher is appointed the 18th chancellor of the University of Pittsburgh, succeeding Mark A. Nordenberg.

MAY 2015: Pitt appoints its inaugural vice chancellor for diversity and inclusion. During Gallagher's tenure, the racial and ethnic diversity of Pitt employees increases by 58%.

APRIL 2017: The new Office of the Senior Vice Chancellor for Research strengthens Pitt's push to grow research funding. Today, the University receives more than \$1 billion a year.

JUNE 2017: Pittsburgh Public Scholars offers all valedictorians and salutatorians in Pittsburgh Public Schools guaranteed admission to the Pitt campus of their choice.

FALL 2017: The School of Computing and Information enrolls its first cohort of students, preparing them for the workforce's growing demand for technological proficiency across fields.

JUNE 2018: The Opioid Abuse Prevention and Recovery Task Force issues a 48-page report that outlines a framework to address the growing substance abuse crisis.

OCTOBER 2018: Pitt's first Community Engagement Center opens in Homewood. "A front door to Pitt in neighborhoods," the centers strengthen the University's connection to the community. A second opened in the Hill District in 2021.

Pitt Med: First, congratulations. You've done so much in your time here. What initiatives here at Pitt are closest to your heart?

Patrick Gallagher: It's always hard for me to answer that, because it's like picking your favorite child. I prefer to just take joy in the whole family.

[That said,] I have a fondness in my heart for trying to turn the viewpoint of the University a little bit more outward than inward—looking at ways in which the University's impact is there, even if you're not a student or a member of the University community. [Editor's note: See the timeline below for a few examples.]

I think most people are drawn to a university because they want to make a difference. And that's individually true in the context of your studies, discipline or work. But I think it's also collectively true: that our city, our region, our country should be better off because we're here. And that, for me, is the real magic of what drew us all here, right? Like bugs around a lantern.

Pitt Med: In Pittsburgh and Pennsylvania, there are pockets that are thriving, and there are pockets, sometimes just down the street, that are left behind, in terms of equity or economic opportunity. How can a university make a difference?

PG: The intrinsic thing that we have as a university is deep expertise. We also have something that's often forgotten, but really important: We're a place to experiment, to try something new. With that comes this ability to convene and form partnerships. It's no accident that many of the public-private partnerships, the newest companies, the nonprofits are often catalyzed out of efforts that started and were incubated in universities. A university is in the position to put the band together, if you will, to tackle a

Continued on page 33.

DECEMBER 2018: **Panthers Forward** welcomes its inaugural class—students who receive \$5,000 in debt relief as well as mentorship from Pitt alumni. As of fall 2022, the program had helped 600 students pay off \$3.75 million in debt.

FEBRUARY 2019: **The Pitt Success program** is announced, restructuring financial aid by matching the U.S. Department of Education's Pell Grants across all five Pitt campuses.

SPRING 2020: Pitt launches **COVID-19 prevention and response efforts**, focusing on mitigation, communication and targeted surveillance testing. The University's approach has been studied as a possible model for other institutions to refer to in the future.

MAY 2022: **The Assembly** opens in a former Model T factory in Bloomfield, bringing researchers of diverse disciplines together to build the next generation of cancer treatments.

SEPTEMBER 2022: **The Campus Wellness and Recreation Center** breaks ground. The 270,000-square-foot facility will feature a recreation pool, jogging track, weight-lifting equipment and courts for basketball and volleyball.

SEPTEMBER 2022: A new, 5,500-square-foot building opens for the **Big Idea Center**, Pitt's hub for student inventiveness and entrepreneurship. The health sciences schools are also a major source of commercialization for the University. Leaders are establishing partnerships and an ecosystem for further life sciences innovation.



Sydney Sharp in Geneva. As a physician, she'll also want to help shape policy.

COURTESY S. SHARP

At the table

When Sydney Sharp applied to a global policy program in Geneva, she wasn't sure what to expect. But that was the point.

"I wanted to do something completely new, outside of my wheelhouse," says the Pitt medical student, now in her second year.

Her time in Duke University's Global Policy Program in Geneva last summer ended up strengthening a longstanding curiosity. Dual undergraduate majors in biology and African American studies at the University of Maryland had piqued her interest in systemic solutions to health inequities. To Sharp, the summer before her second year of med school seemed like a last chance to dip her toes into the health policy waters before an intense slate of classes, research and rotations focused her path.

"When will I ever have the chance in the rest of my training to move to Switzerland for two months and learn from the crème de la crème of the public policy sphere?" she thought.

Her experience in the program included an internship with the Joint United Nations Programme on HIV/AIDS (UNAIDS). Sharp took part in the organization's efforts to decriminalize HIV and AIDS exposure, transmission and disclosure. And at the 50th regular session of the Human Rights Council and the 2022 International AIDS Conference, she helped plan UNAIDS panels and prepare talking points.

"I got to see the bigger picture of how Geneva functions, with organizations working together to achieve a goal," Sharp says. One challenge, she saw, is bringing together different countries and cultures to address a question. "There's no one-size-fits-all solution," she says.

It turns out she has a knack for policy. As part of the program's intensive course week, Sharp's group won a case competition about health care for refugees in Poland. At an April conference, she was a finalist in a poster competition and presented a policy mapping project she worked on for UNAIDS.

The Geneva trip wasn't all work: Sharp bonded with other program participants while hanging out at the Bains des Pâquis, eating gruyère and visiting the Matterhorn. "I was not only having this great educational experience—I was living life," she says. "This is what the world is like outside of the lecture room!"

Sharp didn't have much time to reflect before the start of the fall semester. But she's now seriously considering a step-out year from medical school to pursue a master's in public policy. "There is space for physicians in policy," she says. "Bringing yourself to the table is very valuable." —Andrew Doerfler

Faculty snapshots

Thuy Bui received the Arnold P. Gold Foundation's 2022 Pearl Birnbaum Hurwitz Humanism in Healthcare Award for her decades of work advancing the well-being of underserved populations, immigrants and refugees.

Bui, an MD professor of medicine, has been director of the Global Health and Underserved Populations Residency Track at Pitt Med and UPMC for more than 15 years.

Her work is motivated in part by her own life story: After leaving her native Vietnam at 11 years old, she and her family stayed at a refugee camp in Malaysia before arriving in the United States. Bui later entered the Peace Corps and served as head of the Medical Department of Kamuzu Central Hospital, Lilongwe, Malawi, for two years; she maintains relationships in the country and works to further education opportunities and health services there.

Until 2017, she headed the Birmingham Free Clinic. She still sees patients there weekly.



Bui

J. Timothy Greenamyre won the 2022 Robert A. Pritzker Prize for Leadership in Parkinson's Research, among the field's most prestigious honors. Greenamyre is the Love Family Professor and vice chair of neurology at Pitt Med and director of the Pittsburgh Institute for Neurodegenerative Diseases.

Awarded by the Michael J. Fox Foundation for Parkinson's Research, the prize recognizes Greenamyre's extensive contributions to our understanding of the disease. His research into genetic and environmental factors helped demonstrate that pesticides like rotenone and paraquat contribute to the disease. The rotenone model he developed continues to inform other researchers studying the causes of—and treatments for—Parkinson's disease.

Greenamyre, an MD, PhD, also added to the evidence suggesting that mitochondrial function could go awry in Parkinson's.

"My relationship with my patients is what motivates me," says Greenamyre.

Alok Joglekar received the National Institutes of Health (NIH) Director's New Innovator Award, which supports early career scientists pursuing unconventional approaches to major challenges.

Joglekar is a PhD assistant professor of immunology and member of the Center for Systems Immunology. He and his team engineer molecules to manipulate the T cells in the immune system, boosting their ability to fight cancer and keeping them from attacking healthy tissues. Typically, T cells respond to target cells when their receptors recognize antigens displayed on molecules; Joglekar's engineered molecules allow other immune cells to respond and influence T cell function.

"We've essentially converted a one-way street into a two-way," Joglekar says. He hopes the research will lead to new treatments for diseases such as type 1 diabetes and multiple sclerosis and enhance immunotherapies for tumors.

The award, Joglekar says, "allows us to dive head-first into these ideas and gives us a cushion for taking risks." —Staff reports



Greenamyre



Joglekar

ALL OF US RETURNS GENOMIC DATA

These days, tools like smart watch-based health apps allow people to become more engaged in their own care—and, hopefully, improve their well-being. Now, the National Institutes of Health's All of Us research program is adding to the individualized toolbelt. The massive effort, which aims to build a database based on genomic sequences and other health-related information from 1 million volunteers, is expected to catalyze biomedical research and change how health care is delivered. It's also offering a direct return on investment for participants.

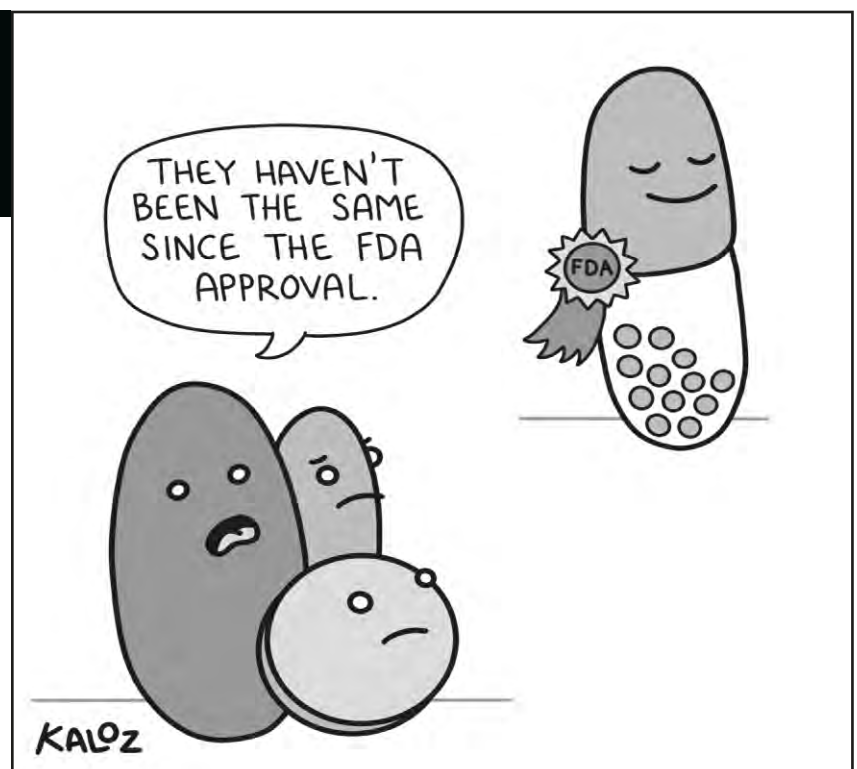
In November 2022, All of Us began returning health-related genomic results to participants. The reports include information about pharmacogenomics (how genes affect a person's response to medications) and hereditary disease risk.

Steven Reis, an MD, Pitt's vice chancellor for multidisciplinary innovations in the health sciences and director of the Clinical and Translational Science Institute (CTSI), leads the Pennsylvania arm of the study. The very first All of Us national participants enrolled at Pitt back in 2017; now, they are some of the first receiving results.

As partners in genomic testing, participants can opt in to receive results—and decide which ones they receive. The information should serve as "a conversation-starter between participants and their health care providers," says Philip Empey, a PharmD, PhD associate professor of pharmacy and therapeutics and part of Pitt's All of Us team.

He adds that Pitt programs are training local providers to understand results and "be on the cutting-edge of precision medicine." At the same time, Pitt's CTSI team is guiding investigators interested in applying for NIH funds to start analyzing the data coming out of All of Us. —Micaela Corn

ASIDE



by Tara Kaloz

LIGHT WORK

The risks that come with invasively measuring intracranial pressure can be catastrophic enough that it's ruled out for many patients who would benefit from the information, like some who've had a head injury.

Michael McDowell, an MD assistant professor of neurological surgery, and his collaborator Jana Kainerstorfer, a PhD at Carnegie Mellon University, have an alternative. They're developing a device no bigger than a credit card that attaches to the patient's forehead, without a procedure or incision, by either a headband or adhesive.

Once it's secured, near-infrared light passes heatlessly and painlessly through the skin and skull to reach blood vessels in the brain. The light is then temporarily absorbed by hemoglobin within the blood cells. The hemoglobin releases the light, which then makes its way back to the device. The operator calculates the distance the blood cell traveled in the time between absorbing and releasing the light. Fluctuations in blood flow correspond with changes in intracranial pressure.

A preliminary study of 15 children at UPMC Children's Hospital of Pittsburgh found that the device's results closely matched those of the more invasive method. McDowell hopes that "by the end of 2023, we will have a large-scale observational trial in adults and children at a multicenter level."

By making intracranial brain pressure measurement faster and safer, the device may also help physicians discover new, useful applications for brain pressure monitoring.

LOSING CONTACT

The key to simpler vital sign measurement may already be in your pocket. Michael Pinsky, an MD professor of critical care medicine, and his team have developed a noncontact pulse oximeter app compatible with any Android smartphone. Unlike the standard finger-clip style device for blood oxygen saturation, the app uses a smartphone camera to provide the same information.

Every time your heart beats, the color of your skin changes slightly, getting a little redder. The app detects such changes in a tiny area of a patient's forehead to determine pulse rate. Other changes in light density indicate the patient's respiratory rate. In tests, the app has returned these measurements accurately regardless of the person's skin pigmentation. Based on an analysis of the pulse and respiration data, the app determines blood oxygen saturation.

If the FDA approves the technology, it could be used to assess the vitals of unconscious victims in disaster scenarios, give health information to previously unreachable communities and even allow patients to collect measurements in the waiting room before an appointment—reducing the chances of exposing medical staff to infections.

Says Pinsky, "My critical care professional colleagues around the world have called it a game-changer."

Heads up on new devices

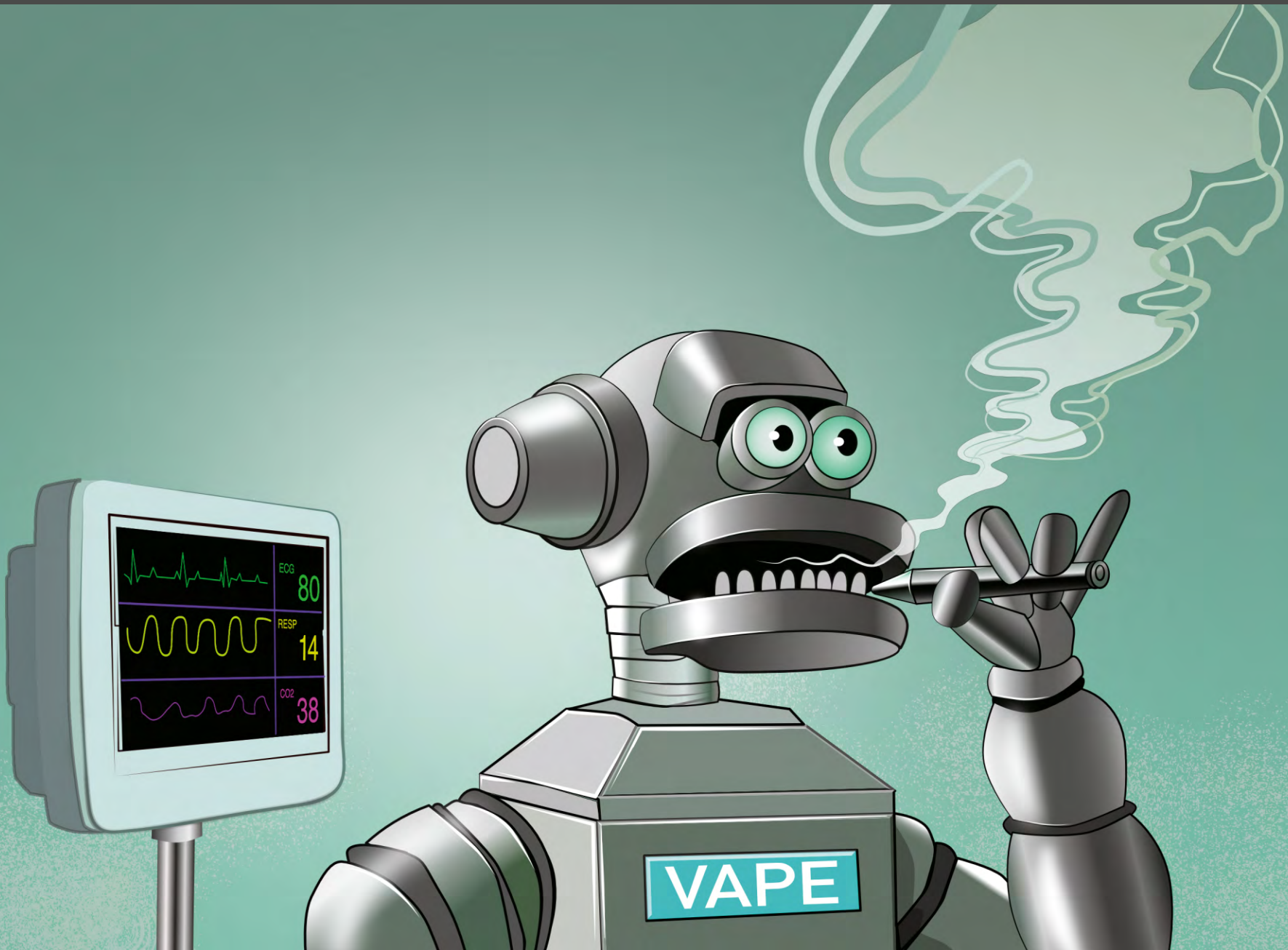
Recognizing that some tools used to assess patients aren't ideal for all situations, and some are simply too risky, two Pitt Med professors and their teams are developing technologies to offer alternatives. Although these are separate initiatives, both approaches happen to look to the forehead to collect this important information.

— Nicole Matthews

—Illustration by Frank Harris

INVESTIGATIONS

Explorations and revelations



A vaping robot (the real thing is shown right) gives researchers the opportunity to study what vaping introduces into the lungs without the time and cost needed to run clinical trials. **RIGHT:** The system uses a vacuum pump to draw in vapor from an e-cigarette; other components dilute the vapor, mimic breathing and control temperature and humidity.

PUFF PIECE

A ROBOT IS HELPING TO EXPOSE
VAPING'S HEALTH RISKS

BY ANDREW DOERFLER

In September 2019, the Centers for Disease Control and Prevention reported an outbreak of severe lung disease among patients with something in common: They all vaped regularly. Today, more than 2,500 cases of vaping-associated lung illness have occurred in the United States, along with dozens of deaths.

But scientists have yet to fully determine how e-cigarettes and other vaping devices threaten health. With hundreds of different products with an array of ingredients on the market, any number of culprits could play a role.

Researchers now have a new partner helping them get to the bottom of the mystery: A vaping robot, devised by the University of

Pittsburgh's Kambez Hajipouran Benam, a DPhil associate professor of medicine.

The tabletop system mimics inhalation while simulating the conditions inside the human body to measure what people are drawing in when they take a puff from an e-cigarette.

"We are concerned that vaping is seen as a completely safe thing to do, especially among young people," Benam says. For adults looking to quit smoking cigarettes, it may present a less harmful alternative. "But when someone in middle school or high school thinks, 'Oh, it's safe, so I can try it,' that is where the problem emerges."

The robot, which the journal *Nature* featured in a roundup of research highlights in 2021, offers the chance to study what vaping introduces into the lungs without the time and cost needed to run clinical trials. It can also help researchers keep up as new products, fla-

vors and ingredients hit shelves, some attempting to evade new FDA regulations.

"We want to use the robot to generate the data much more quickly than any other platform," Benam says. "We will be able to test tens or even hundreds of e-liquids, so people will have a better understanding of the potential for toxicity."

When the CDC announced the rash of vaping-associated lung illness, the agency linked hospitalizations to an additive called vitamin E acetate. The compound, commonly found in hand lotions and many foods, is used in some vaping liquids, especially those containing THC or other cannabinoids. But it's not certain how exactly its presence might lead to lung damage.

Benam suspects part of the answer lies in the size and quantity of particles drawn into the lungs when vaping. Even a small amount of vitamin E acetate in e-liquid, the robot has shown, dramatically increases the total number of particles, especially very small ones, that end up in the lungs.

Further: "The very small particles can make it deeper into the lungs, and they're more likely to coat the inner surface of your respiratory tree," Benam says. "They're more likely to even penetrate into your bloodstream."

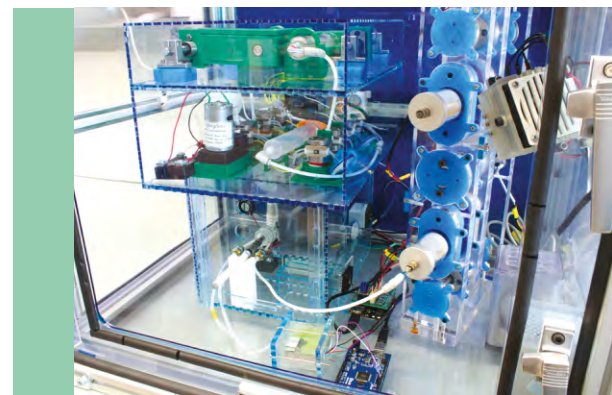
E-liquids that contain menthol, the robot has found, also generate toxic microparticles.

The robotic system—called the Human Vaping Mimetic Real-time Particle Analyzer—uses a finely regulated vacuum pump to draw in vapor from an e-cigarette, while a diluting component adds filtered air (since vape users aren't breathing in a vapor puff alone). Two air-tight syringes, programmed to simulate the flow rate of breathing, inhale and exhale.

An exposure chamber senses and controls the robot's "body" temperature, humidity and gas levels. With all these factors taken into account, a laser sensor measures the size and number of particles breathed in.

"Basically whatever breathing profile you want, whether it's restrictive or obstructive or normal breathing, you can customize it to that," says Rachel Bogdanoff, a research technician in the lab.

In a related, FDA-funded project, Benam's team is engineering a "next-generation organo-



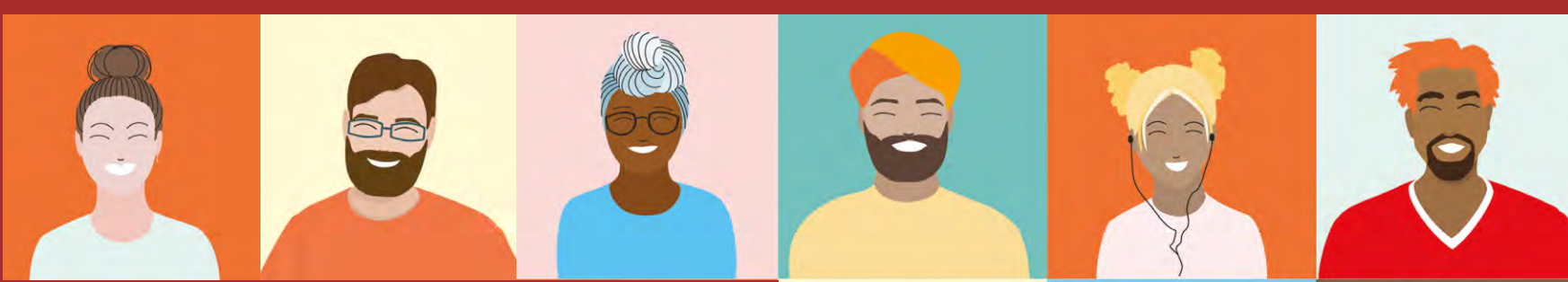
mimetic human lung system" that, combined with the vaping robot, could show the effects of these products on living cells. In the meantime, the team is looking to confirm its findings through clinical validation and retrospective analysis.

Benam notes that the project brings together engineering, lung pathobiology, breathing mechanics and inhalation toxicology.

"The beauty of bringing multiple disciplines together is that you come up with creative solutions for a growing or emerging problem." ■



Benam



THE NEW POWER OF POSITIVE THINKING

COGNITIVE TRAINING ENHANCES KETAMINE THERAPY FOR PEOPLE WITH SEVERE DEPRESSION

BY ELVIRA DIPAOLO-HOFF



Imagine if your brain could reroute itself away from depressive thoughts just as easily as your car's GPS reroutes itself when you make a wrong turn.

Rebecca Price, a PhD associate professor of psychiatry in Pitt's School of Medicine, thinks a similar concept could help the roughly 30% of depression patients whose illness doesn't respond to traditional treatments. Using an approach that incorporates computer-based neurocognitive training, Price is prolonging the antidepressant effects of ketamine therapy.



Price

In a study published in *The American Journal of Psychiatry*, Price found that showing positive words and images to people with treatment-resistant depression after a single ketamine infusion can help them quickly learn new ways of processing information that lead to happier thoughts.

Ketamine has been used worldwide as an anesthetic in medical settings for more than half a century. Around 2000, researchers began noticing and testing its quick-acting efficacy against depression. Soon, there was enough evidence to prompt clinicians to start prescribing it off-label for treatment-resistant depression, and clinics began opening across the country to administer intravenous ketamine therapy.

Price became interested in ketamine's

potential while a graduate student in clinical psychology at Rutgers University. Her mentor connected her with investigators at the Icahn School of Medicine at Mount Sinai who were conducting some of the earliest studies on ketamine use for depression treatment. As a clinician interviewer for those studies, Price was floored by the nearly immediate ability of ketamine to transform a patient's thinking.

"I would speak to a patient one day and they would be describing decades of chronic depression that had not ever really remitted to any approach they tried," says Price, who is also an associate professor of psychology at Pitt. "Then I would come back the following day and it was like speaking to almost a totally different person."

However, the benefits tend to be short-lived, with symptoms of depression returning in a matter of a weeks after an infusion. Price is working to change that.

A "psychoplastogenic" drug, ketamine quickly increases the brain's plasticity, or ability to adapt in response to stimuli. In a study involving 154 adults, Price was able to capitalize on the brain's malleable period following a single dose of ketamine by adding an automated self-association training twice daily over four consecutive days.

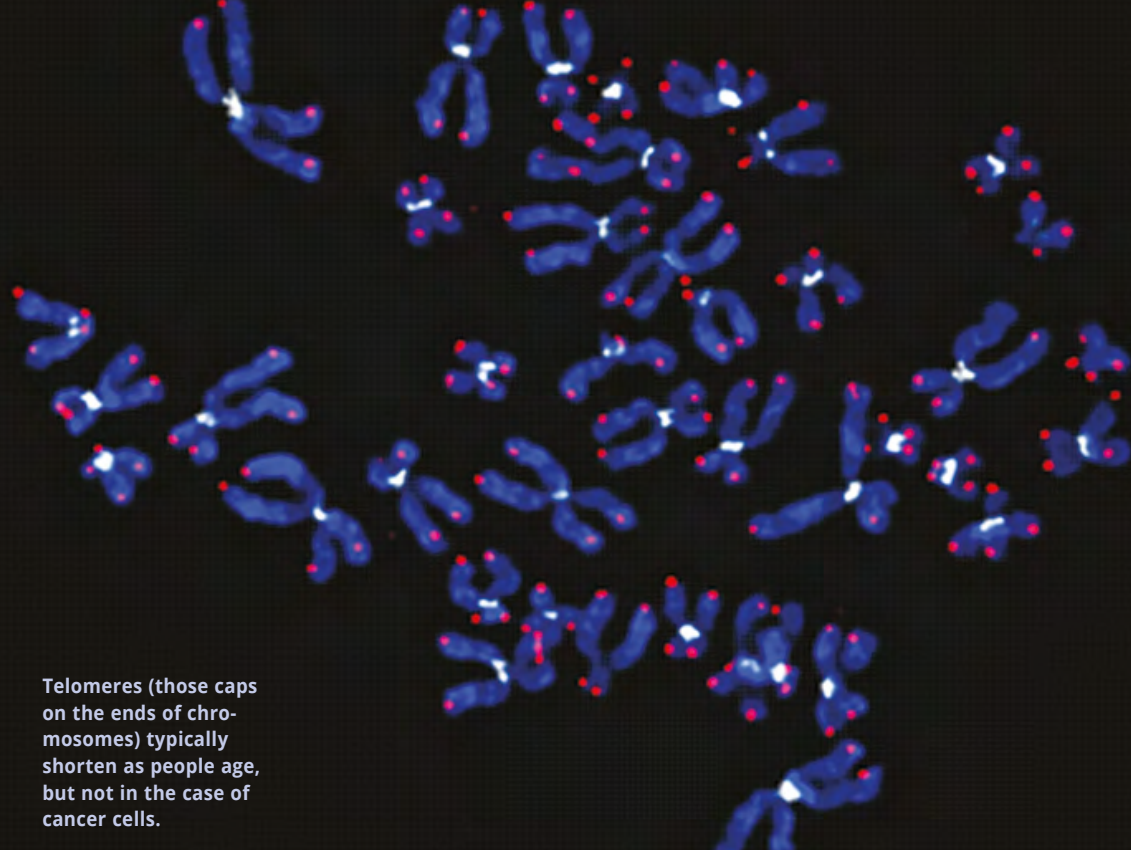
In the training, a patient might be shown words like "sweet" or "attractive" or a photo of a smiling actor. The platform would pair that

positive image with an image of the patient or the word "I." In the group of 53 participants who received both the single dose of ketamine and the self-association training, the "package deal" was shown to prolong depression relief for three months.

Extending the effects of a single ketamine dose could dramatically increase the ability of patients to access the treatment. Patients get started with anywhere from four to eight infusions administered in the first few weeks and return for booster doses as necessary, often creating long waiting lists at clinics. (Although most health insurance plans don't cover ketamine treatments.)

"I've been flooded with requests from ketamine providers, patients and their families," Price says. Some of her colleagues wonder if the same type of therapy could be adapted to treat phobias, eating disorders or similar conditions. Pitt has filed a provisional patent for the combined treatment protocol.

Price is now testing her protocol in hospitalized patients who have just attempted suicide. She is also seeking next-step funding to study either making the combination treatment powerful enough so that it lasts longer than three months or determining what form of intervention at that juncture could help boost its effects. Although there is more to do, Price's work already offers a great deal of practical hope for what's often a devastating condition. ■



Telomeres (those caps on the ends of chromosomes) typically shorten as people age, but not in the case of cancer cells.

THE LONG GAME

DISCOVERY REVEALS A KEY TO MELANOMA'S IMMORTALITY
BY HAYLEY REIN AND ANDREW DOERFLER

When Pattra Chun-on first reached out to Jonathan Alder hoping to join his lab at the School of Medicine, Alder was hesitant.

Chun-on, an internist with a background in cancer biology, had come to the University of Pittsburgh for a PhD and wanted to study the extra-long telomeres found in cancer. Telomeres are the caps at the end of chromosomes that protect DNA from degrading. In healthy cells, they become shorter with each cycle of replication until the cell can no longer divide. Cancer cells, meanwhile, have telomeres that maintain their length, allowing the cancer to continue replicating and keeping them effectively immortal.

Though she was an excellent candidate, Alder told the physician that his lab focused on short telomeres, associated with premature death and aging, not the long ones she was interested in. But Chun-on insisted. "This went on until I realized that Pattra would never take 'no' for an answer," says Alder, a PhD assistant professor of medicine.

Her persistence paid off. Chun-on, Alder and their collaborators found a combination of mutations that promote extra-long telomere growth in melanoma, a discovery that could change the way oncologists understand and treat it.

Published in the journal *Science* in November, their findings identified two genetic alterations that work together to stimulate telomerase, the enzyme that keeps telomeres from shortening. Until now, no one had ever seen them work together to help make melanoma immortal.

"We did something that was, in essence, obvious based on previous basic research and connected back to something that is happening in patients," Alder says.

For years, scientists have seen strikingly long telomeres in melanoma tumors, especially compared to other cancers. About 75% of melanoma tumors contain mutations in the TERT gene that activate telomerase and allow cells to continue growing. Yet, when scientists mutated TERT in cells in culture, they couldn't produce extra-long telomeres. It turns out that TERT promoter mutations were just half of the story.

The road to discovering the other half began when Chun-on heard a talk from Patty Opresko, a PhD professor of environmental and occupational health in Pitt's School of Public Health who studies DNA damage and repair at telomeres.

"She gave a talk that was so impressive to me," Chun-on says, "and I just decided, 'Oh, I will focus on the telomere angle with cancer.'"

As it turned out, Alder had tried studying long telomeres before. Years earlier at Johns Hopkins University, where Alder earned his PhD, he had bandied about an ambitious idea with Carol W. Greider, the Nobel winner who discovered telomerase: What if they could classify all cancers by how they maintain their telomeres? The idea fizzled out in 2015; four years later, Chun-on was taking it up again.

Alder's team had previously discovered a region in a telomere-binding protein called TPP1 that was often mutated in melanoma

tumors. Chun-on found that mutations in TPP1 were strikingly similar to those of TERT. "Biochemists more than a decade before us showed that TPP1 increases the activity of telomerase in a test tube, but we never knew that this actually happened clinically," Alder says.

When Chun-on—a PhD candidate in Environmental and Occupational Health in the School of Public Health—added mutated TERT and TPP1 back to cells, the two proteins together created the distinctively long telomeres seen in melanoma tumors. TPP1 was the missing factor scientists had been searching for, and it was hiding in plain sight.

By identifying a telomere maintenance system that is unique to cancer, scientists now have another target for the development of new chemotherapeutics.

Alder's team collaborated on the National Institutes of Health-funded study with researchers at the UPMC Hillman Cancer Center. John Kirkwood, the Sandra and Thomas Usher Professor and Distinguished Service Professor of Medicine, Dermatology and Translational Science at Pitt and coleader of the UPMC Melanoma Program, provided many of the cell lines the team used.

"We were in the right place, and many things lined up," Alder says. "But so much of this was driven by Pattra's absolutely unbreakable determination." ■



Chun-on



Alder



LEFT TO RIGHT: Street Medicine at Pitt members Kathleen O'Connor, Julia Lam and Helena Oft (plus Oft's dog, Junie B. Jones) head to rounds among people without homes in Downtown Pittsburgh.

OUTSIDE INFLUENCES

HEALING HAPPENS THROUGH CONNECTION

BY ANDREW DOERFLER

PHOTOGRAPHY BY MARTHA RIAL



One Wednesday last July, Julia Lam spent the evening as she usually does: heading to Downtown Pittsburgh with a group of students and faculty from the University of Pittsburgh, meeting people without homes.

Equipped with food, clothing and supplies to hand out, they walked the streets striking up conversations. Some of the talks led to medical assistance; in other cases, the group shared information about local housing resources. Eventually, a man rushed up to them in distress.

Eyes immediately fixed on a large gash on his leg—it looked like it needed attention. But the man had something else on his mind. “I need to find my bus, because it’s leaving soon,” he hurriedly explained. The man had somewhere to stay that night but would likely have to sleep on the street if he didn’t catch the bus.

The open wound called out to the group like a blaring fire alarm. But at that moment, the man’s needs lay elsewhere. The crew put aside their initial impulses and rushed him toward the bus stop.

“It goes against all of your instincts,” says Lam, a doctoral student in occupational therapy, “but that’s really the nature of street medicine: putting what we as providers find important on the back burner.”

Two weeks later, Downtown once again, the group came across the same man. He thanked them for their earlier help. “And then we said, ‘We also noticed this wound on your leg. Can we help you out with that?’” Lam recalls. The man agreed.

Lam is the president of Street Medicine at Pitt, an interprofessional, student-run group serving Pittsburgh’s unhoused population. Weekly rounds are a cornerstone of their work: Every Wednesday, accompanied by faculty from the medical school, up to 10 members go Downtown (and sometimes to Oakland) to ask people without homes what they need—and provide it whenever they can. Blood pressure checks, wound care and offers of medications, eye drops and antibiotic ointments are routine, but the clinicians on hand often provide more involved care when the need arises. If the team can’t address a request on the spot, they direct the person toward other resources or promise to follow up the next week.

Street Medicine at Pitt lets those they

serve guide what the group provides rather than imposing anything. Often, even those suffering from health problems don’t ask for or accept care on the spot—they may have more pressing needs in the moment. Others have felt mistreated in formal medical settings. Many just want a sympathetic ear to listen to

them without judgment.

“You are taught to be a fixer in the halls of the medical school,” says Kathleen O’Connor, a second-year medical student who is the didactic education coordinator for Street Medicine at Pitt. “You really have to let that white coat go when stepping onto



LEFT TO RIGHT: Street Medicine at Pitt cofounder Antonio Gumucio, advisor Jim Withers and medical director Anna Marie White have all had a hand in shaping the student group’s patient-centered approach.



LEFT TO RIGHT: Lam, O'Connor and Max Hurwitz, the group's assistant medical director, value the opportunity to meet with unhoused patients on a human level, outside of the clinic's demands.

the street. The reality is that for many, their chronic conditions are not a priority. They're just trying to survive to the next step."

Their method has deep roots in Pittsburgh: Many consider the city to be the birthplace of street medicine. It was here, in 1992, that Jim Withers (MD '84) began donning shabby clothes and taking to the streets to provide medical care to the unhoused. The mainstream medical system had largely left these vulnerable people behind, despite their higher rates of chronic health problems. Withers put aside some of the rigid expectations of his formal training and developed a new approach inspired by the house calls he'd seen his father, a family physician, conduct. Accompanied on his rounds by Mike Sallows, who was once homeless, Withers made a point of building relationships with the people he encountered.

"We tend to have a medical focus," says Withers, "but when you do this work, you end up addressing the whole person." His efforts

turned into Operation Safety Net, now a long-running program of the nonprofit Pittsburgh Mercy. He is also on the teaching faculty at UPMC Mercy, where each year he directs a fellow dedicated to street medicine, and is a clinical assistant professor at Pitt Med.

Withers' model has spread far beyond his purview, inspiring new programs and organizations—many launched by his students and other acolytes—throughout the country. Here in Pittsburgh an interconnected network of groups and providers has grown over the years, aiming to provide mindful, culturally sensitive care to the unhoused population. In November, the year-round, low-barrier Second Avenue Commons shelter opened with 95 beds (plus overflow space for 30 more) and a UPMC-run health center within.

The need, meanwhile, is growing: A February 2022 census identified 880 people experiencing homelessness in Allegheny County, up from 692 the previous year. Many

believe that count (conducted over the course of just one day) to be well below the actual number. Max Hurwitz, a DO assistant professor of physical medicine and rehabilitation and Street Medicine at Pitt's assistant medical director, estimates the population to far exceed 1,000. In January 2023, the City of Pittsburgh declared homelessness a public health emergency.

Homelessness is correlated with heightened risks of diabetes, hypertension and heart attacks. The discrepancies between housed and unhoused people are even starker for depression, substance use disorder and HIV.

Members of Street Medicine at Pitt are doing their part to help address the crisis. Among the many inspired by Withers' work was Becky Mackenzie, now a PhD student in bioengineering and one of the cofounders of Street Medicine at Pitt. She learned about Operation Safety Net in the mid-'90s while working as an engineer in Pittsburgh. "This hit



ABOVE: Street Medicine at Pitt cofounder Becky Mackenzie uses her personal experience with homelessness to help guide the group's approach. RIGHT: Someone is happy to get shoes that fit.





me between the eyes,” she says. “It was like, ‘Whoa, where was this guy when I needed him?’”

Mackenzie had spent years homeless and a victim of human trafficking in Buffalo, beginning when she was a teenager in the late '60s and early '70s. She had hardly any encounters with medical providers, even after many experiences that left her in need of attention. Avoiding the hospital was an intentional choice to escape scrutiny or arrest, and no outreach organizations were going out to her community.

“There wasn't even a rumor of anybody doing that,” she says. “And I know, in retrospect, there was nobody doing it.”

When she heard about Withers, Mackenzie reached out immediately—but because she had no medical training, Operation Safety Net didn't have a place for her. She and Withers stayed in touch over the years, as she went on to become an EMT. Eventually, a spot opened for her on street rounds.

When Mackenzie later attended Pitt, she met Antonio Gumucio (MS '19), a military veteran, EMT and a student in the School of Public Health. Gumucio had grown up in Bolivia, witnessing extreme poverty and widespread homelessness.

The two immediately clicked over a shared vision. “The kindest thing Becky ever said to me was ‘You get it,’” Gumucio says. In spring 2021, they founded Street Medicine at Pitt with med students Paul Seraly and Cameron Metz, another former EMT. Withers, a godfather to the group, serves as its distinguished honorary advisor.

From the start, Mackenzie's experience of homelessness has been a guiding influence. But the fledgling group knew, from the hurdles past student organizations had faced (student involvement in street medicine groups had waxed and waned over the years), that the right philosophy alone couldn't sustain it. Gumucio, the group's first president, proposed that Street Medicine at Pitt emphasize interprofessional collaboration so their work would be constantly re-energized by enthusiasm and ideas offered from different perspectives. He established connections across Pitt's health sciences schools; membership now includes students in occupational therapy, public health, nutrition,

dental medicine and other disciplines.

“People have got a lot to give,” Mackenzie says. That has extended to faculty and institutional support. Anna Marie White (MD '10), a clinical assistant professor of medicine and a former student of Withers, agreed to be the group's medical director and has since been a key mentor and constant presence on rounds. The School of Public Health has provided funding, and even more has come from the Shadyside Hospital Foundation's Cooper Fund. Anantha Shekhar, an MD, PhD, senior vice chancellor for the health sciences and John and Gertrude Petersen Dean of the School of Medicine, has been a vocal proponent of the group, which aligns with his emphasis on expanding education about inequities and social determinants of health.

The support reflects a growing appreciation in mainstream medical systems for patient-centered care, long a foundation of street medicine. “After 30 years, people don't think I'm crazy anymore when I start babbling about this,” says Withers.

Since launching, Street Medicine at Pitt has been met with a flood of interest from more than 400 students. The organization also hosts speakers, workshops and a book club. Organizers have intentionally kept its street rounds crews small, to ensure that its interactions remain personal, organized and not overwhelming to those they're serving.

On a Wednesday in February, Street Medicine at Pitt members trekked to the overflow shelter on Smithfield Street. The six members “rounding” were accompanied by faculty members White and Hurwitz, plus a therapy dog in training. They arrived to find about 40 unhoused people, ranging widely in age, waiting for the shelter to open at 7 p.m.

After a briefing that included safety protocol, the group began unloading supplies from two cars; then they split into two crews, one sticking by the shelter while the other walked the nearby streets. Clothes, sanitary products and food (fresh fruit, sandwiches, juice and Valentine's Day lollipops) filled a couple of wagons—but not for long. The volunteers hadn't even finished unloading supplies from their cars when people started approaching.

It was a mild night, much warmer than the bitter cold of the week before, but sweatpants

remained in high demand. (Hypothermia is a major concern.) Victoria Lee, a biomedical master's student, helped folks find correctly sized clothing while simultaneously fielding requests for food. Some people, expecting the group's arrival, approached quickly with specific requests; others meandered around the crowd's perimeter, scoping out the inventory and accepting items only when offered.

Aishwarya Mukundan, a student in the School of Public Health, was taking part for the second time. She's been struck by the sense of community: That night, one man cut through the crowd to help carry items to people who have trouble walking. Later, the team offered feminine products to a young woman sitting with a few others. She declined, but shortly afterward, a companion returned to the wagon to grab some for her.

Amid the hectic distribution, White chatted with an man in a red beanie. Recent health emergencies landed him in the hospital not long ago; he didn't see the point of returning, despite lingering effects. White looked up his medical records through a smartphone app. She found some good news: No evidence of pneumonia, blood clots or heart attack. White gently asked whether he'd heard of a local medical respite shelter, but he was uninterested, carrying bad experiences and little hope. He preferred to tell her about his in-progress memoir, which chronicles his time on the street. White was happy to listen.

A few weeks later, after the group collaborated with shelter staff and a physician from Second Avenue Commons, the man agreed to go to the respite facility. It wasn't the first time someone became more open to care after connecting with Street Medicine at Pitt members on a human level. The street offers a rare opportunity to deeply listen to patients outside of the usual pressures and demands of a clinical setting.

“There's nobody with a checklist right next to you,” says Nicole Alindogan, the group's vice president and a first-year medical student. “The checklist probably wouldn't even help the person that you're talking to.”

During the group's early rounds in 2021, Alindogan recalls, a man in Schenley Plaza often watched them from afar as they provided blood pressure checks and medication



Street Medicine at Pitt member Helena Oft stops to listen while her therapy-dog-in-training looks on.

to a friend of his. A few weeks later, he sat on a bench nearby—but still declined to talk. After more than a month of seeing them around (and eventually accepting some food and a cell phone charger pack), he ended up asking for medical advice.

On rounds, White carries a small gray pack with quick access to items like gloves to address immediate medical needs; she also has a larger bag with more equipment, including a blood pressure cuff, and medications (most provided by the Birmingham Free Clinic) organized in translucent sleeves.

In light of the high rates of substance abuse on the street and the heightened risk of overdose that the prevalence of fentanyl has brought on, group members carry naloxone on rounds. They've begun distribut-

ing the nasal spray to anyone they encounter who will accept it—and teaching them how to use it.

The teams reconvened at the end of rounds to debrief. Each member shared a word or phrase that captured the evening: *Continuity, grateful, teamwork, intuition* . . . They discussed practical matters—what supplies they need to replenish, whether tweaks to safety procedures are in order. But they also allowed their imaginations to roam: How might art students get involved? (Lam has already led therapeutic art groups, among other activities, at shelters.) The following week, to address podiatric needs, the group hosted its first foot soak at a shelter.

The group also hopes to influence the curriculum to include more about street medi-

cine. Its members and supporters believe that students are especially suited for this work.

“We have this flexibility in time, and we're not necessarily dogmatic in our training yet,” says Kathleen O'Connor.

“So there's creativity among an interprofessional group of students that might not exist in a traditional health care setting.”

O'Connor and her counterparts will carry what they see and learn back to formal settings, letting their experiences on the street inform care for all patients.

Some, though, find it hard to imagine heading back inside the clinic.

“Other students have said to me that street medicine has spoiled them from going back to the hospital setting,” says Lam. “And I feel like that's what happened to me.” ■



What's going on in the
brains and bodies of
people with Alzheimer's?



THE GRAYEST OF GRAY MATTERS

WHAT DO WE REALLY KNOW ABOUT ALZHEIMER'S, AND WHAT ARE THE MOST PROMISING WAYS TO APPROACH THE DISEASE? PITT IS BUILDING A CRITICAL MASS OF RESEARCHERS IN THE SEARCH FOR ANSWERS.

BY ANITA SRIKAMESWARAN

“**H**elp wanted.” The post-pandemic plea, now commonplace on the doors of restaurants and retail shops, could also be displayed in the homes of the estimated 6 million Americans now living with Alzheimer’s disease. That’s 6 million people who are likely to lose the ability to remember whether they had breakfast. Six million who are flummoxed by the simplest problems. Who are disoriented, anxious and may become distraught enough to lash out toward caregivers. Their diagnosis is typically made with cognitive and other neurological testing, family discussions and brain scans—well after symptoms have started and the brain changes may be, tragically, irreversible.

Suspicion has fallen on aluminum pans, artificial sweeteners and flu shots; but despite decades of research, the underlying causes of Alzheimer's have remained elusive. For the most part, the hunt has centered on the beta-amyloid plaques in the brain that are found during autopsies of patients who had the disease.

Last November, findings from the double-blind, multicenter Clarity AD trial, funded by the pharmaceutical and biotech companies Eisai and Biogen, were published in the *New England Journal of Medicine*. Among the nearly 900 of 1,795 study participants with early Alzheimer's given the amyloid-targeting monoclonal antibody lecanemab, cognitive decline slowed by an average of 27% compared to those given placebo after 18 months of treatment.

"This sets the bar for future studies. Everything else that is coming has to be the same or better," says Oscar Lopez, director of the Alzheimer's Disease Research Center (ADRC), Levidow-Pittsburgh Foundation

caused by having three rather than two copies of chromosome 21, have a substantially higher risk of developing the dementia—and chromosome 21 contains the amyloid precursor protein gene. Other genes associated with elevated risks of developing Alzheimer's play roles in amyloid metabolism.

But prior to lecanemab, which works with the body's immune system to clear amyloid, trial after trial of amyloid-targeting drugs failed to make patients better even if they reduced amyloid burden, and amyloid brain plaques also can be found during autopsies of people who didn't have Alzheimer's.

That indicates to Lopez that "it's not the whole thing. Amyloid has something to do [with it], but there are some other things going on."

Research teams at Pitt and around the world are closely examining tau, another protein that gets misfolded into clumps called neurofibrillary tangles, in the brains of people with Alzheimer's. It's thought that amyloid aberrations lead to

protective mechanisms at work in people who do not develop Alzheimer's? And how will scientists raise the curtain to see what's really unfolding on the stage?

The number of people with Alzheimer's is predicted to rise to nearly 13 million by 2050. Pitt is building a critical mass of researchers with approaches and insight, as well as opinions, that stem from a range of perspectives. All of them are determined to quell the coming storm.

WINDOWS TO THE BRAIN

Pitt made an indelible notch in the timeline of Alzheimer's research in 2002.

That year, William Klunk, an MD, PhD, who recently retired as a Distinguished Professor of Psychiatry and Neurology, and Chester Mathis, a PhD who's now a Distinguished Professor of Radiology and UPMC Professor of PET Research, first revealed their work on the develop-

That's 6 million people who are likely to lose the ability to remember whether they had breakfast. Six million who are flummoxed by the simplest problems. Who are disoriented, anxious and may become distraught enough to lash out toward caregivers.

Professor in Alzheimer's Disease and Related Dementias and an MD professor of neurology at Pitt. Alzheimer's symptoms in those who received lecanemab progressed more slowly than in those in the placebo group, he explains, so "it's a step forward."

He acknowledges that the clinical impact, while measurable, is small, far from the giant leap needed to cure the forgetfulness, confusion and other cognitive issues that patients—and their families—face. The study suggests there may be merit to the "amyloid hypothesis," the notion that amyloid aggregation triggers a biochemical cascade that leads to dementia-inducing neuronal death and, therefore, treating or eliminating the plaques will treat or eliminate Alzheimer's symptoms.

Amyloid abnormalities have been a suspect in the genesis of Alzheimer's since scientists saw during autopsies that the brains of people who had the disease were riddled with clumps of the protein. Also, people with Down syndrome,

changes in tau, which is needed to maintain the internal, microtubular structure of neurons.

Yet, studies of tau-reducing drugs in patients have also failed to improve Alzheimer's symptoms.

The relationship between amyloid plaques and tau tangles in the Alzheimer's brain remains a mystery, says Julia Kofler, an MD associate professor of pathology and an ADRC codirector. Tau abnormalities can be found in many other neurodegenerative diseases.

Also, "some tau pathology is almost a part of normal aging," she notes. "If you get a brain without any tau pathology, it would be the exception, not the rule." As the leader of Pitt's Brain Bank, Kofler would certainly know. She preserves postmortem brain tissue from patients who died with neurodegenerative diseases.

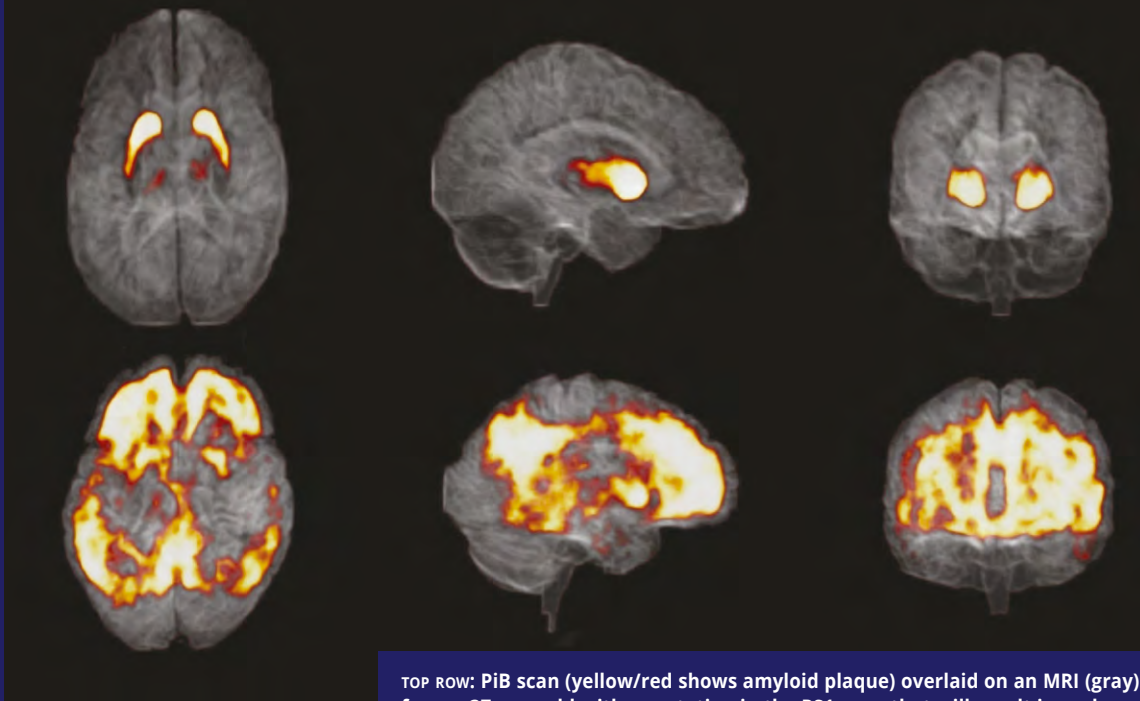
The science of Alzheimer's appears to be the grayest of gray matter. If beta-amyloid and tau are factors, are they leading actors, supporting cast or distracting set dressing? Are there pro-

ment of Pittsburgh Compound B, or PiB, a radiopharmaceutical. PiB was able to, for the first time, reveal amyloid deposition in the brains of living patients. The feat changed the research landscape, making it possible to use brain scans to track how experimental drugs affect the presence of amyloid.

Pitt scientists are now creating new tools to monitor what's happening inside the aging brain.

Just last fall, a team led by Ann Cohen (a PhD who trained with Klunk), Howard Aizenstein, an MD, PhD, and Victor Villemagne, an MD, all of psychiatry, as well as Milos Ikonovic, an MD in neurology, was awarded a \$33.5 million National Institute on Aging (NIA) grant renewal to examine neuroinflammatory processes in subclinical Alzheimer's using a novel imaging agent. The agent tracks astrocytes, or astroglia, star-shaped cells that play key roles in neuronal metabolism.

"When amyloid and tau proteins begin to deposit in the brain, astrocytes react in ways that may either benefit or harm surrounding nerve cells," says Villemagne. That process is known



TOP ROW: PiB scan (yellow/red shows amyloid plaque) overlaid on an MRI (gray) from a 37-year-old with a mutation in the PS1 gene that will result in early onset, autosomal dominant Alzheimer's (though this person was asymptomatic at the time of the PiB scan). BOTTOM ROW: Typical late-onset Alzheimer's. PiB is only prominent in the basal ganglia of the person with the mutation.

as reactive astrogliosis, and Villemagne's team has developed a method to measure it in living persons. Preliminary data indicate that astrogliosis becomes abnormal early on in Alzheimer's, even before changes associated with amyloid and tau. Further, it seems that persistent astrogliosis might lead to increased vulnerability to Alzheimer's disease pathology (meaning amyloid and tau aggregation).

The investigators will use the project grant to examine the roles played by astrogliosis in the brain. For instance, how does the process work in people with known risk factors for Alzheimer's, notably cardiovascular disease or sleep disturbances? Does it contribute to cognitive impairment or alter behavior?

Other biomarker stars include Tharick Pascoal, an MD, PhD, and Thomas Karikari, a PhD, who both recently joined Pitt's psychiatry faculty and are part of the astrogliosis program project grant.

In October 2021, Pascoal and his team were awarded a five-year, \$40 million NIH grant to compare two tau tracers in studies across eight medical centers. Karikari came to Pitt from Sweden's University of Gothenburg to adapt a new blood biomarker for tau, which he described in the December 2022 issue of the journal *Brain*.

About 30% of people with Down syndrome develop Alzheimer's in their 50s; that goes up to 90% when they get to their 60s. In 2020, the NIH awarded a five-year, \$109 million grant to a multicenter effort led by Benjamin Handen, a PhD professor of psychiatry, who is looking for Alzheimer's biomarkers in this population.

Building on the revolution of PiB, "we have continued to grow our place in biomarker

research, and we think we've assembled the world's best team in Alzheimer's imaging," says psychiatry department chair David Lewis, Distinguished Professor of Psychiatry and Neuroscience.

NEW STARTING POINTS

In 2017, several years after Klunk and Mathis revealed PiB, Peter Strick stared at Klunk's PowerPoint slide of PET scans at an Alzheimer's-themed Brain Day symposium. The slide showed neon red, yellow and green PiB-highlighted splotches of beta-amyloid in the brains of cousins who carry a mutated gene known to cause an early onset form of Alzheimer's disease (autosomal dominant Alzheimer's disease, or ADAD).

The basal ganglia are chock-full of plaques, but these people have no symptoms, noted a perplexed Strick, scientific director of Pitt's Brain Institute, PhD chair of Pitt's Department of Neurobiology and the Thomas Detre Professor. What the self-professed "basal ganglia guy" was seeing made no sense. The basal ganglia play a role in how we move, learn, process emotions and perform many other tasks. *If amyloid accumulation causes dementia, why weren't these 30-somethings ill already?*

Klunk and Mathis had shown the world that people who inherited the mutation that causes ADAD somehow show up with plaques in the basal ganglia without apparent symptoms. Ben Handen led studies showing the same in people with Down syndrome. (In more common, late-onset cases, basal ganglia aggregation

appears eventually in the disease but is less prominent.)

Inspired by the conundrum presented in that slide, Strick launched a basic neuroscience research effort that, in October 2022, received a five-year, \$32.5 million grant from the NIA to create what could be a gamechanger—a model of late-onset Alzheimer's disease in marmosets. Unlike rodents, these squirrel-sized primates have sensory and motor systems as well as neural networks that are similar to those of humans. If successful, the model will be the first of its kind in the world.

In the project, nicknamed Marmo-AD, researchers will breed animals that are born with genes known to be associated with late-onset forms of Alzheimer's. The marmosets will be closely followed throughout their lifespans with blood tests, behavioral assessments, brain scans and sampling of skin cells called fibroblasts, which can be made into neurons for further studies in the lab.

"Each marmoset will be monitored in clinically relevant ways comparable to what is and can be done in humans," but with the bonus of gathering information from birth and not just at symptom onset, says coprincipal investigator Afonso Silva, Endowed Professor in Translational Neuroimaging and professor of neurobiology.

"If we are successful, we could learn how Alzheimer's begins and what might be done to stop it," he notes.

And there are many more promising efforts underway at Pitt.

Amantha Thathiah, like many first-time visitors to Pittsburgh, was happily shocked to discover it was not the dark, smoky Steel City of legend. She was looking for a place to start her own lab after postdoctoral training and a faculty appointment in Leuven, Belgium, and her mentor, world-renowned Alzheimer's expert Bart De Strooper, saw that Pitt, the birthplace of PiB, was recruiting.

Her interest in Alzheimer's arose because, as she puts it, she "followed the science." For her doctorate, Thathiah studied proteases, enzymes that break down proteins, in a cancer biology lab. Wanting to expand her knowledge of protease biology in her postdoctoral training, she focused on Alzheimer's, because the disease



involves three classes of these enzymes, thrilling her scientific sensibilities.

Thathiah arrived in 2016 as a PhD assistant professor of neurobiology—among the first in a wave of recruits focused on the basic science of Alzheimer's. She's had some success with interrupting what seem to be mechanisms of the disease.

In one of her projects, Thathiah and her team focus on G protein-coupled receptors, or GPCRs, a group of proteins that are involved in numerous biological processes. Forty percent of current-day medications, including drugs for hypertension, asthma, motion sickness and schizophrenia, work by targeting GPCRs. Thathiah had previously found that a subset of Alzheimer's disease patients has elevated levels of the GPR3 protein. Deleting the *Gpr3* gene (which makes the GPR3 protein) in a mouse model reduced the amyloid plaque burden in the brain but elevated anxiety levels. In an October 2022 paper published in the *Proceedings of the National Academy of Sciences*, Thathiah's team showed in an Alzheimer's mouse model that modifying the *Gpr3* gene to block binding of a cellular-signaling protein led to reduced amyloid plaque and cognitive difficulties—without causing anxiety and other significant side effects that occurred with gene deletion. (That's a half-vote for amyloid burden contributing to the disease, if you are keeping track.)

The findings suggest drugs that lead to

appropriately biased GPCR signaling could inspire new approaches to treating Alzheimer's.

In another project, she's examining neurons made from skin fibroblasts of patients who've died with Alzheimer's. That project could help reveal relationships between aging and dementia. Her energies are focused on both alleviating suffering and understanding the disease.

She finds it inspirational to meet people who are caring for Alzheimer's patients.

"It gives me purpose. I'm going to investigate disease mechanisms, but I'm always thinking of therapeutically targeting that mechanism to benefit the patients," says Thathiah.

TOWARD CRITICAL MASS

While the psychiatry department has been building an elite team of biomarker investigators, Pitt's ranks of neurobiologists with an interest in Alzheimer's disease, like Thathiah, have continued to grow. That's been due in part to Strick's curiosity about the images he saw in 2017 and the interests of Arthur S. Levine, Distinguished University Professor who is the former dean of the medical school and senior vice chancellor for the health sciences; he became executive director of the Brain Institute in 2020.

Shortly before the pandemic, Pitt recruit-

ed two young PhD neuroscientists from MIT: Hansruedi Mathys, who is using his expertise in single-cell RNA sequencing to uncover how and, hopefully, why Alzheimer's-affected brain cells differ from those taken from people who don't have dementia; and Or Shemesh, who is studying the possible influence of viruses, bacteria and other infectious agents as an Alzheimer's trigger.

Established PhD investigators are also making their professional homes here. Afonso Silva brought his expertise in brain imaging—and his marmosets—from the National Institutes of Health. Stacey Rizzo, renowned expert on the use of rodents in behavioral studies, came from the Bar Harbor, Maine-based Jackson Laboratory to apply her knowledge to nonhuman primate research models.

Likewise, a cadre of investigators from a number of disciplines throughout Pitt are probing a range of possible culprits and antagonizers.

For instance, M. Ilyas Kamboh, a PhD, is well-known for his work in Alzheimer's genetics and pathologies; he was studying the APOE gene before it was identified in 1992 as the most significant risk factor for Alzheimer's. Likewise, Rada Koldamova, an MD, PhD, focuses on the variant APOE4, which increases the risk of developing Alzheimer's to those who carry one (four times) or two (10 times) copies of it. Both are based in the School of Public Health. (By the way, in the brain, the APOE protein is mainly produced by astrocytes and is used to transport

lipids from astrocytes to neurons.)

Stephen Chan, an MD, PhD cardiologist who is Pitt's Vitalant Professor of Vascular Medicine, and Toren Finkel, an MD, PhD Distinguished Professor of Medicine and director of the Aging Institute, are studying how inflammation leads to both cardiovascular disease and neurodegeneration. Anne Newman, MD, MPH Distinguished Professor of Epidemiology and clinical director of the Aging Institute, will oversee a clinical trial evaluating whether a monoclonal antibody that reduces inflammation can lead to improved cardiovascular and cognitive function. This multitiered approach is supported by \$14.3 million from the WoodNext Foundation.

Those projects are complemented by ongoing work of psychiatry faculty members such as Rebecca Thurston, a PhD and the Pittsburgh Foundation Professor in Women's Health and Dementia, who is examining menopause and dementia; Mary Ganguli, MD, MPH professor, whose focus is the epidemiology of cognitive impairment and dementia; Meryl Butters, a PhD who studies depression and dementia; and many others.

Simply put, "We're all looking for clues," Silva says.

FRESH PERSPECTIVES

Globally, "there is no question that the tenor of the investigations has changed." And that's good, says Karl Herrup, PhD professor of neurobiology and author of "How Not to Study a Disease: The Story of Alzheimer's" (MIT Press, 2021).

Herrup, an outspoken critic of the amyloid hypothesis, says "a lot of basic scientists have certainly realized that [targeting amyloid] is not a productive way of approaching the disease, and pharmaceutical companies are coming to the same realization."

After faculty appointments at Yale, Case Western Reserve University and University Hospitals at Cleveland (where he directed its Alzheimer's Center) and the Hong Kong University of Science and Technology, Herrup returned to his hometown in 2019. Pitt has one of the nation's best Alzheimer's Disease Research Centers (led by Lopez), and Herrup had already collaborated with Kofler for several years.

Much has been learned about amyloid biology, notes Herrup. Yet: "It's as if we spent all this time figuring out why hair turns gray because

people with gray hair are at higher risk for Alzheimer's. Both of those statements are true. It's interesting to learn about hair follicles, pigment cells and so on," but it doesn't cause the disease, he says.

He sometimes dismays his colleagues with his frank views on the failure to move the needle on Alzheimer's, but he takes that in stride. "Science moves faster if everyone is questioning everyone else's thinking. It forces you to sharpen your argument," Herrup says.

In his own lab, Herrup has been examining the role of DNA damage and noncoding genetic variants in Alzheimer's, as well as the cellular response to DNA damage and neuroinflammation.

Yet he wonders if Alzheimer's could be what he calls an "emergent property" of the aging brain, like a hurricane forming from water and wind. "If so, that would be really troubling because it doesn't lend itself to a biotech approach to the disease" Herrup says, because "no one element is responsible for the emerging property. You can't predict a hurricane just by knowing the physical and chemical characteristics of water."

From his perspective, an Alzheimer's-research do-over should go back to the clinical symptoms and work to fix those. He's also closely following work at Pitt and elsewhere that probes possible contributions of viruses and of the Alzheimer's-associated APOE4 gene and its protein's role in cholesterol transport, vascular abnormalities, myelin changes and synaptic decay.

"We need to reach beyond the usual suspects. We need to be talking to people who aren't now working in Alzheimer's," he says.

Prior to 2018, when Silva came to Pitt, he was focused on stroke, not Alzheimer's.

He decided to leave the NIH in part because the need for answers for Alzheimer's is urgent, he says. Strick encouraged him to work with Gregg Homanics, PhD professor of anesthesiology and perioperative medicine, to breed marmosets with abnormalities in the presenilin-1 (or PSEN1) gene that causes an inherited version of Alzheimer's. It's the same gene carried by the cousins who had amyloid plaques in the PiB brain scans Strick had seen a year earlier in the Brain Day talk.

During the last few years, Silva, Homanics and their colleagues have quietly developed that early onset (ADAD) marmoset model. The

new Marmo-AD (late-onset) award builds on this early onset modeling effort. "The primary goals for the first five years of this grant will be to start characterizing the early onset animals we have generated and to use genetic alignment information between mice, marmosets and humans to identify which risk genes for late-onset Alzheimer's we should focus on," Silva says.

Late-onset Alzheimer's is not an inherited disease in the conventional sense. The vast majority—95%—of Alzheimer's cases are considered sporadic, but some mutations (like those mentioned earlier) increase risk. Introducing such genes into marmosets and closely following gene expression patterns, brain scans and behavior could shed some much-needed light on what the underlying problems might be. And also accelerate the pipeline to clinical trials.

This year, results are expected from other big clinical trials of antibodies targeting amyloid. Lopez says it will be encouraging if more drugs are able to slow disease progression, as lecanemab did, but he doesn't expect them to be "magic." He recalls the painstaking process of vetting statin drugs to combat high cholesterol; those first came out in the 1990s.

"The first ones were not that good, and with time we improved them. It took so long to get really good statins"—and that was "in a disease where we know exactly the physiopathology," he says. But, as Lopez notes, the physiopathology, meaning the underlying disease-causing biological aberrations, are not yet known in Alzheimer's.

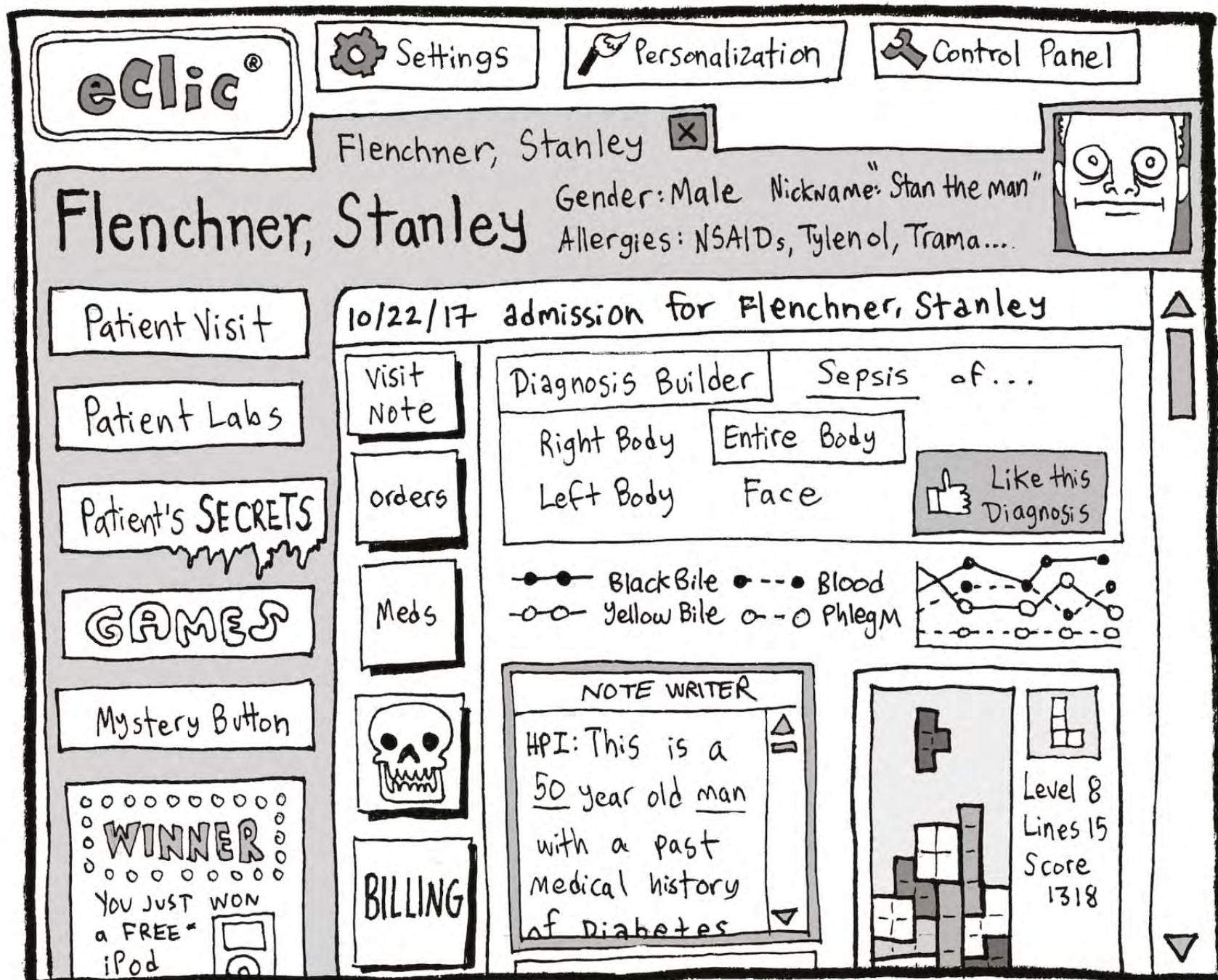
As a site for multiple national and international clinical trials, Pitt's Alzheimer's Disease Research Center has long been at the forefront of Alzheimer's research. For instance, the center contributed to the finding that careful blood pressure control in midlife reduces the risk of developing Alzheimer's.

Herrup, who is planning to write a second book on Alzheimer's research, is encouraged by "bright spots," like Lopez's work with plasmapheresis (removal of harmful substances from the blood).

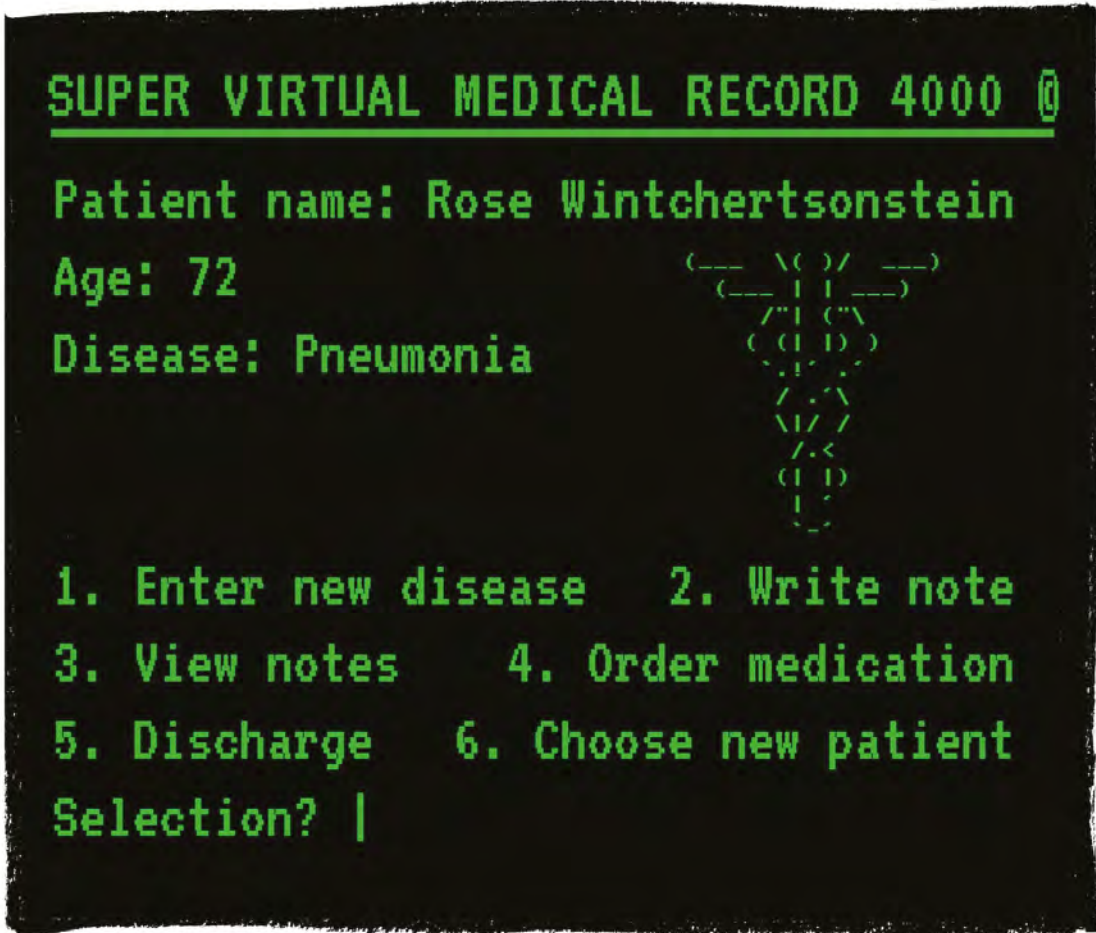
The wait for answers is hard, both for families living with Alzheimer's and for scientists conducting the research.

"We need a hit so badly," says Herrup. ■

A TAXONOMY OF electronic medical records



In this comic, Jason Bitterman, the physician who taught a Comics and Medicine course, satirizes the variety of electronic medical records providers deal with.



Drawing his initial inspiration from the likes of “Calvin and Hobbes,” Bitterman has been honing his skills as a comic artist since grade school.

DRAWING FROM EXPERIENCE

ELECTIVE HELPS MED STUDENTS OFFER THE BEST OF THEMSELVES
BY MICHAEL AUBELE

“**T**ell a story about a personal experience with health care and do that by drawing it.”

That was an assignment for the Comics and Medicine course offered in November 2022 to fourth-year Pitt Med students. They were asked to draw and write as a patient, a medical student or someone standing by a friend or family member dealing with a health issue. The experiences they chronicled varied—deciding on a career in medicine or overcoming burnout, for instance. One student was surprised to find herself recounting the aftermath of a sexual assault. Yet the projects they took on had a common outcome. *(Continued on page 32.)*

I WAS ALWAYS TRYING TO 'BE PRESENT' AND 'SHOW OFF' TO ATTENDINGS AND RESIDENTS WHICH LED ME TO FEEL...



BUT THEN AN ATTENDING TOLD ME SOMETHING I REALLY NEEDED TO HEAR.



Christina Cheung's project took her on a cathartic process, helping her overcome burnout. The course contributed to her change in perspective that will help when the demands of the medical profession build up, in residency or her future practice. "I definitely learned to look at things in different ways," she says. For instance, she says she became more willing to take advice from mentors rather than put all of her stock in the expectations she's created for herself.

IT'S STRESSFUL TO BE 'ON' OR 'THE BEST' ALL THE TIME. BUT, A SURGEON ONCE SAID TO ME...

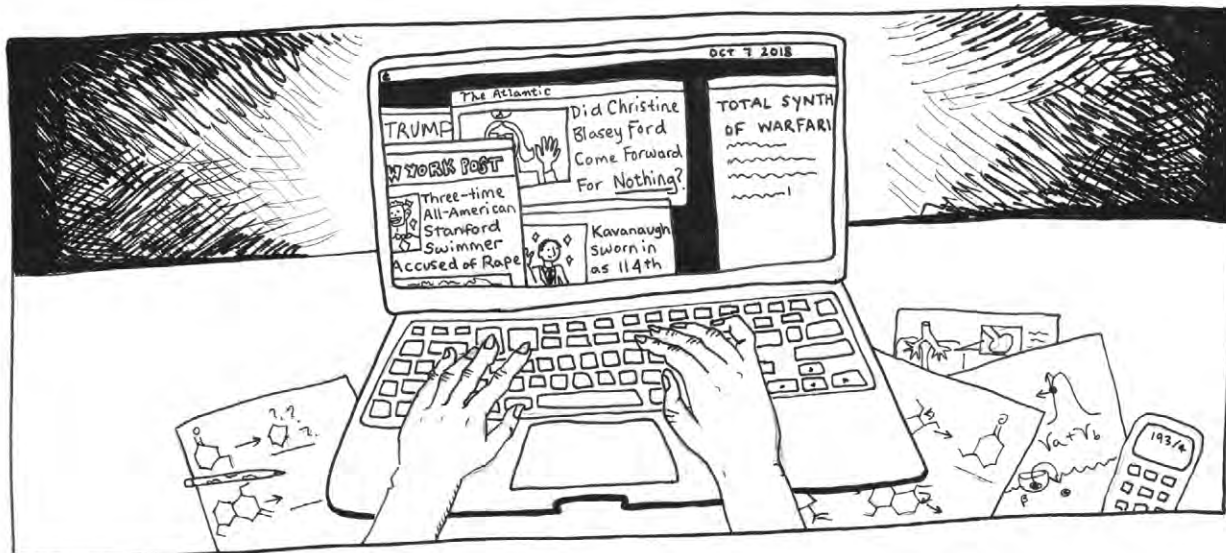


SO MAKE THE MOST OF WHAT YOU WANT AND ENJOY THE RIDE!

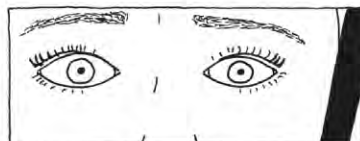
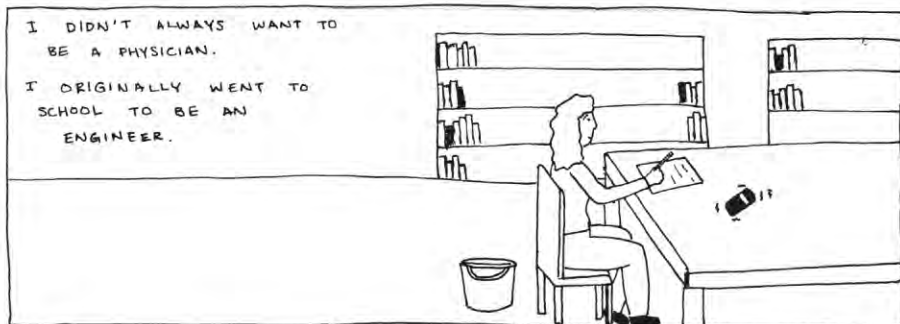




Students shared deeply personal, and even traumatic experiences, as well. In the course, Olivia Legan revisited her experience following a sexual assault. Her comic depicts living with post-traumatic stress disorder and healing from trauma during medical school. "It was something I really didn't anticipate exploring," she says. "But I found it very therapeutic to sift through those memories."



In addition to the difficult moments, like being surrounded by #MeToo headlines, Legan shows her healing process and patient interactions. She wanted to create an alternative to the common depiction of survivors as broken: "Not only can we be whole and worthy of love, but we also can use our experience to connect with and advocate for young people who have been abused or assaulted."



Vaidehi Patel tells a story about her father—his hospitalization led her to switch gears and want to become a doctor. She also took the opportunity to articulate how health care can be “desensitizing,” but that she remains committed to being empathetic. “Sometimes we can lose a little of that empathy, but I wanted to convey that it’s not gone; it’s going to be there when the patient needs us.”



Students say they walked away from the assignment with a deeper understanding of their experiences, a new way to express their emotions and the ability to better cope with stressors—all insights they expect to rely on as doctors to keep themselves grounded and to offer the best of themselves to their patients.

For most, the course was also a chance to relax in the classroom after three grueling years of study and exams. “It was a super-not-stressful thing to do,” Vinod Rajakumar says. His classmate, Vaidehi Patel, admitted as much and adds there was a certain allure in exploring her chosen field through a different lens.

“I personally find it hard to express myself in words,” she says. “I’m more of an artistic person who finds it easiest to express my emotions through [other] media.”

Regardless of their experience level, Jason Bitterman, the MD assistant professor of physical medicine and rehabilitation who taught the class, started them at the ground floor before they really put pencil to paper.

“A lot of medical students don’t have an arts and humanities background,” Bitterman says. Yet: “This is a skill they can take on to make themselves better clinicians.” He says comic journalism has helped him process and respond to the social, economic and philosophical issues that arise in medicine.

Bitterman took the class through his creative process: First, form themes or ideas for a story. Think about how to present the ideas in

pictures; draw thumbnails, then draw at a larger scale and trace in ink. “Like any kind of art,” he says, “there are steps.”

Bitterman also brought the students to the Carnegie Museum of Art to show them how the pros form certain features or postures and to give them space to think more deeply about what individual pieces express—and how those pieces may elicit different emotions and responses from different people.

For their second major project, Bitterman had the students create a patient education comic—an informative piece that might live in an emergency room or doctor’s office. “Patient education documents are often mainly text,” Bitterman says. “Visual media like comics may teach patients in a more easily digestible and engaging way. You could use them to explain most things: What are the signs of depression? What is appendicitis? What’s a colonoscopy?”

A fascination with classic strips such as “Calvin and Hobbes” got Bitterman hooked on the genre in grade school, and his love for it has persisted. The themes of his own comics reflect major stages in life, from high school (notably, social dynamics) to medical school (and its stressors) and joining the workforce (for instance, the challenges of transitioning from a resident to an attending physician). In all of it, he has looked for a common underpinning . . . something, well, comical.

Sketching comics has become a routine for Bitterman, who writes or draws several times a week, though he doesn’t always do it for publication. “It’s a skill I’ve had for a really long time that I don’t want to lose,” he says.

See more of the student pieces online: pi.tt/comicsmedicine_pittmed

Gallagher interview continued from page 7.

particular problem.

There's been a bias embedded sometimes in science, engineering and technology: "If we can only come up with the answer, then good things will flow from that." There's certainly great benefit that comes from the technological outputs of what we do. But having the tools doesn't necessarily mean they're going to be used for those that have the greatest need.

We have to be the catalyst to provide new ways of thinking about questions like, "What does the problem of health look like when you're not looking at it from the perspective of curing a disease or a specific

student who's never come to Pitt knows all the things that you can do here?"

Pitt Med: What about your role as director of the National Institute of Standards and Technology (NIST)? How did that inform your leadership here?

PG: At NIST, there was a fundamental purpose behind everything we did. We were there to help understand measurement and how to apply it to the most important challenges that the country had. Everyone there bought into that. That sort of centering in your purpose is what made coming to Pitt so natural. Because let's be honest—there's no better mission than a

The ones that tip in, everyone is out there, working together, and they rebuild the city. And the ones that tip out fall apart, and it's never the same. Pitt tipped in.

Pitt Med: Thinking about your next life chapter, are there any issues that you plan to tackle, whether societal, scientific or whatever?

PG: No, at this point, my goals are very modest. I want to be a good professor, but I'm a rookie. What I'm planning to do is to reconnect with the world of physics, but also to learn both the art and science of teaching.

As a university . . . we also have something that's often forgotten, but really important: We're a place to experiment, to try something new.

condition, but more holistically, in a social context?" That's going to look very different. It may in fact create new kinds of innovations that are either technological, or social, or policy.

Pitt Med: How did your training as a physicist and early career experiences influence your outlook coming to Pitt?

PG: A very formative experience for me was teaching high school for one year.

I was not trained as a teacher: They had lost a teacher, and they knew I was available. But it was life-changing. It was the first time I saw that I wanted to go deeper into the realm of teaching. I wanted to do it at a college level, and that's what brought me to Pitt [for a PhD].

Of course, though, I failed. I never became a college teacher. I became a researcher and then an administrator. It's only now, after this long career, that I'm in some ways finally realizing one of my initial dreams. [Editor's note: Gallagher will transition to the faculty of Pitt's Department of Physics and Astronomy after stepping down as chancellor.]

What our educational experience, particularly in higher ed, does is not so much give you the pathway that you already selected coming in. It's giving you an opportunity to explore and see what these other fields look like. I mean, how can it possibly be that a

university's. We're here to make the world a better place through knowledge and understanding.

Pitt Med: There was a recent *Journal of American College Health* paper about the University's approach to the pandemic and how it could be a model for others. Of course, we're hoping there isn't another pandemic around the corner. But what do you think worked particularly well at Pitt?

PG: When I look back to that experience, it was defined by three things: One is complete uncertainty; the fog of war problem was enormous. The second was the speed and the scale. It was a great teachable moment, but exponential dynamics are just not something human beings are very good at. How small things became massive so fast defied a lot of expectations we had about how things should work. And the final one was, unlike almost any other emergency that you can imagine facing, it wasn't contained. The pandemic was the whole globe, everywhere, everybody. It stressed all of our organizations. And look, there was a lot of stress for us, too. We were not immune in any special way. But our community, even when it got tough, in the end came together.

Craig Fugate, a former director of FEMA, once told me that places that experience natural disaster either tip in or tip out.

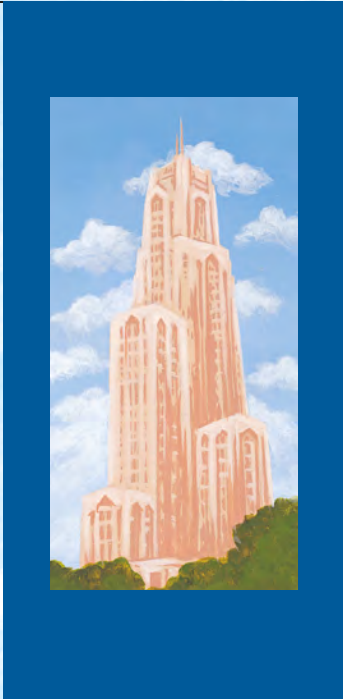
Pitt Med: We all went remote for a while during the pandemic. What do you think are the advantages of gathering, learning and living on campus? Do you think that will still be valued in 10, 15, 20 years?

PG: I don't know, but I hope it matters. Technologies allowed us to do dramatic things like pivot to online teaching and keep most organizations operating with very few employees working together physically as they traditionally did. They were amazing. But the penalty we paid for that has been quite high.

There is a magic that comes from direct human contact. I think that's true if you're a student: learning from your peers, interacting with them, living together; being away from home and trying on adulthood for the first time in a supportive environment. It's very difficult for me to see how technology supplants that without consequences. And students seem to be, in some ways, voting with their feet on that.

Education, exploration, scholarship—yes, they're knowledge activities, but they're social activities. And I think it's important to maintain that. Otherwise our relationships change and are distorted, and some of those changes and distortions may not be to our advantage. ■

—Interview by Erica Lloyd
Edited for space and clarity.



CLASS NOTES

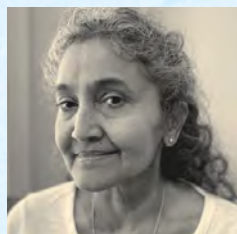
'60s Charles Gaush (PhD '62)

enlisted in the army in 1951, during the Korean War, and was deployed to Japan where he created pro-democracy propaganda that was translated into Russian and Korean. Gaush retired in 1995 after a career in teaching at the University of South Dakota and working in various microbiology and virology labs. His last position before retiring was with the American Red Cross in its blood lab outside of Rockville, Maryland.

Today, he estimates he has nearly 800 titles in his personal library and that he's read every one of those books. At 93, he names books about botany among his favorites. "I go straight to nonfiction," he says.

While not a season ticket holder anymore,

Don Hennon (MD '63) keeps tabs on his beloved Panthers men's basketball team. The Pitt Hall of Famer was a scoring legend from his days on the team in the '50s and had a message for this year's team: "Keep up the good work." After retiring from full-time practice as a general surgeon, Hennon worked part-time up until last year conducting physical exams for military recruits at the United States Military Entrance Processing Command along Liberty Avenue in Downtown Pittsburgh.



Parthasarathi

'70s William Young

(MD '70) remembers a Grand Rounds talk shortly after the famed Pitt surgery chair Henry Bahnsen completed one of the first heart transplants. Then-chair of orthopaedic surgery Albert Ferguson good-naturedly chimed in: "That Hank has become more skillful over the years." Apparently Ferguson and Bahnsen (both surgical giants and both Harvard educated) liked to joke with each other. Young went on to become an ob/gyn, training in Montreal before landing at Dartmouth, where he met another dynamic duo. He befriended Dartmouth undergrads Milton and Fred Ochieng' on a service trip to Nicaragua; the young men were determined to become doctors and eventually go back to their home, Lwala, Kenya, to start a hospital. With the help of Young and others, including their sister, Grace Ochieng', a nurse, they did so in 2007. Their story was chronicled in the documentary "Honoring a Father's Dream: Sons of Lwala." Young has also spent a great deal of time in Kosovo, working with USAID to establish newborn and obstetrics services.



Milton Ochieng' with William Young in Lwala

'90s

For almost 40 years, **Niranjana Parthasarathi** (Internal Medicine Resident '91) has lived with lupus; she was diagnosed at the age of 23. After residency, Parthasarathi experienced a major organ flare and struggled with kidney disease. She persevered though, practicing medicine full-time until she turned 50, as an assistant professor of clinical medicine and then associate professor at the University

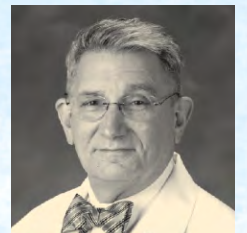
of Cincinnati. Forced to step away from full-time practice because of her illness, she wrote the book "Lupus: In the Jaws of the Wolf" to chronicle her experience and provide guidance and resources to patients and clinicians. Proceeds from the book's sales go to the Lupus Research Alliance and the Lupus Foundation of America.

Peter Wenner's (PhD '93) cell biology lab at Emory University probes how circuits in the nervous system develop appropriate and inappropriate levels of excitability. In some neurodevelopmental disorders, appropriate levels of excitability are never established. The insights his team gleans should make it possible to therapeutically address and bring those levels back into alignment, he says. Wenner won the mentor of the year award in Emory's Graduate Division of Biological and Biomedical Sciences in 2019.



Wenner

Daniel C. Jaffurs (PhD '99, MD '00), a pediatric plastic surgeon and medical director of craniofacial services at Children's Health of Orange County (CHOC) and division chief of pediatric surgery at the University of California, Irvine, is back in school. He's pursuing his master's degree in health care administration at UCLA and plans to expand CHOC's programs and service lines while improving existing programs. "It's gratifying to work with people of a similar mindset," Jaffurs says. "We're all on a mission to provide the best care for the children of Orange County."



Jaffurs

'00s

Early in **Ilene Ruhoy's** (MD '00) medical career, she pursued a PhD in environmental toxicology and trained in pediatric and adult neurology at the University of Washington and Seattle Children's Hospital. Her own experience with a brain tumor influenced her clinical focus. She cofounded the Mount Sinai South Nassau Chiari Ehlers-Danlos Syndromes (EDS) Program in 2021 to treat patients with structural defects in the base of the skull and the cerebellum (Chiari malformations) and EDS, a group of inherited connective tissue disorders caused by abnormalities in the structure, production and/or processing of collagen. She continues to conduct research at that New York program while also serving as the medical director of Cascadia Complex Health in Seattle.



Ruhoy

Nima Sharifi (MD '01), director of the Genitourinary Malignancies Research Center and Kendrick Family Professor for Prostate Cancer Research at Cleveland Clinic, is part of a team that recently published in the Journal of Clinical



Sharifi

Investigation on a possible treatment for castration-resistant prostate cancer (CRPC), a lethal form of the disease. The research shows that blocking the epithelial and endothelial tyrosine kinase known as BMX could be a viable treatment strategy in men who are genetically predisposed to faster tumor development and shorter lifespans. About half of the men who develop CRPC have a genetic predisposition. Researchers at the University of California, San Diego are conducting a clinical trial to determine the efficacy of a drug that targets BMX.



Adeoye

Opeolu M. Adeoye (MD '02), a physician-scientist specializing in emergency medicine and neurological emergencies, was elected to both the National Academy of Medicine and the American Society for Clinical Investigation in 2022. His research focuses on how acute-care interventions influence outcomes after strokes, seizures and traumatic brain injuries. At the Washington University in St. Louis, he is the BJC HealthCare Distinguished Professor of Emergency Medicine and chair of emergency medicine. He's also the chief medical officer of Sense Neuro Diagnostics, a company developing noninvasive scanners to monitor brain injury.



Diedrich

'10s

After completing his postdoctoral research in Cape Town, South Africa, **Collin Diedrich** (PhD '12) came back to Pittsburgh to establish Learning Disabilities Association of Pennsylvania (LDA of PA) in 2018. As both the founder and president of the nonprofit, Diedrich advocates for adults and children who are neurodivergent. He's motivated not only by his personal experience with learning disabilities but also his drive to help others. LDA of PA teaches students life skills through improv classes and multisensory science videos. Diedrich is also a researcher at Pitt, where he studies immunologic responses in HIV and tuberculosis. In 2022, he was named a Pittsburgh Magazine 40 Under 40 honoree.

—Michael Aubele, Rachel Bittner, Nicole Matthews, Erica Lloyd and Lynnette Tibbott

SPOTLIGHT

JOSIE VAN LONDEN: MUSINGS TO HEAL, COMFORT AND GUIDE

Gijsberta “Josie” van Londen, an MD (Res '04, Fel '07, '09 and MS '09), wanted an outlet to share stories with compatriots who'd also completed their cancer treatments—an outlet where she'd find support and compassion and be able to offer her own inspiration and guidance. So she took to blogging and built a community of survivors who heal, at least in part, by sharing with people who can empathize.

The website CancerSurvivorMD is where van Londen takes on questions like “Who or what do we get angry with?” and posts videos on topics like addressing weight gain and updates on her health. The site includes personal musings about books and the like, even images of impressive gnome villages. To broaden her reach, she launched a Facebook support network and uses other platforms, as well.

Van Londen has both survived and treated cancer. She is a geriatrician and medical oncologist; as an associate professor of medicine at Pitt Med, she's studied challenges that older cancer survivors can face, from cardiovascular disease to post-mastectomy pain syndrome.

And she's well aware of how cancer resources drop away after treatment ends. “I want to help more people, beyond what I do in the clinic,” van Londen says. “I want to have a voice, and I want other people to have a voice.”

Her frustration with a lack of post-treatment support reached its breaking point around Christmas several years ago. That's when she sat down during the holiday break and built her website.

“If you ask me, ‘What's the message?’ I think one is that the more knowledge you have, the less fearful you are,” she says. “Another is about empowering people to ask questions.”

Van Londen hasn't posted much recently because of another health issue. She's on long-term disability while being treated for primary mitochondrial disease, which she was diagnosed with in 2021 after failing health.

Despite her health struggles, she'd like to visit her ailing father in the Netherlands, where she's from. Van Londen's husband, Stasa Tadic (Res '04, Fel '06, MS '06), MD associate professor of medicine, wrote on a GoFundMe page established for medical expenses that the couple remains “rebelliously hopeful” about better health and being able to make the trip.

—Michael Aubele



van Londen

Attention class!

If you have news about an exciting career advancement, honor, publication or gratifying volunteer work, let us know. And we love to hear your Pitt memories. Please share updates with our Alumni News editor, Michael Aubele, at mia97@pitt.edu.

MAA SAYS

“TRULY A HUGE HELP” FOR STUDENTS

Attending conferences and presentations, making time to serve as chapter president with the Student National Medical Association, taking pressure off her family—all of this is happening for Brianna Blake (Class of '25) thanks to her scholarship from the Medical Alumni Association (MAA).

“This has truly been a huge help to me,” she says. “I don’t think any of those things would be possible without it.”

A first-generation college graduate who received bachelor’s degrees in biology and in biochemistry and molecular biology and a minor in informatics from Lincoln University of Pennsylvania, Blake is passionate about closing the gap for health literacy in minority youth, serving underserved populations and promoting women’s cardiac health. She’s considering a career in surgery or interventional cardiology.

The MAA scholarship is awarded annually to two first-year medical students and provides \$10,000 (in full the first year and \$5,000 per semester the following years) each year until graduation, provided the standards of the scholarship are maintained. Otherwise the funds have no restrictions and can be used as needed by the student.

“The scholarship has enabled me to broaden my horizons, beyond simply studying, to give me opportunities I might not have otherwise had,” Blake says. “I would encourage everyone to apply.”

Successful applicants will generally meet the following criteria:

- Remain in good academic standing at Pitt Med.
- Show a commitment to the goals of the MAA. (See: www.maa.pitt.edu/mission-statement.)
- Display a dedication to serving the health of patients in Pittsburgh and the larger Western Pennsylvania region. —MA



Blake

STEP UP: PITT MED TRIVIA



Can you answer these without going online? (We encourage you to call doctors-in-the-know for consults.)

1. What Pitt Med graduate won a Nobel Prize for his discovery of cortisone’s application to rheumatoid arthritis?
2. At what hospital did med students, pre-1999, look forward to their rotation so they could catch a glimpse of Panther games?
3. Who popularized the use of the surgical stapler in the United States?
4. Multiple choice: Who founded Presbyterian Hospital (now UPMC Presbyterian)?
 - A) The Rev. Stephen Dows Thaw, son of banker and philanthropist Benjamin Thaw Sr. and Elma Ellsworth Dows
 - B) Andrew Carnegie, industrialist and philanthropist
 - C) Louise Lyle, a newcomer to Pittsburgh and newly minted MD, with \$5 in her purse
5. Multiple choice: Pitt Med’s MD Class of '22 published how many manuscripts during their med school years?
 - A) 166
 - B) 237
 - C) 346

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.

ALUMNI PROFILE

PRACTICAL IMPLICATIONS SCHAFFNER HAS SPENT DECADES INVESTIGATING PARADIGM SHIFTS IN MEDICINE.

BY SHARON TREGASKIS

Fifty years ago, Kenneth Schaffner was chair of Pitt's Department of History and Philosophy of Science, investigating logic problems in biomedicine. At the same time, renowned Pitt Med diagnostician Jack Myers was heading up a team developing the first-generation AI and computer-based diagnostic tool, Internist I.

The two hit it off at a conference, then teamed up to fine-tune how Internist diagnosed patients with symptoms of multiple diseases. They developed the course Logic Problem Solving in Clinical Diagnosis for second-year medical students that featured a mix of conventional diagnostic tactics of the time and analyses of the results Internist produced.

There was only one problem, which was that Schaffner, whose PhD is in philosophy from Columbia University, struggled to keep pace with Myers and the students.

"So I made the arrangements to do two years of medical education," says Schaffner, now 83 and a Distinguished University Professor Emeritus. After starting courses at Pitt Med in 1980, Schaffner ended up completing an MD in 1986.

For the past four decades, Schaffner has grappled with profound paradigm shifts in medicine by expanding his work on how disease states are understood, digging into the benefits and risks of using nematodes and other model organisms to understand human health and disease and seeking insights from genetic discoveries to make sense of the interplay between nature and nurture. In 2016, Oxford University Press published his book "Behaving: What's Genetic, What's Not, and Why Should We Care?" His sequel is in progress.

Paul Appelbaum was a Pitt assistant profes-

sor of psychiatry when he met Schaffner in 1980. Still a clinical psychiatrist and now director of an ethics center at Columbia, Appelbaum has stayed in touch.

"Ken's thinking about diagnosis and diagnostic categories, including in psychiatry, and his thinking about genetics—especially how we should be thinking about the genetics of behavior—are real contributions."

As cofounding director of Pitt's Center for Medical Ethics—now the Center for Bioethics and Health Law—Schaffner and his colleagues formed a multidisciplinary brain trust for clinical consultations and to drive research. Their training programs in philosophical and practical approaches to bioethics for medical students, researchers and health care professionals continue to this day.

Lisa Parker, a PhD, the Dickie, McCamey & Chilcote Professor of Bioethics and professor of human genetics in the School of Public Health, now directs the center. Schaffner sat on her Pitt dissertation committee in the late 1980s.

"Ken really understands and analyzes the scientific methods, not just the output of the science," she says. "He looks at an earlier stage—how the methods within the science affect its findings and then how those findings affect people."

Consider Schaffner's analyses of paradigm shifts in immunology and their implications for early clinical trials in transplant medicine.

Schaffner, eminent philosopher of medicine, recalls taking classes with med students he was also teaching.

Pitt transplant pioneer Thomas Starzl reached out after reading Schaffner's essay on a problem with institutional review board standards to safeguard human subjects in clinical trials and how it could impede discoveries emerging in transplant medicine. The pair wound up guest-editing a special issue in Theoretical Medicine and Bioethics on immunological tolerance.

Colleagues and trainees alike credit Schaffner's generosity with introductions and collaborations. Thomas Cunningham, a PhD who is now a director of clinical bioethics at Kaiser Permanente West Los Angeles Medical Center, notes Schaffner connected him to Robert Arnold, Distinguished Professor of Medicine and director of Pitt's Institute for Doctor-Patient Communication. The introduction yielded an ongoing partnership to understand and improve how clinicians work with surrogate decision makers for patients in intensive care.

"Together, Ken and Bob showed me that if you want to talk about medical reasoning, talk about things that are familiar and happen a lot," says Cunningham.

"In disagreement, we could come back to focus on what we know, what we don't know, and how people reason about hard choices."

—Rachel Bittner contributed to this article.



UNIVERSITY OF PITTSBURGH/TOM ALTANY

WILLIAM C. E. PFISCHNER JR.

SEPT. 10, 1922—MAY 5, 2022



Pfischner

Serving on a U.S. Navy destroyer in the Mediterranean and at a research institute in Egypt, William Pfischner Jr. (MD '48) had seen and experienced a ton before he returned stateside for the bulk of his medical career.

Pfischner, born into a working-class Pittsburgh family (his father was a steelworker), chronicled every moment of his days, down to where he ate ice cream abroad; his journal was buried with him just months before he would've turned 100. Beyond those adventures in his early years, he traveled around the world by air in 30 days and visited at least a dozen countries, from those in Europe and the Middle East to China and Japan.

After earning his MD and interning at West Penn Hospital, Pfischner served in the navy for 10 years, including two at the Philadelphia Naval Hospital before sailing on the USS Shenandoah as a medical officer and moving on to the U.S. Naval Medical Research Institute in Cairo. He also served at the Naval Medical Center in Bethesda, Maryland.

Pfischner earned a master's in public health from Johns Hopkins University and took a job with the City of Philadelphia, directing various health centers and teaching at Jefferson Medical College, which is now the Sidney Kimmel Medical College at Thomas Jefferson University. Retirement in 1983 saw Pfischner move to Florida before ultimately landing in Charlotte, North Carolina.

Pfischner had befriended Loy Witherspoon, renowned religious scholar and founding chair of religious studies at the University of North Carolina at Charlotte, during his time in Cairo. The pair became lifelong companions.

"They had a really great friendship and were like mentors—more like adopted grandfathers—to me," says Sheri Williams, a UNC Charlotte graduate who got to know Pfischner and Witherspoon

through the university.

Williams says Pfischner spoke of Pitt often: "He always held Pittsburgh near and dear to his heart." —MA

PHILMORE HAMIL CRICHLLOW

JULY 31, 1927—DEC. 4, 2022



Crichlow

While a resident at Mercy Hospital, Philmore Crichlow, MD (Res '60), found himself at Pitt in the virology lab of Jonas Salk. The experience held professional importance for him, but also created an admiration for Salk that he talked about for the rest of his life.

Born on the island of Tobago in the West Indies, Crichlow immigrated to the United States in 1948 and enrolled at Howard University, where he earned his MD. He came to Pitt in 1956 and within months joined Salk's lab.

"When he talked about his work in the lab, my dad spoke a lot about Dr. Salk himself, being an amazing leader and very fair-minded," said Rudyard Crichlow, one of six Crichlow children. "He would say that Dr. Salk didn't judge by the color of a person's skin, but by the content of their character."

Rudyard and his sister, Jeanne Crichlow, say one of the stories their father told perfectly illustrates the point. It involved the arrest of a young Black woman who worked in Salk's lab and how Salk intervened to get her out of jail.

As the Crichlows tell it: The woman had a painful wound on her arm. On her way home from the lab one night not long after she was hurt, police approached her because she was on the street late. One of the officers grabbed her by the arm, and she immediately pulled it away because of the pain. That led to her being taken to jail for resisting arrest.

IN MEMORIAM

'40s

WILLIAM C. E. PFISCHNER JR., MD '48

'50s

WALTER FOSTER, MD '57
MARTIN MEYER, MD '56
MILTON MICHAELS, MD '54, RES '55
ALAN MORGAN, MD '57
CHARLES TRIPOLI, MD '55

'60s

PHILMORE HAMIL CRICHLLOW RES '60
ALBERT WILLIAM DIBBINS, FEL '67
ANTHONY J. GIALAMAS, RES '60
GEORGE GOLDSAND, RES '67
CHARLES KRIFCHER, RES '65

'70s

E. LEON BARNES JR., RES '72
PAUL E. BERKEBILE, RES '71
FRED BERKOWITZ, RES '72
VIRGINIA LACKMAN BILLIAN, RES '72
GEORGE FATULA, MD '71, RES '74
STEVEN HOWARD HOYME, RES '75
CALVIN NEITHAMER JR., MD '77
JAMES RAYMOND, MD '74
ALLAN BERT SCHACHTER, RES '72
JEAN-MICHEL LOUBEAU, RES '75
JOSEPH MATTHEW ZETERBERG, FEL '74

'80s

JAMES DUGGAN, MD '80
WILLIAM J. FORSTATE, FEL '84
KAM FAI PANG, MD '85
WARREN SMITH, MD '81

'90s

MICHELE A. MORO, RES '94
DEMETRIOS PATRINOS, DMD '97, MD '97, RES '99

'00s

GREGORY H. TATUM, RES '06

FACULTY

MARCEL BRUCHEZ, PHD
MARTICA HALL, PHD

Please send
In Memoriam notices
to mia97@pitt.edu.

The woman called Salk from jail and asked for help. “He ended up going there in the middle of the night to get her out,” says Rudyard.

He says Salk’s influence rubbed off on his dad.

“For me, it was all about his integrity,” Rudyard says of his father’s character and concern for others. “He stood for what he thought was right.”

Crichlow spent 55 years as an internist, caring for patients in Pittsburgh and Tobago and making sure they enjoyed the best quality of life possible.

“I worked for him for four years, and he was one of the most ethical people I’ve ever known,” says Jeanne. “He was caring, compassionate and a man of great faith who was always teaching and inspiring others.” —*MA*

MARCEL BRUCHEZ

SEPT. 21, 1973—AUG. 27, 2022



Bruchez

Being the guy who invented the molecular sniping rifle sounds like something a gaming developer might put on his résumé, but it’s the kind of notoriety that sets you apart in the realm of biomedical science, not in fantasy warfare.

Marcel Bruchez, a PhD, created the molecular sniping tool, also referred to as the fluorogen activating protein (FAP), though the contribution was only one of many in his impressive career as a scientist and technologist, cut short by brain cancer. His colleagues at Pitt Med described him as a master craftsman determined to solve complex problems.

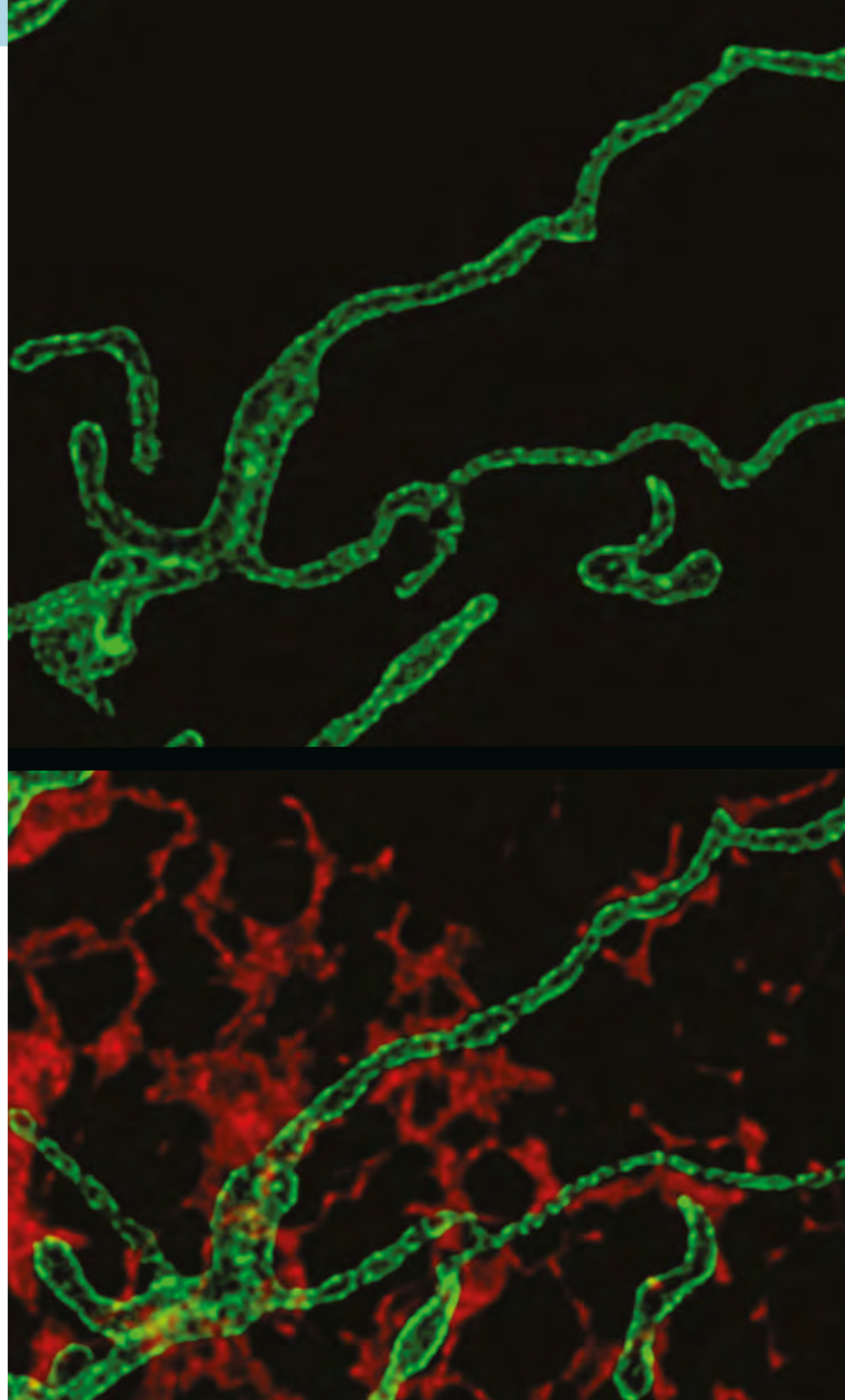
“There are people who build tools to answer questions, and people who build tools and then look for questions to answer,” says Simon Watkins, a PhD, Distinguished Professor and vice chair in the Department of Cell Biology. “It’s a very important difference, and a lot of people in chemistry and physics and optics build all sorts of clever things. But they’ve got no idea what they’re using them for until they find the right question. Marcel would meet with us, and we would come up with problems we were trying to solve, and Marcel would design solutions that solved a lot of these problems.”

Working under a primary appointment at Carnegie Mellon University as a professor of chemistry and of biological sciences, Bruchez collaborated regularly with researchers at Pitt Med and held an appointment at Pitt in cell biology. He arrived at CMU in 2006 after launching Quantum Dot Corporation, which was later acquired by the company Invitrogen.

Bruchez was the recipient of the Rank Prize in Optoelectronics and held more than 30 patents that have been licensed to six companies. He was inducted as a fellow into the National Academy of Inventors in 2022. One of his papers has been cited more than 11,000 times. (He liked to say his favorite “invention” was his child, Leo, who is now a teenager.)

“I’m 64, and I know a lot of scientists,” says Ben Van Houten, Pitt’s Richard M. Cyert Professor of Molecular Oncology and professor of pharmacology and chemical biology. “Marcel was a rare genius who had this exceptional ability to understand the problem.”

Julie Heinrich, who met Bruchez in 1996 and married him in 2002, says, “He was our rock. He was steady and trustworthy; he was just a great friend, to me and to everyone he knew.” —*MA*



CELL BIOLOGIST’S SWISS ARMY KNIFE

To apply oxidative damage to a specific site within the cell, Marcel Bruchez developed a system that fuses a fluorogen-activating protein (FAP) to another protein. The FAP becomes fluorescent when it binds to a dye and when illuminated by red light, produces a tiny singlet oxygen “bomb.”

Bruchez, with Pitt’s Ben Van Houten and Edward Burton, was part of a team that used the system to target oxygen damage to mitochondria in cells and ablate mitochondrial function in zebra fish embryos. Patty Opresko’s lab at Pitt used the system to produce a specific type of mitochondrial DNA damage only in telomeres, the ends of chromosomes. The result? They learned that cancer cells were not affected by a few lesions on their telomeres; however normal cells were (they underwent senescence). Van Houten says these breakthroughs contribute to our understanding of how resistant cancer cells can be, and how, in other cells, crippled mitochondria can cause problems, like causing cellular dysfunction with age.

The FAPs that Bruchez developed are incredibly versatile, Van Houten notes. “Think of a Swiss Army knife for cell biologists.”

Shown above: Green shows FAP labeling within mitochondria; red shows the endoplasmic reticulum. Images: Courtesy Mike Calderon, Department of Cell Biology and Center for Biologic Imaging.

Why did some species lose their fur coats?



*Das Mammut, Elephas primigenius Blumb
nach einem vollständig erhaltenen Funde aus einem Flussufer Sibiriens.*

FOR REAL! TWEEN SCIENCE



Ever wonder why you don't have fur all over your body, like your primate cousins—chimps and bonobos?

After all, if we humans had thick hair all over our bodies, we wouldn't need such heavy jackets in the winter. (Our heating bills wouldn't be as high, either.) So why do we have less body hair than most mammals?

Of course, the answer lies in evolution—how living things change over long periods of time. Plants and animals (people included) all gain and lose traits depending on what they need to survive; those changes often help us thrive.

Typically, it takes many millions of years before a new trait becomes standard. But humans seem to have lost their thick body hair, a.k.a. fur, much more quickly than that. Our hair loss might have happened over *merely* a hundred-thousand to a few million years.

As it turns out, we humans still have genes for producing hair all over our bodies. But during our evolutionary history, those genes mutated and stopped sending fur-making instructions. Other mammals such as naked mole-rats and dolphins also have the genes for fur. But apparently, they didn't need to be so shaggy either. The “phenotype,” or physical trait, was lost at some point.

Take the extinct woolly mammoth and its present-day cousin, the elephant. Somewhere along the chain of evolution, across a warming ice age, a common ancestor lost a full coat of hair.

For all of us—elephants, humans and other furless friends—there was probably an advantage to nature fussing with the follicles. Scientists aren't yet certain what the benefit would have been for humans to have lost their fur. Maybe it helped keep pesky parasites from getting too comfortable. And that might have made furless men and women more attractive to potential mates.

Our hair loss is thought to have happened well before modern humans migrated north of Africa. So body balding would also have allowed our ancestors to better control body temperature in hotter climes.

You may need a coat sometimes, but at least you don't have to carry it around all year long.

—Lynnette Tibbott

A big thanks to Amanda Kowalczyk (PhD '21), who got her doctorate in computational biology through Pitt and Carnegie Mellon University's program and is now a postdoctoral researcher at CMU. Kowalczyk's recent study with Pitt's Maria Chikina and University of Utah's Nathan Clark on the genetics behind how humans and other species lost their fur helps explain this hairy situation.

CALENDAR

FOR ALUMNI & FRIENDS

Unless otherwise noted,
for information: Alex Rigby at
hsalumni@pitt.edu

CLASS OF 2025 PINNING CEREMONY
MAY 5
Alumni Hall Auditorium

DIPLOMA DAY
MAY 21
Soldiers and Sailors Memorial Hall

PHYSICIAN SCIENTIST SYMPOSIUM
JUNE 9-10
Heinz History Center
For information:
pi.tt/pittpssymposium2023

WHITE COAT CEREMONY
JULY 30
Soldiers and Sailors Memorial Hall

ORIENTATION WEEK
JULY 30—AUGUST 4

**REUNION WEEKEND
AND HOMECOMING**
OCTOBER 13-15

PHYSICIAN SCIENTIST SYMPOSIUM



HEINZ HISTORY CENTER, PITTSBURGH, PA

SAVE THE DATE

FROM FUNDING TO LEADERSHIP JUNE 9-10, 2023

Calling all School of Medicine physician-scientist trainees, students and alumni: You'll want to come to Pitt's first Physician Scientist Symposium; the focus is on you. This June, take some time away from your studies and the clinic to focus on topics like successful approaches to continued funding (from sources beyond the National Institutes of Health), building leadership capacity and more. If you preregister, you can even work with an executive coach. You'll refresh or jump-start your career while networking with budding and established counterparts. The weekend begins with a gathering at Barcadia in Market Square and ends at the Heinz History Center.

To register: pi.tt/pittpssymposium2023
Contact hsalumni@pitt.edu for more information.



University of
Pittsburgh

School of
Medicine



Pitt Med Trivia *(from page 36)*

Answers:
1. Phillip S. Hench (MD 1920)
2. Pittsburgh VA Medical Center
3. Mark M. Ravitch
4. C: Louise Lyle, a newcomer to Pittsburgh
and newly minted MD, with \$5 in her purse
5. C: 346



PHOTOGRAPHY: UNIVERSITY OF PITTSBURGH



Guests at a recent Toast to Diversity and Call to Action evening; the annual event was established by Thompson.

Reflections. Remedies.



From her adolescence during the civil rights movement to her current role as vice dean of the School of Medicine, **Ann Thompson** has noticed an uncomfortable truth: Very little of her education in social justice came from formal schooling.

"The more stories I hear, and the more I read, the more that I realize what I didn't learn in high school, college, medical school," Thompson says, "and the more I feel it needs to be incorporated into everyone's learning."

Thompson, an MD, MCCM Distinguished Service Professor of Critical Care Medicine and professor of pediatrics, was deeply involved in the establishment of pediatric critical care medicine as a subspecialty and the use of extracorporeal life support in pediatrics in the 1980s. As chief of pediatric critical care at UPMC Children's Hospital of Pittsburgh from 1981 to 2009, she presided over growing clinical and fellowship programs and helped to define the entire field along the way.

Since becoming vice dean in 2014, Thompson has focused more and more on addressing barriers to success for women and underrepresented communities in academic medicine and helped establish an annual celebration that brings these groups together. Thompson has continually advocated for the school's curriculum to focus on health disparities and social determinants of health; she herself is a certified unconscious bias educator.

Confronting such issues, she says, is integral to the health of the country—which she compares to a patient on life support: "I've come to see racism and social injustice as the chronic critical illness of America."

Thompson will step down from her vice dean role in fall 2023; her legacy will endure. She recently endowed a new professorship for social justice in medicine. The recipient will explore what it takes to equitably serve those whom the medical system has left behind—and put findings into action. Collaborating with community members to establish and maintain new services in underserved areas will be key.

Thompson would like to see more opportunities for her colleagues to identify "not just the challenges but the best ways of working with communities."

"If we could have more people focused on this work and bring them together," she says, "we would get farther faster."

To make a gift to the medical school:
giveto.pitt.edu/pittmedmaggive
Or call Jen Gabler: 412-864-5547.



Thompson