UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE | SUMMER 2023

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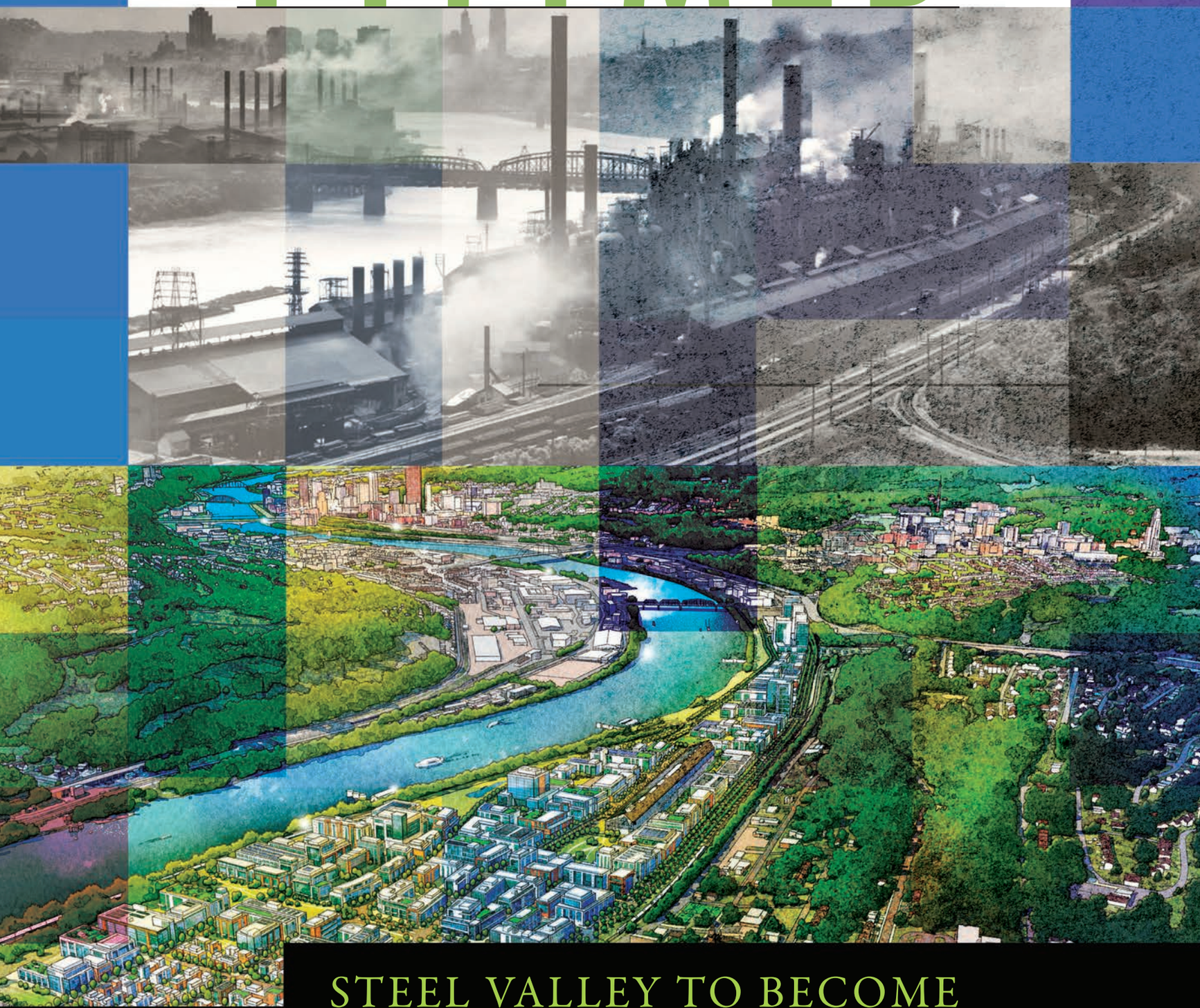

STEEL VALLEY TO BECOME BIO VALLEY

PITTSBURGH WILL BIOMANUFACTURE ITS FUTURE

RECENT MAGAZINE HONORS

2023 Press Club of Western Pennsylvania Golden Quill Awards

• Winner: Excellence in Written Journalism, Medical/Health—Division 4 (E. Vitone, "911, What's Your Emergency?")

• Finalist: Excellence in Written Journalism, Medical/Health—Division 4 (M. Passmore, "Hidden in Plain Sight")

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Great ambitions, transformative work

"Without ambition one starts nothing.
Without hard work, one finishes nothing."
—*Ralph Waldo Emerson*

AIMEE OBIDZINSKI/UNIVERSITY OF PITTSBURGH

Dear Pitt Med Readers,

In Pittsburgh, we have great ambitions. Our city has the necessary ingredients to excel in biotech innovations and create the next generation of health care solutions. We believe that such an audacious pursuit can be led by Pitt and the University of Pittsburgh Medical Center (UPMC), in collaboration with visionary partners. Our cover story, "Steel Valley to become Bio Valley," describes the first step in this transformative work. It is a great example of how an enlightened local foundation, top-notch industry collaborator and community partners can join forces with a leading academic medical center to realize a bold vision. It is also a story of the transformation of a city known for providing the steel to build the world in the 20th century now aspiring to create biological products for worldwide utilization.

Transformation on this scale, of course, only happens when we come together. I like to think of our medical school as a catalyst, a force for good that brings together people from our universities, the regional communities and, indeed, experts from across the world to work with us and advance health for all. An example of such catalytic innovation is demonstrated by the work our researchers are doing in collaboration with faculty at Carnegie Mellon University, which has become a great partner institution to Pitt. The latest is a promising new use for spinal cord stimulation technology. In this issue's "A moving story" (page 24), you can follow a stroke patient's astonishing recovery from upper extremity paralysis during lab trials of an adapted application of the technology. The method was developed by Pitt's Marco Capogrosso and Elvira Pirondini with Carnegie Mellon's Douglas Weber. It's hard to imagine a more meaningful pursuit.

Transformation is also a work in progress, and it will take hard work to realize the fruits of any ambitious goal. So, we'll not only do the hard work of innovation and entrepreneurship, but through our innovative new curriculum, make sure that Pitt Med students cultivate the mindset and the skills to become the leaders of the health care of the future. (I encourage you to read "An open conversation" on page 10 to learn more.)

Here at Pitt Med, we are committed to transformation at all levels—education, research, patient care, community service, innovation and entrepreneurship.

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

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UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE MAGAZINE
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"When your hands are holding up someone's body, it's high stakes. It's very adrenaline filled, but you learn how to work under pressure."

DEPARTMENTS

University of Pittsburgh
School of Medicine

ABOUT THE COVER A vibrant biomanufacturing center along the Monongahela will bring promising therapies to the marketplace and put Pittsburghers at the front of the queue for treatments and economic opportunities. Photo-illustration by R.J. Thompson, © 2023. (Photography: J&L Hazelwood Works: Heinz History Center. Hazelwood rendering: Depiction.)

Pitt Med is published by the Office of the Dean and Senior Vice Chancellor for the Health Sciences and produced quarterly for alumni, students, staff, faculty and friends of the School of Medicine.

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"That very first day in the lab, I opened and closed my hand for the first time in the nine years since my stroke."

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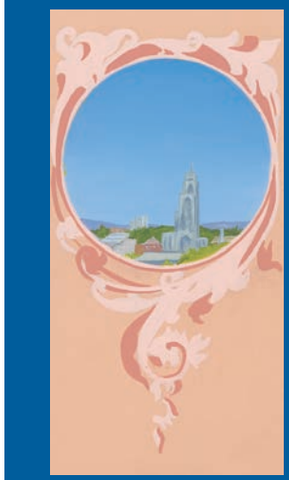
FEATURES

CONTRIBUTORS

R.J. THOMPSON [cover photo-illustration] is a jack-of-all-trades, experienced in design, video, photography and marketing. Before joining Pitt in 2019, he was a tenured professor of design at Youngstown State University. He's now a manager of multimedia and digital strategy for health sciences at Pitt. Yet since he was 14, Thompson has participated in health research, including a Pitt/UPMC study that led to the development of Trikafta, a treatment for cystic fibrosis that allows him to live symptom-free. He believes the biomanufacturing effort featured on the cover will help bring about further medical advances.

Writer **PHOEBE INGRAHAM RENDA** ["Surgical fluid may be key to future care" and "Low dose, high alert"] began her career in forensics and genetics research, only to realize that science communication was her calling. After working as a scientific writer for Pitt and UPMC surgeon Anita Courcoulas' group, she joined Pitt's Office of Strategic Communications, Health Sciences this year. Of her article about modern targeted cancer therapeutics, Renda says: "I really like writing about the small things that we can't see that have profound effects on the big things we do see."



ALL PHOTOGRAPHY: UPMC

Independent thinking

MERCY PAVILION PAIRS VISION AND PHYSICAL REHAB

Take a plate of leftovers out of the refrigerator and pop it into the microwave. Easy? For a person with visual or physical impairments, this everyday act requires a series of movements and skills that can make all the difference between dependence and independence.

At the new UPMC Mercy Pavilion, which opened for patients May 1 in the Uptown neighborhood of Pittsburgh, a light-filled kitchen in a model apartment overlooking the Monongahela River lets patients practice those skills in a supported setting.

The model apartment is just one among many features in the 410,000-square-foot building moving visual and physical rehabilitation forward. The pavilion's 109,788 square feet of research space houses University of Pittsburgh scientists pursuing breakthroughs in labs adjacent to clinical spaces. That proximity will help bring research findings directly to patients.

The building serves people "trying to regain their vision, mobility, lives and independence," says José-Alain Sahel, an MD, Distinguished Professor, Eye and Ear Foundation Professor and chair of the Department of Ophthalmology at Pitt Med, as well as director of the UPMC Vision Institute. (Sahel also led the Institut de la Vision in Paris for many years.) Among other approaches, he is exploring the use of gene therapy as a cure for blindness.

FOOTNOTE

When filmmaker Sarah Polley accepted an Oscar for writing "Women Talking" in March, it was the culmination of a long journey back to health. A concussion she suffered in 2015 had left her with debilitating symptoms for years. Polley credited Pitt Med concussion expert Micky Collins with a treatment plan that allowed her to write and direct her acclaimed fourth feature. And she says the title of her 2022 essay collection, "Run Towards the Danger," was inspired by Collins' advice to retrain her brain "by charging toward the very activities that triggered my symptoms."

LEFT: Gwendolyn Sowa (right) directs physical therapy in Mercy Pavilion's rehabilitation gym. RIGHT: The building's art exhibits, like those by Kipp Kobayashi (top) and Amy Stacey Curtis (middle), aim to encourage, soothe and inspire patients.

John Innocenti, president of UPMC Mercy, calls the rooftop garden a "playground for recovery."

"If you think about the way people navigate their environment when they have visual, mobility or cognitive impairments, there are a lot of similarities in what we need to do in terms of a rehabilitation approach," says Gwendolyn Sowa, an MD, PhD, Endowed Professor and chair of Pitt's Department of Physical Medicine and Rehabilitation, as well as director of the UPMC Rehabilitation Institute.

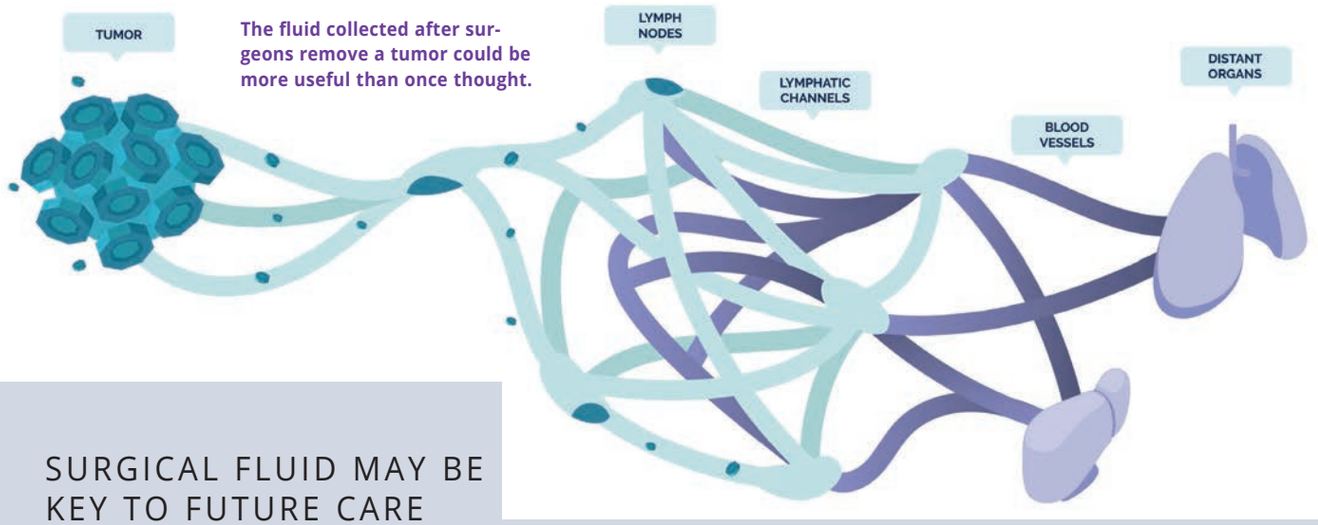
The pavilion also houses Pitt's Rehab Neural Engineering Labs, which focus on decoding and understanding signals from the brain and the peripheral nervous system in ways that can help with mobility, sensory and even visual impairments.

Anantha Shekhar, an MD, PhD, senior vice chancellor for the health sciences and John and Gertrude Petersen Dean of the School of Medicine, says the new research capacity—along with international collaborations—"place Pitt and UPMC at the leading edge of visual and physical rehabilitation medicine worldwide."

The architecture firms HOK and IKM designed the pavilion with input from Chris Downey, one of the world's few blind architects. (Mascaro–Barton Malow was the building's construction manager.) It incorporates a roof garden that John Innocenti, president of UPMC Mercy, calls a "playground for recovery," where patients can practice navigating surfaces like grass, pebbles, steps and cobblestones among fragrant plants like rosemary and sage.

Even the art in the building was chosen to be encouraging, soothing or inspirational, rather than merely decorative. For one installation, patients and staff put notes of inspiration or hope for healing into antique bottles hanging from the ceiling.

"There's a little piece of all of us in them," Sowa says. *—Roberta Zeff*



The fluid collected after surgeons remove a tumor could be more useful than once thought.

COURTESY DROPLET BIOSCIENCES

SURGICAL FLUID MAY BE KEY TO FUTURE CARE

After a tumor is removed, surgical drains clear fluid from the healing area. That fluid usually ends up in the trash—but Pitt's José Zevallos believes that it could be lifesaving.

A new company called Droplet Biosciences, which is co-led by Zevallos, has been developing kits to test the lymphatic fluid from surgical drains and characterize cancer to direct precise post-surgery treatments for patients.

"It was a simple idea," says Zevallos, an MD, the Eugene N. Myers Professor of Otolaryngology and chair of that department at Pitt since August 2022. The lymph from these draining surgical sites provides "a window into the body's physiology that had never been looked through before, and [the lymph] has the tumor's immunology," he says, including what's "contributing to treatment response and tumor aggressivity."

These insights launched Zevallos into the entrepreneurial world, where he met Stan Lapidus, founder of Exact Sciences and inventor of Cologuard, a kit that uses DNA in stool to screen for colon cancer. Weekly meetings between Zevallos and Lapidus expanded to include Aadel Chaudhuri of Washington University in St. Louis and business expert Theresa Tribble. The four founded Droplet in 2021.

This year the company received an $8 million investment led by the Engine, an MIT-backed capital incubator, to establish proof of concept for the technology. *—Phoebe Ingraham Renda*

Top honors

Königshoff

Neal

Melanie Königshoff, an MD, PhD, and Matthew Neal, an MD, are newly elected members of the American Society for Clinical Investigation (ASCI). They are among 100 members elected in 2023 to one of the most esteemed honor societies of physician-scientists.

Königshoff, professor of medicine, focuses her research on deciphering the mechanisms involved in lung repair and regeneration to identify novel therapeutic targets for age-related chronic lung diseases, such as idiopathic pulmonary fibrosis and chronic obstructive pulmonary disease.

Neal, the Roberta G. Simmons Associate Professor of Surgery, runs a translational research program focused on hemostasis and thrombosis following injury, and his basic science laboratory studies platelet response and mechanisms of immunothrombosis.

Congratulations also go to these ASCI Young Physician-Scientist Awardees, who are assistant professors of medicine: **Cary Boyd-Shiwarski,** an MD, PhD, and **Mark E. Snyder**, an MD. **Utibe R. Essien**, an MD, MPH who recently moved from Pitt to UCLA, also received the award. **Richard P. Ramonell, an MD assistant professor of medicine, was named an ASCI Emerging-Generation Awardee.**

Four Pitt Med faculty members have been inducted into the Association of American Physicians (AAP), an honorary society for physicians with outstanding credentials in basic or translational biomedical research.

Stephen Chan, an MD, PhD and Vitalant Professor of Vascular Medicine, is director of the Vascular Medicine Institute. Chan's research uses bioinformatics and experimental reagents to accelerate translational discovery in pulmonary hypertension. He is also leading a research team exploring cardiovascular links to dementia and a treatment for jet lag.

Pamela Moalli, an MD, PhD professor of obstetrics, gynecology and reproductive sciences and of bioengineering, is director of the Division of Urogynecology and Reconstructive Pelvic Surgery. She leads a team that won the $1 million Magee Prize sponsored by the Richard King Mellon Foundation. Moalli's group focuses on the development of biomimetic biomaterials to improve outcomes of gynecologic surgery for girls and women.

Page Pennell, an MD, the Henry B. Higman Professor of Neurology and chair of that department, came to Pitt from Harvard University in 2021. She researches maternal health and fetal outcomes of women with epilepsy, anti-seizure medication use during pregnancy and the effects of neuroactive steroids on seizure provocation.

Mary Phillips is an MD/MD (Cantab), the Pittsburgh Foundation-Emmerling Professor in Psychotic Disorders, Distinguished Professor of Psychiatry, and a professor of clinical and translational science and bioengineering. She directs the Center for Research on Translational and Developmental Affective Neuroscience. Her research uses neuroimaging techniques to explain abnormalities in circuits of the human brain associated with major depressive disorder and bipolar disorder. *—Michael Aubele*

Chan

Moalli

Pennell

Phillips

Muenzer

COURTESY SARITA DARLINGTON-WINEY. INSET: EMILY FOWLER.

Overheard Dancing through medical school

Just a few years ago, **Maya Muenzer** (shown here) could be found, quite often, dangling from a trapeze as a teacher and performer with Frequent Flyers Aerial Dance in Boulder, Colorado.

Now she is a University of Pittsburgh School of Medicine graduate starting a residency in pediatrics at Children's Hospital of Philadelphia. Muenzer grew up in the Point Breeze section of Pittsburgh.

At Oberlin College, she double majored in biology and dance, both of which spoke to her fascination with how the human body works. She then moved to Boulder, where she spent three years with Frequent Flyers. They often collaborated with other local artists—breakdancers, choral groups, even the Boulder Philharmonic.

At Pitt Med, Muenzer received honors that included an Excellence in Pediatrics Award from the UPMC Department of Pediatrics and membership in the Arnold P. Gold Humanism Honor Society, Charles G. Watson Chapter. She also performed in this year's Scope and Scalpel production, "West Wing Story" (see page 8 for more on that).

As she moves on to residency, Muenzer expects to draw on her experiences with aerial dance in her work—even if she's traded her leggings for a white coat.

How did dance prepare you for medicine?

One of the reasons that I chose to come to Pitt Med was that I think that they valued the fact that I had this nontraditional background and saw even what I might not have been able to see myself: how I can apply those skills and the experiences that I had to myself as a physician.

When your hands are holding up someone's body, it's high stakes. It's very adrenaline filled, but you learn how to work under pressure. I was constantly having to work with people who have different expectations, different understandings of their body, of what's going on in the air, different ways that they like to learn. That will really apply to when I'm a resident teaching a medical student, or an attending teaching a resident, or when I'm working with families and teaching about a new diagnosis, or trying to explain to a 7-year-old what's going on with their body and why they feel the way that they do.

How did your background shape your research?

My research advisor, Dr. Amy Houtrow, is a pediatric physiatrist. She primarily does research but also works with kids who have disabilities and complex health needs. And she's just fantastic. She's helped me with my longitudinal research project while at Pitt Med.

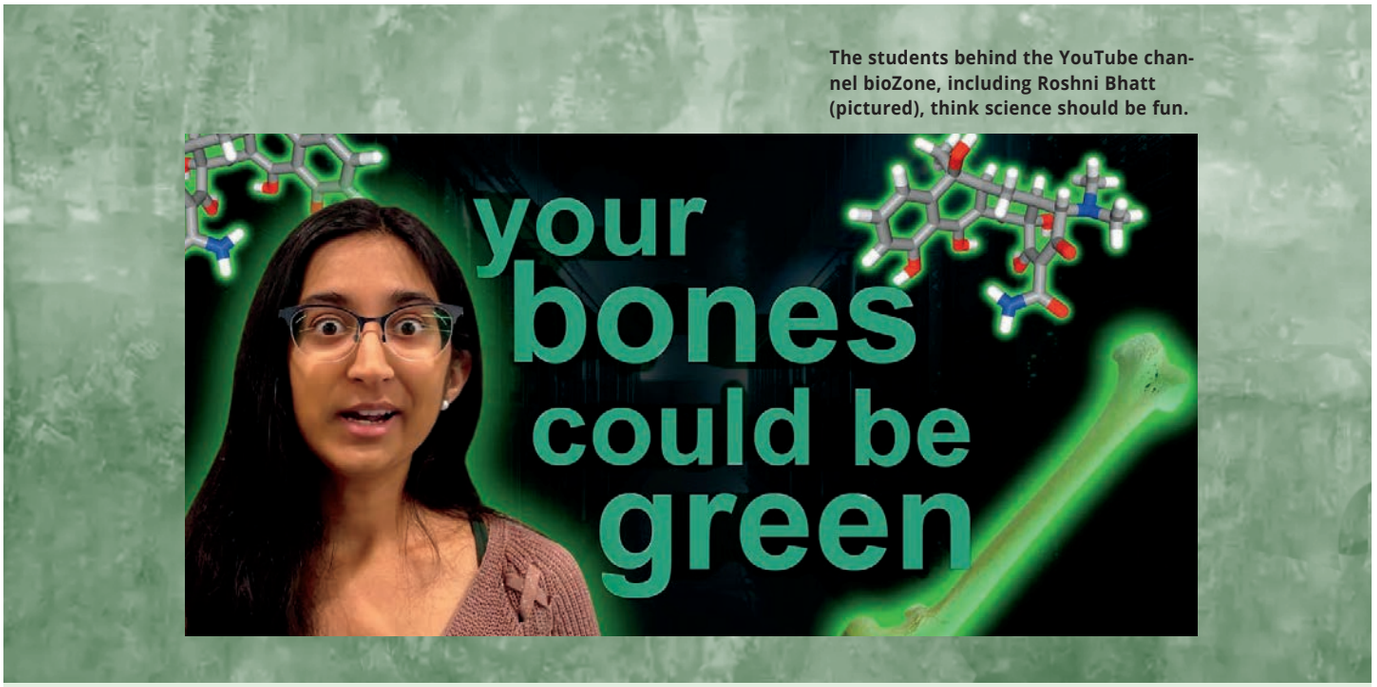
I was able to learn how to use the dataset that she uses, the National Survey of Children's Health. I ultimately wrote a manuscript looking into the physical activity participation of children with complex health care needs.

We know that physical activity is associated with lots of benefits, like improved health outcomes, greater quality of life, along with a plethora of other things. And so, my findings broadly show that this population is at greater risk for having lower physical activity participation. By focusing in on those children, we can make sure to not leave them behind.

What's next for you?

I'm really looking forward to residency where I'm going to continue to have constant opportunities to be teaching not only medical students and [premed student] shadows, but also patients and their families. It's a huge aspect of pediatrics. It also intersects with my passion for working with people with disabilities and advocating for them.

—Interview by Roberta Zeff



The students behind the YouTube channel bioZone, including Roshni Bhatt (pictured), think science should be fun.

UNIVERSITY OF PITTSBURGH

THEY ARE IN THE ZONE

THOUSANDS TUNE IN TO STEM CHANNEL RUN BY GRAD STUDENTS

"What color are your bones?" Roshni Bhatt asks in the opening of a video posted in January. "What if I told you there's a chance they could be green?" Bhatt goes on to explain how an acne treatment (tetracycline) joins with calcium in the bone matrix to produce a fluorescent hue.

On the YouTube channel bioZone, six Pitt Med students tackle quirky (yet often complex) scientific questions with a sense of fun. Is CBD a cure-all? Can you get all your DNA from one parent? Why do cats' eyes gleam in the dark? bioZone has the answers—usually accompanied by sound effects, pithy quips and helpful visuals.

The channel launched early in the COVID-19 pandemic, when PhD student April Rich decided to create a series to engage young people with science. BioZone has since grown into a six-person operation featuring Bhatt, Dante Poe, Marissa Di, Mark Ebeid and Steven Smeal—all, like Rich, students in computational and systems biology at the School of Medicine.

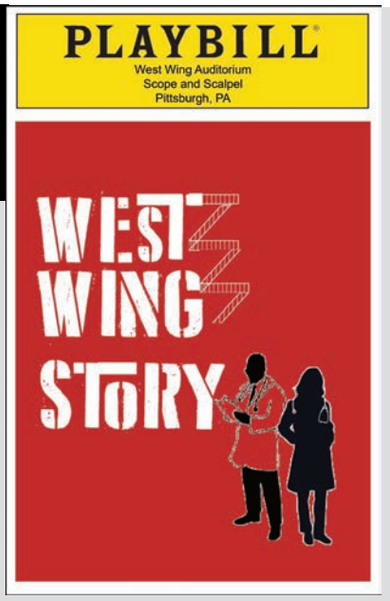
The friends use the platform to highlight topics that interest them personally, widening the channel's perspective and scope along the way. "Even though we've all known each other for a while, I feel like I'm always learning from them," says Bhatt.

As the team has expanded, so has bioZone's reach. In just a few years, the channel has amassed more than 1,500 subscribers. The UPMC Hillman Cancer Center Academy and the National Cancer Institute have sponsored the videos, setting the team up with microphones and lighting equipment and supporting their outreach to Pittsburgh schools. High schoolers who take part in the Hillman Academy's mentored research program have promoted bioZone videos and created Instagram shorts.

Rich hopes bioZone's outreach will one day expand to younger students. And she envisions some of their apprentices eventually taking over the channel to "keep this tradition going."

—Lynnette Tibbott

ASIDE



For this year's Scope and Scalpel, the annual student-run musical lampooning the med school experience, the graduating class had their sights set on the long-anticipated expansion of Alan Magee Scaife Hall. In "West Wing Story," rival specialties—the Scopes and the Scalpels—face off to claim space in the new wing. Meanwhile, students look forward to no longer dealing with construction workers climbing through the windows of small-group sessions. ("That actually happened," one student points out.) "The glove story of a lifetime" ran May 18 and 19, 2023, about a month after a soft opening of the new wing—while work continued in anticipation of a full-fledged debut later in 2023. (Learn more about the addition on page 12.)

—Andrew Doerfler

LEFT: At Diploma Day, the Class of '23 celebrated their achievements and looked ahead to new challenges. BELOW: Keynote speaker Victor J. Dzau encouraged the class to become leaders and effect social change.

Meet Pitt's new chancellor

Gabel

The University of Pittsburgh has a new hand at the wheel. **Joan T.A. Gabel** took office as the University's 19th chancellor in July, following four years as president and chief executive of the University of Minnesota System and Twin Cities campus.

"I am excited and filled with optimism when I think of leading this institution into its important next chapter—to taking leaps when needed, and incremental steps as necessary, to ensure that every step we take, however large or small, moves us forward," Gabel said in a statement.

She will be the first woman to lead the University since its founding in 1787. Gabel succeeds Patrick Gallagher, who held the chancellor position for nine years.

At the University of Minnesota, Gabel led the development of the system's first comprehensive strategic plan, leading to record-setting graduation rates and annual research expenditures, as well as record numbers of startups and patents. During her tenure, the university completed a 10-year, $4 billion capital campaign that exceeded its goal by 10%.

Anantha Shekhar, senior vice chancellor for the health sciences and John and Gertrude Petersen Dean of the School of Medicine, said he looks forward to collaborating with Gabel in pursuit of new successes for the Pitt community.

"Joan T.A. Gabel is a natural leader," Shekhar said in a statement. "It was clear to me that she is forward-thinking, innovative and driven—the right leader for our University at this time and place."

Gabel holds a bachelor's degree in philosophy from Haverford College and a juris doctor from the University of Georgia. She's no stranger to Pitt, though—one of her three children is currently enrolled here. *—Staff reports*

A RESPONSIBILITY TO THE FUTURE

On May 21, members of the School of Medicine's Class of '23 stepped into the next stage of their careers—and all the responsibility that comes with it—as they gathered with loved ones at Soldiers and Sailors Memorial Hall for Diploma Day.

"As the newest participants in the health and biomedical system, you've also been empowered to help change its future," said keynote speaker Victor J. Dzau, president of the National Academy of Medicine. "Maybe it sounds a little grandiose, but I believe that in so doing you shape the future of the nation, as well."

He encouraged the graduates to serve not only individuals but their communities by helping to shape policy and speaking out against injustice. "I've often said, 'There can be no health equity without social equity.'"

Austin Walker Anthony, class president, who gave the Senior Medical Student Address, reminded his classmates that the health care system hasn't always instilled trust in those it's meant to serve. "It is our responsibility to continue to rebuild that trust," he said. "In the coming months, as time becomes scarce, I hope that we will remember that we are not simply called to care for patients, but more importantly, we must care about them." *—AD*

Pantanowitz leads pathology

Pantanowitz

Liron Pantanowitz, an MD, PhD, MHA, has returned to Pitt's School of Medicine and UPMC as the chair of pathology. He's an internationally recognized leader in digital pathology and informatics.

He first came to Pitt in 2010 as a faculty member in pathology, with a secondary appointment in biomedical informatics. In 2020, he left to join the University of Michigan, where he also served as director of anatomic pathology. Pantanowitz is known for his dedication to training the next generation of pathology clinicians, researchers and innovators.

As chair of pathology, Pantanowitz succeeds George Michalopoulos, an MD, PhD who held the position for 31 years.

—Staff reports

The Three Rivers Curriculum emphasizes connections among different courses, reflecting how systems in the human body interact. Students will also make use of hands-on technology in Alan Magee Scaife Hall's new West Wing.

AIMEE OBIDZINSKI/UNIVERSITY OF PITTSBURGH

An open conversation

A NEW MED SCHOOL CURRICULUM BUILT ON DIALOGUE

Lisa Borghesi knows a missed opportunity when she sees one. She recalls presenting a topic in her class, only to find out from her course evaluations that another faculty member had covered it a few weeks before.

"I realized that, despite the fact that the faculty are my friends, and we talk about the courses, I couldn't say I ever sat down with the syllabuses of the pre-clerkship curriculum and informed myself about what every course is doing," says Borghesi, a PhD professor of immunology and the assistant dean for foundations in the University of Pittsburgh Office of Medical Education.

Soon, she and her colleagues won't be left to work out such challenges on their own. The Three Rivers Curriculum, launching this fall for the incoming Pitt Med class, reshapes medical education into an ongoing conversation—among instructors of different courses, among educators and students, among trainees from multiple health care professions, and among the medical school and its community.

In the human body, systems interact, overlap and influence each other. How a medical school imparts knowledge, the new curriculum suggests, should reflect that reality not only in content but in method.

The new model moves away from lectures, which often see paltry attendance. (Students tend to tune in to faculty lecture podcasts instead.) The one-way street can also leave students without a confident grasp of the material. Now, more small-group discussions, facilitated by longitudinal educators who work with students for an entire semester, will engage students as active participants in their education. Classes in the new West Wing of Alan Magee Scaife Hall won't be held in large lecture rooms—see "Best of the West," page 12, for more.

The curriculum's case-based approach encourages critical thinking and emphasizes underlying mechanisms in medicine. And the longitudinal educators will guide future doctors throughout the stages of their preclinical education, linking concepts and serving as mentors.

Pitt Med is already ranked among the top schools in the country (11th for primary care and 13th for research, according to the 2023 U.S. News & World Report rankings). Yet a more integrated understanding of health will more fully prepare students as they step into the clinic for the first time, says Nathalie Chen, an MD, PhD student who served on the curriculum reform task force.

"When you hit clerkships, a person may come in who's tired, and they have a rash and all these other symptoms," says Chen. If you don't understand the connections across the material you've learned, "you're like, 'Well, I don't know what class we're in right now.'"

John Maier, a PhD, MD assistant professor of family medicine who served on the curriculum reform task force, believes more small-group discussion will not only deepen students' knowledge but will also help them become better at relating to others—a great benefit to their future patients.

The curriculum's very development took the value of dialogue into account. "Students were equal partners in the creation of this," says Jason Rosenstock, associate dean for medical education and an MD professor of psychiatry. Their feedback influenced a stronger focus on social medicine and leadership. And taking student well-being into consideration, new "flex weeks" allow more time for independent learning, shadowing, research and personal activities.

Just as important was participation from staff who help make learning possible. "If you come up with a brilliant idea, will it work? Do we have the technology to do it? Do we have the resources? Only the staff who do that work every day can answer that," says Katie Maietta, an MPPM and executive director of the Office of Medical Education. "They want to be heard. And they want to also make [medical education at Pitt] better."

Other essential voices came from beyond the walls of the medical school. The curriculum reform task force included community members to help represent patients—of vastly different backgrounds—that today's med students will eventually serve.

"The health care system has the power, and the community members oftentimes felt powerless in this arrangement," says Felicia Savage Friedman, a task force member who runs a yoga studio, studied education and previously worked as a UPMC community health worker.

The task force sought to break down hierarchies by having everyone address each other by first name—no titles or honorifics. "Just seeing me on a regular basis in this kind of space as a peer is going to help to shift folks into a space where they're more introspective and more thoughtful," says Friedman. She sees it as just one step toward a more inclusive, patient-centered approach to medicine.

Since the reform process launched in 2019, Rosenstock says, its three phases have brought approximately 400 people to the discussion table, spread among task forces, committees and subcommittees. Even after all the planning, those involved know that implementing the curriculum in the fall will bring new challenges to work through.

"Our students will have a huge role in leading the discussion of the new curriculum," says Borghesi, who also served on the task force. "There will be first-year hiccups, and they'll be our partners in coming up with solutions."

The conversation continues.

—Andrew Doerfler

The new curriculum encourages conversation and team-building among students by moving away from large lectures. In the new West Wing, students meet in intimate, flexible classrooms for more active learning. And new spaces to study and gather keep the dialogue going beyond the classroom.

The seven-story expansion of Alan Magee Scaife Hall opened its doors for the first time in April.

Boston architecture firm Payette handled design planning for the building, and PJ Dick led construction management.

AIMEE OBIDZINSKI/UNIVERSITY OF PITTSBURGH

Best of the West

With the launch of a new curriculum at the School of Medicine comes a long-awaited facility to match.

The new West Wing of Alan Magee Scaife Hall opened its doors in April, with a grand opening planned for later in 2023. The airy, light-filled expansion, built on the existing foundation at Terrace and Lothrop streets, offers seven stories where health sciences students will learn, study, gather and—if you can believe it—even relax.

Katie Maietta, executive director of the Office of Medical Education, compared stepping from the old building into the "bright and beautiful" West Wing to Dorothy's introduction into the technicolor world of Oz. Among its highlights is the seventh-story anatomy lab. There—past hallway displays featuring cross sections of brains, bodies and other specimens—students dissect cadavers both real and, using virtual reality systems, digital. Nearby, a wet lab spans the width of the building.

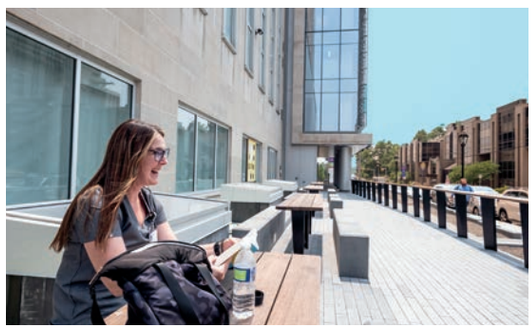
Gone are the large, rigid lecture rooms of old. Instead, the West Wing features smaller-scale, flexible learning spaces with partitions and seating that can be adjusted as needed. The rooms square with the new curriculum's emphasis on more group discussion and active learning.

There is one space equipped to hold a large crowd: A 600-seat auditorium. Fittingly, among its very first uses was hosting the Class of '23's Scope and Scalpel performance, "West Wing Story."

Access to the sixth floor is limited to med students only. There, aspiring doctors can take advantage of group study rooms and a lounge with Ping-Pong and pool tables, a Wii, a lava lamp and a life-size cut-out of Nicolas Cage (reportedly, a specific request from students). Students can snatch a snooze in the sixth-floor quiet room. "Every day I get my half-hour nap in," says Stephen Frederico, a third-year medical student. Plenty are also making use of the Panera Bread two floors down, as well as the study areas in the Falk Library of the Health Sciences.

Maietta hopes that cross-disciplinary symposia in the building and features like the open, lobby-style seating across multiple floors will encourage more intermingling.

"We've really been moving toward more interprofessional education in our curriculum," she says. "I feel like [the wing] is going to turn into a hub for the health sciences students." *—AD*



The new wing includes bright and airy spaces with lobby-style seating (above) designed to encourage more intermingling among students across the health sciences.

The seventh-floor anatomy lab (middle left) has 27 exam tables; an adjacent room makes use of virtual reality technology for complementary anatomy instruction.

The West Wing's design took student well-being into consideration. Outdoor spaces (middle right) and a fourth-floor Panera Bread provide a chance to refresh amid a heavy course load.

Only medical students can access the building's sixth floor, where they'll find a break room, study rooms and a quiet room for resting. The sixth-floor lounge (bottom right) features billiards, Ping-Pong and other games.

LOW DOSE, HIGH ALERT

A NEW RADIOTHERAPY WAKES UP THE IMMUNE SYSTEM

BY PHOEBE INGRAHAM RENDA

GETTY IMAGES/MACK2HAPPY

Cancer cells look different from healthy cells. They are dusted with molecules that stick out like flags, which the immune system can often see and react to by destroying the cells. However, immune cells don't always detect the flags, allowing cancerous cells to divide and spread throughout the body.

Radiation treatment typically involves aiming an external beam of radiation at a tumor site to kill the cells. In the case of metastatic cancer, though, there are too many sites to irradiate this way, and the high dose of radiation poses a risk to healthy cells.

Ravi Patel, an MD, PhD radiation oncologist at the UPMC Hillman Cancer Center and assistant professor of radiation oncology and of bioengineering at Pitt, is taking a different approach. Instead of trying to eradicate all cancer cells with radiation, his lab is using low-dose radiopharmaceuticals that locate and kill some cells in a tumor and then alert the patient's own immune response to take care of the rest.

His work makes use of targeted delivery of radionuclides, called theranostics. The approach was pioneered by Saul Hertz in 1941 when he used radioactive iodine to combine imaging with therapy for thyroid cancer.

Here's how modern theranostics works: While traveling through the bloodstream, a targeting molecule searches for the molecular flags on cancer cells. It also carries a radionuclide, which emits radiation that can provide either imaging or treatment.

Patel notes that current radiopharmaceutical therapies can improve cancer patients' quality of life. He recalls a patient with metastatic prostate cancer who regained the ability to bend over and pick things up.

"These are small things," Patel says, "but for these individuals, it's a really big thing, because when you lose those functions, it can dramatically affect your life."

Still, Patel wanted to do more for patients with metastatic disease, which is why he began experimenting with using theranostics differently. His low-dose theranostics approach fights cancer from two angles: radiation and immunology. As cells die, they display molecular flags unique to dead cells, which wakes up the immune system and calls it to where cancer was hiding. After a series of treatments, the cumulative dose of radiation needed to eradicate a tumor can reach 150 to 200 gray (a unit for measuring absorbed ionizing radiation). But Patel and colleagues discovered that up to 100 times less radiation was needed to damage tumors enough to elicit an immune response—with minimal side effects from the radiation. The body was then able to destroy many of those previously hidden, or what are also known as "cold," tumors.

"When we stimulate an immune response and then give immunotherapies that tumors have become resistant to, we can cure many of these cancers," says Patel.

With collaborators at the University of Wisconsin, he showed the potential of this low-dose radiopharmaceutical treatment in animals and published the results in a 2021 paper in Science Translational Medicine.

Yet the approach can be honed even further. Cancer is unique to each patient, so there's variability in how well targeting molecules locate and differentiate cancerous cells from healthy cells. "Even though you're targeting this radionuclide to tumor cells, some do go to normal tissues," Patel notes. And targeted radionuclide therapy alone is often unable to cure cancer.

Patel aims to develop a personalized low-dose theranostics platform through which patients will receive the best dose and radiopharmaceutical to achieve high uptake in their tumors and little in healthy tissues. The platform would then direct the best combination of additional therapies.

Working with Pitt's nuclear medicine and radiation oncology groups, Patel is now preparing clinical trials to get the low-dose approach into the clinic.

"One of the nice things at Pitt," he says, "is that we have an attitude that we are here to treat patients, and we are going to work together and bring all our strengths together." ■

WHEN LIGHT TOUCH HURTS

GENE THERAPY MAY HELP THOSE TORTURED BY EVERYDAY STIMULI

BY ANITA SRIKAMESWARAN

FRANK HARRIS

On the podcast "The Pain Beat," you can hear host Rebecca "Becky" Seal discuss the whys of what-hurts with world-renowned researchers, including Nobel Prize winners.

But Seal doesn't just talk the talk. A PhD professor of neurobiology at the University of Pittsburgh, she studies the world of pain—dull, aching, burning, sharp, shooting, stabbing. And she's hopeful that she's found a way to stop certain kinds of it.

"There are no safe and efficacious long-term therapies for most forms of chronic pain," she says. As a postdoc at the University of California, San Francisco, she first became determined to take on this "widespread and under-resourced clinical problem."

Seal's lab is developing customized gene therapies to end the torture of mechanical allodynia, in which ordinary stimuli—a light touch, the brush of clothing—become exquisitely and persistently painful.

The condition can occur after various injuries that damage nerves. In a January 2021 paper in the journal Neuron, Seal's research team reported that in mechanical allodynia, different kinds of injuries predictably alter distinct neural microcircuits in the dorsal horn, the spinal cord highway that transmits a peripheral stimulus to the brain to be perceived as sensation.

For example, what's known as the calretinin subset of neurons conveys pain after inflammatory injury, such as arthritis. And the team implicated another subset (protein kinase C gamma) after a traumatic nerve injury, like a laceration.

Tell Seal what the original injury was and she can probably pinpoint which neural circuit is being a pain, so to speak—and how to make it better. The powerful gene therapy platform she's developing targets and corrects misfiring pain circuitry.

"We showed in mice that we can alleviate mechanical allodynia by turning off specific excitatory neurons in these circuits or by turning on specific inhibitory neurons in these circuits," Seal says. Her team expects the same strategy can help people, too.

Seal is working on the platform with collaborators Benedict Alter, an MD, PhD assistant professor of anesthesiology and perioperative medicine and director of Translational Pain Research; Daryl Fields, an MD, PhD postdoctoral research fellow and neurological surgery senior resident; and Andreas Pfenning, a PhD assistant professor of computational biology at Carnegie Mellon University.

The team uses adeno-associated virus (AAV) vectors to insert the genetic blueprints for slightly modified human protein receptors called DREADDs, or designer receptor exclusively activated by designer drugs, into selected neurons in the dorsal horn. Instead of interacting with naturally occurring signaling molecules, DREADDs bind only with complementary drugs, usually given orally; when bound, the DREADD flips the neuron from active to inactive or vice versa.

Alter, a clinician as well as a researcher, says mechanical allodynia is like pressing the buzzer for a third-floor apartment and setting off a building-wide siren. Here's how their fix works: An AAV security guard carrying a regulatory key escorts a DREADD repairperson into the unit with the mis-wired buzzer. There, the repairperson is able to switch off the siren or switch on an override that interrupts the buzzer's connection to the siren, but only if the homeowner—the drug—is present and says it's OK.

Co-investigator Pfenning uses machine-learning models to identify the genomic regulatory elements unique to the cell subtype involved in each kind of mechanical allodynia, so the DREADDs only go to cells contributing to aberrant pain pathways.

"The cells that are involved, for example, in sensing pain are near the cells that do things like help you breathe, and other important things you wouldn't want to be disrupted," Pfenning says.

DREADDs, Seal says, have also been exceptionally useful for investigating what happens when neurons are activated or deactivated and, now, they are setting the stage for novel therapeutics. The research team is looking to spin out their technologies and form a company that will develop gene therapies for persistent pain and other neurological disorders. ■

With foundation, community and industry partners, Pitt is planting seeds for a vibrant life sciences ecosystem in Pittsburgh. The new BioForge biomanufacturing center (preliminary rendering shown right) in Hazelwood will be a catalyst, creating new opportunities and attracting industry partners.

PHOTOGRAPHY: J&L PLANT IN HAZELWOOD: HEINZ HISTORY CENTER. TWO STEELWORKERS: UNIVERSITY OF PITTSBURGH. HAZELWOOD RENDERING: DEPICTION. BIOFORGE RENDERING: HOK.

STEEL VALLEY TO BECOME

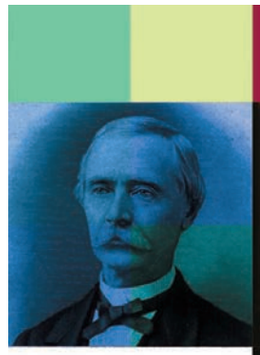
BIO VALLEY

PITT AND PITTSBURGH CHART A BIOTECH CORRIDOR

BY CARA MASSET

PHOTO-ILLUSTRATION BY R.J. THOMPSON/UNIVERSITY OF PITTSBURGH

Patients who expected to live with blindness for the rest of their lives are back in action playing sports, reading signs and recognizing familiar faces. Some are driving cars again. Their turnarounds come from a novel gene therapy that's restoring sight for patients enrolled in clinical trials originating in Paris and conducted in Europe and the United States. These people are recovering from a form of blindness known as Leber hereditary optic neuropathy, which typically comes on in the teens and 20s.



"Eighty percent of patients get very significant vision improvement. Over 70% get partial but significant vision recovery," says the University of Pittsburgh's José-Alain Sahel, an MD, Distinguished Professor and chair of ophthalmology whose team developed the gene therapy. It's the first treatment for the rare disease—and the first-ever gene therapy to target mitochondrial DNA, opening new treatment possibilities for other genetic mitochondrial diseases.

Dozens of patients in Sahel's clinical trial are benefiting from the treatment, but he has had to ask some participants to wait as long as a year for doses to become available. Producing the gene therapy is among the biggest challenges for moving it—or any gene therapy—through trials and into the medical marketplace.

The global bioeconomy is in a manufacturing squeeze. Scientific and clinical advancements have prompted an explosion in the development of gene and cell therapies and other biological treatments over the past decade. (Broadly speaking, cell therapies transfer live cells into patients to treat diseases, while gene therapies transfer genetic material into patients to treat diseases.) Transitioning these living therapies from wet labs and animal models into clinical testing—and, if all goes well, widespread use for patients—requires manufacturing them in facilities where they can be purified for human safety and scaled up to clinically important levels.

But the processes are more complicated than manufacturing traditional pills, and few manufacturers have the specialized knowhow to make these clinical-grade therapies. Those that do have yearslong waitlists. Pitt scientists like Sahel are among the researchers worldwide who have had to wait in queues for their biological products to be manufactured. And there have been growing pains with quality control as manufacturers adapt to producing entirely new products. One Pitt research team outsourced the production of an antibody they'd developed for treating COVID-19 to an out-of-state manufacturer where it, frustratingly, failed to meet quality control standards. The researchers were among the very first to develop a monoclonal antibody for the disease, in 2020, yet they weren't able to move it forward. (This during a pandemic, and in the context of Operation Warp Speed, when the federal government made historic attempts to remove regulatory and other obstacles for promising COVID-19 therapies and vaccines.)

Beyond COVID, there's work to be done to make next-generation treatments widely available.

"When you look at where life sciences research is going over the next decade, almost all of it is focused on biological products—gene therapy, cell-based therapy, mRNA-based therapy," says Anantha Shekhar, Pitt's senior vice chancellor for the health sciences and the John and Gertrude Petersen Dean of the School of Medicine. "These are very different types of technologies. We're no longer going to be just making pills to give to patients. These are living products, most of them, and they have to be manufactured in a very different way. There is both significant unmet need and a huge bottleneck in capacity to manufacture them with current technologies."

The need for investing in and expanding biomanufacturing was underscored in September when President Biden issued an executive order on the American bioeconomy. "It's not enough to invent new technologies that save lives. We need to manufacture advanced biotechnologies here in the United States," Biden said.

In the executive order, Biden's administration laid out goals to support biomedical research that will "develop genetic engineering technologies and techniques to be able to write circuitry for cells and predictably program biology in the same way in which we write software and program computers" and "advance the science of scale-up production while reducing the obstacles for commercialization so that innovative technologies and products can reach markets faster."

The president would be pleased to see what Pittsburgh has planned.

Before long, Pitt will break ground for its own biomanufacturing facility, which will be known as BioForge. The futuristic "factory" for biological therapies will rise from Hazelwood Green, a former brownfield that was scrubbed and revitalized thanks to the persistent efforts of community groups and Almono, initially a consortium of four local foundations (which today includes the Heinz Endowments, the Richard King Mellon Foundation and Claude Worthington Benedum Foundation). Hazelwood Green is the site of the city's last operating steel mill, run by LTV Steel (formerly Jones & Laughlin Steel), which closed in 1998. President Biden has given remarks there twice since 2020 on bolstering America's future in manufacturing.

Hazelwood Green sits along the bank of the Monongahela River, a few miles upstream from Station Square's monument to the steel industry's revolutionary Bessemer process—fitting, because BioForge is being designed not only to meet urgent biomanufacturing needs but to revolutionize the biomanufacturing process itself.

THE WAY BACK STORY, AND THE BACK STORY

In 1811, William Kelly was born into an Irish immigrant family living in Pittsburgh. The region's first iron mills began operating during his youth, and Kelly studied metallurgy at the Western University of Pennsylvania, which would become the University of Pittsburgh. He then joined his brother in running a dry goods company, a gig that involved business travel by canal boat, stagecoach and horseback. Train travel wasn't yet widely available—a circumstance Kelly would ultimately help to change.

The family's dry goods warehouse burned down, and around that time, Kelly had fallen for

WILLIAM KELLY AND BESSEMER FURNACE: WIKIMEDIA COMMONS. IMCPL: NEXT ARCHITECTURE.

Pitt alum William Kelly (far left) developed an approach to making a stronger metal from iron, steel. Today along the Monongahela, once a steel capital, a new industrial era is rising.

a Kentucky woman he met during his business travels. He married Mildred Gracy of Eddyville, Kentucky, and bought land in her hometown, where he applied his metallurgy expertise to open an ironworks. After a while, Kelly became concerned about the amount of timber his mill burned to make charcoal for the iron refining process. His crew of Chinese laborers knew about blowing air into molten pig iron to remove impurities, a method requiring less timber; they'd done that in China. So Kelly and his team worked on developing this pneumatic process. The resulting metal not only reduced timber costs but made a stronger metal—steel.

Civilizations had turned iron into steel for centuries through intensive small-scale production, but now Kelly was developing it in the context of the Industrial Revolution and taking steps toward mass production. He wasn't the only one. In 1855, Sir Henry Bessemer filed a patent in England for a similar pneumatic process.

The United States had largely been importing pricey iron rails from England, and the cheaper and stronger steel rails resulting from Kelly's and Bessemer's developments drove its railroad industry forward. Thousands of miles of new railroads catalyzed the industrial economy. Take the example of Hazelwood: After it earned a railroad track, its first steel mill set up shop.

Skip ahead almost 170 years to 2023 and a site just a mile or so northwest along the Monongahela. In a clean room in the Riviera building, a laboratory tech works at a hygienic stainless-steel bench (made possible by continued advances in metallurgy). Clean rooms are the factory floors, as it were, for producing cell and gene therapies, but you won't find assembly lines with conveyor belts here. This sterile room of gleaming white and silver, built in compliance with the FDA's Good Manufacturing Practice (GMP) recommendations, features specialized appliances that wash cells or separate cells by type.

The technician carefully extracts immune T-cells from a tumor that was removed from a patient at UPMC Hillman Cancer Center a few days prior. Over the following month, he will create a personalized therapy for the woman, who is participating in a clinical trial for tumor-infiltrating lymphocyte (TIL) therapy led by Udai Kammula, Pitt associate professor of surgery. The technician will select the patient's T-cells that are the most effective at attacking her tumor and then multiply those T-cells from the millions to the billions.

After the resulting product goes through multiple quality control checks to ensure its efficacy and make sure it hasn't been contaminated with bacteria, it will be hand-delivered to Hillman, where doctors will administer it to the same patient and, hopefully, eradicate her cancer. The results of the TIL trial are promising so far, with regression of metastases in many cancer types.

The clean room for TIL trials is part of Hillman's Immunologic Monitoring and Cellular Products Laboratory (IMCPL), founded in the 1980s as a pathology laboratory. Its most recent evolution and 2021 expansion quadrupled its clean rooms and added better capabilities for gene and cell therapy fabrication. IMCPL is probably the largest such lab in an academic medical center, and teams of international scientists from Korea to Croatia regularly visit to learn how they can build their own facilities. Yet it's a precursor of what's to come along the Monongahela.

Hillman founded the IMCPL back when cell and gene therapies were still in their early experimental phases. At the time, some success with such therapies had been achieved in animal models and rare clinical uses, but those largely remained good ideas rather than viable treatments. The gene editing techniques in existence were complicated, and the safety of patients who might be helped by gene therapy was a serious concern, as evidenced by the tragic death of an 18-year-old clinical trial participant in Philadelphia in the 1990s. The scientific community continued honing their methods, and clinical trials began demonstrating the safety and efficacy of newer cell and gene therapy approaches. A landmark change came in 2017 when the FDA approved the first cell and gene therapies for commercial use.

The agency has since approved 27 cell and gene therapy products—and it expects to soon approve 10 to 20 such products per year, based on an assessment of the current pipeline and clinical success rates.

UPMC Hillman Cancer Center was the first clinical site in the Pittsburgh region to offer FDA-approved CAR T-cell therapies, with the IMCPL responsible for preparing and shipping patient cells to pharmaceutical companies for genetic modification and then verifying that the cells were in top clinical condition upon return to Pittsburgh. ("CAR" stands for chimeric antigen receptor. The CAR T-cell approach is similar to Kammula's TIL in that clinicians extract a patient's natural immune T-cells and use them to create a per-

"BioForge puts another flag in the ground around reasons why industry partners would want to come to the region—there's now a capability that doesn't exist in many places."

sonalized therapy for the patient.)

The Hillman and IMCPL teams have since administered more than 100 CAR T-cell treatments, a significant number because the whole process for each patient takes upward of a month or two.

But what if the process could be reduced to, daresay, 24 hours? That's the sort of question that will be tackled at BioForge.

"A WONDERFUL ENVIRONMENT"

Pitt and Carnegie Mellon are already neighbors along Pittsburgh's Forbes-Fifth corridor, and they'll soon become neighbors at Hazelwood Green, where Carnegie Mellon's advanced manufacturing innovation facility is the lead tenant at Mill 19, a modern facility built inside the exoskeleton of the original Jones & Laughlin Hazelwood Works (later LTV Coke Works). The facility, led by Sandra DeVincent Wolf, is known as the Carnegie Mellon Manufacturing Futures Institute.

Wolf, who most recently hosted President Biden at Mill 19 in 2022, is excited to watch BioForge rise across the street from her Mill 19 office and expects to partner with Pitt on taking biomanufacturing to new heights. Faculty at the Manufacturing Futures Institute have already made big strides in biomanufacturing—such as figuring out 3D printing of soft and biological materials. "It's hard to print squishy materials because they don't support themselves," says Wolf.

Shekhar says locating the front doors of Pitt's BioForge and Carnegie Mellon's Manufacturing Futures Institute across the street from each other will be a boon for biomanufacturing.

"There's very little being done in terms of disrupting the existing slow and painful technologies that biomanufacturing is using right now," Shekhar says.

"With Pitt and Carnegie Mellon expertise, we can not only do routine manufacturing, but we can start to add robotics into it or add artificial intelligence and add new biological pathways so that the manufacturing itself can transform—so that we're able to make faster, cheaper and safer products. That's the real long-term value."

Shekhar's team has recruited ElevateBio, an experienced biomanufacturing company headquartered near Boston, as an anchor tenant and partner at BioForge.

ElevateBio was founded in 2017 to address the need for biomanufacturing brought on by the new frontier of genetic medicines. "There are more than 1,400 companies currently developing cell and gene therapies focused on treating or curing otherwise intractable diseases," says David Hallal, the company's cofounder and CEO. "We felt like the world really needed an end-to-end solution to help any number of these companies or academic medical centers to advance their cell and gene therapies."

ElevateBio offers a range of technologies (gene editing, induced pluripotent stem cells, RNA-, cell- and vector-engineering) and R&D and regulatory expertise. Shekhar recruited the company for BioForge precisely because of its breadth of offerings and interest in partnering directly with academic investigators.

Hallal's team has been talking with Sahel and other researchers from across the life sciences, as well as Wolf's team at Carnegie Mellon. And it's already partnering with BlueSphere Bio, a drug-development startup based along the Monongahela spun out of the Pitt lab of UPMC Endowed Professor and Distinguished Professor of Immunology Mark Shlomchik, an MD, PhD. BlueSphere uses proprietary platforms to rapidly identify T-cell targets and manufacture T-cell products for personalized cancer therapy. The 63-person company has been working with ElevateBio to manufacture its novel treatment that only attacks cancerous tissue.

"Our manufacturing process is very complicated," says Keir Loiacono, BlueSphere CEO. "ElevateBio hit it out of the park on the first try."

Loiacono says they will submit an investigational new drug application to the FDA later this year; they plan to first apply their T-cell therapy, in combination with stem cells, to treat the high-risk acute myeloid leukemia, often called AML.

Access to ElevateBio should help small companies here get their novel treatment ideas to patients.

"We want our staff to be working closely with the local team in Pittsburgh. We are focusing on generating new ways of manufacturing and creating know-how to advance these technologies forward," says Hallal.

BioForge will be ElevateBio's first manufacturing location outside of its Boston-area headquarters. Hallal, a 35-year veteran of the life sciences industry, has popped into Pittsburgh for conferences and business trips a number of times over the years. He is excited to plant an ElevateBio footprint in the city.

"With research, innovation and health care at its core, Pittsburgh has always struck me with its great alignment between UPMC, University of Pittsburgh, Carnegie Mellon—and even the insurance community," he says. "It creates a wonderful environment for innovation and delivery of transformative therapies to patients with severe and debilitating conditions."

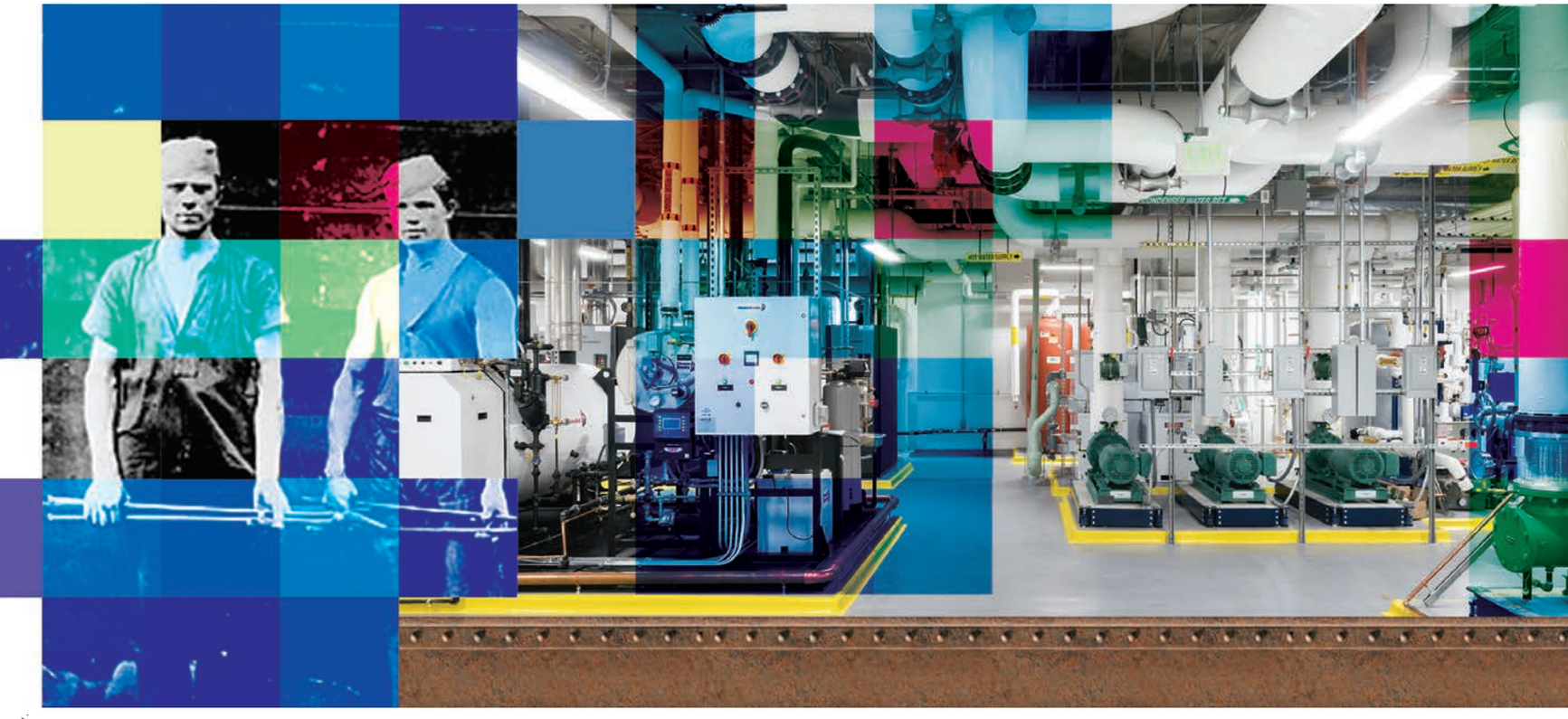
As Hallal notes, the relationship between the University of Pittsburgh and UPMC is unique among academic medical centers nationwide. UPMC operates its hospitals and its own insurance organization (of 4.5 million members) under a single roof, a setup known in organizational lingo as an integrated delivery and finance system. That gives it some latitude to experiment and be entrepreneurial. Its investment arm, UPMC Enterprises, has underwritten $800 million in the development of mostly digital technologies and pledged $1 billion toward life sciences startups, including BlueSphere Bio.

"We've long realized the need to commercialize innovations so that we can transform care globally while reinvesting in our mission," says Leslie Davis, president and CEO of UPMC. "Pitt is a committed and integral partner in bringing this vision to life for the health of our region and all communities that we serve.

"BioForge is a game-changer for our region," Davis adds. "It will help us save lives, create jobs and build new technologies right here in Pittsburgh."

ANOTHER FLAG IN THE GROUND

Pitt's BioForge will be constructed with funding from the Richard King Mellon Foundation, which made its largest single-use gift ever, a $100 million grant, to build it. The grant will disperse $10 million per year over the next decade. "The foundation is making a historic bet on Pittsburgh to lead nationally in the life sciences,"



STEELWORKERS: UNIVERSITY OF PITTSBURGH. ELEVATEBIO: BEN GEBO PHOTOGRAPHY.

Sam Reiman, Richard King Mellon Foundation director, said when the gift was announced.

Kinsey Casey, Pitt associate vice chancellor for economic development in the health sciences who is playing a key role in establishing BioForge and connecting its partners, says the investment is part of a broader effort to raise Pittsburgh's prospects. She points to a 2017 Brookings report concluding that Pittsburgh is ripe for expansion in innovation and technology domains but is missing a key sector which is—ironically, considering the city's heritage—industry, notably biomanufacturing.

"Part of this strategy is to develop an ecosystem. BioForge is serving as a catalyst," she says.

Evan Facher, a PhD, MBA, vice chancellor for innovation and entrepreneurship at Pitt and associate dean for commercial translation in the School of Medicine, says there is a need for the University to invest in projects leading to commercial partnerships.

"When we talk about Pitt from a funding perspective, we typically focus on federal funding and NIH funding. In those areas we're top five, top 10 in the U.S. But when we look at how much research funding comes in from industry partners, we're just inside the top 50," he says. "BioForge puts another flag in the ground around reasons why industry partners would come to the region—because there's now a unique capability that doesn't exist in many places," adds Facher, who also directs the University's Innovation Institute.

Blueprints are still being drawn for the 180,000-square-foot biomanufacturing facility that will include plenty of clean rooms, negative pressure rooms and all the necessary equipment for making biological treatments. ElevateBio is expected to lease about 130,000 square feet as part of its investment.

AT THE FRONT OF THE QUEUE

But BioForge is not solely about the facility, Casey says. "We don't want it to just be that shining building in Hazelwood Green that everyone's like, 'I don't know what happens in there. It's basically magic,'" she says.

In October 2022, lab technicians flew in from ElevateBio's Massachusetts hub to talk with local high schoolers about biomanufacturing careers during a Manufacturing Day event at Mill 19. An effort to build workforce training programs aimed at Hazelwood residents for BioForge is underway. Pitt's partnership with ElevateBio is expected to generate more than 170 permanent full-time jobs, 900 construction jobs and 360 off-site support jobs. Pitt will also partner with local residents to create a community engagement center in the neighborhood.

BioForge will put Pittsburghers at the front of the queue in more ways than one.

"Having local biomanufacturing is critical to helping local patients first," Shekhar says. "Wherever manufacturing capabilities are, hospitals or universities in the region have the first access to the products for their patients. We'll be able to do the first testing of all these products here, and we will be becoming world experts in these treatments."

Constructing the large-scale biomanufacturing site portends a new era of translational medicine at Pitt. Shekhar and his team are looking ahead toward creating a more robust infrastructure for multisite and late-phase clinical trials, exploring ways to prepare primary care physicians to offer gene and cell therapies as they become more commonplace and preparing health sciences students to practice in this new environment.

BioForge's grand opening is targeted for 2027. Pitt scientists we talked to can't wait to walk into a large-scale biomanufacturing site in their own backyard.

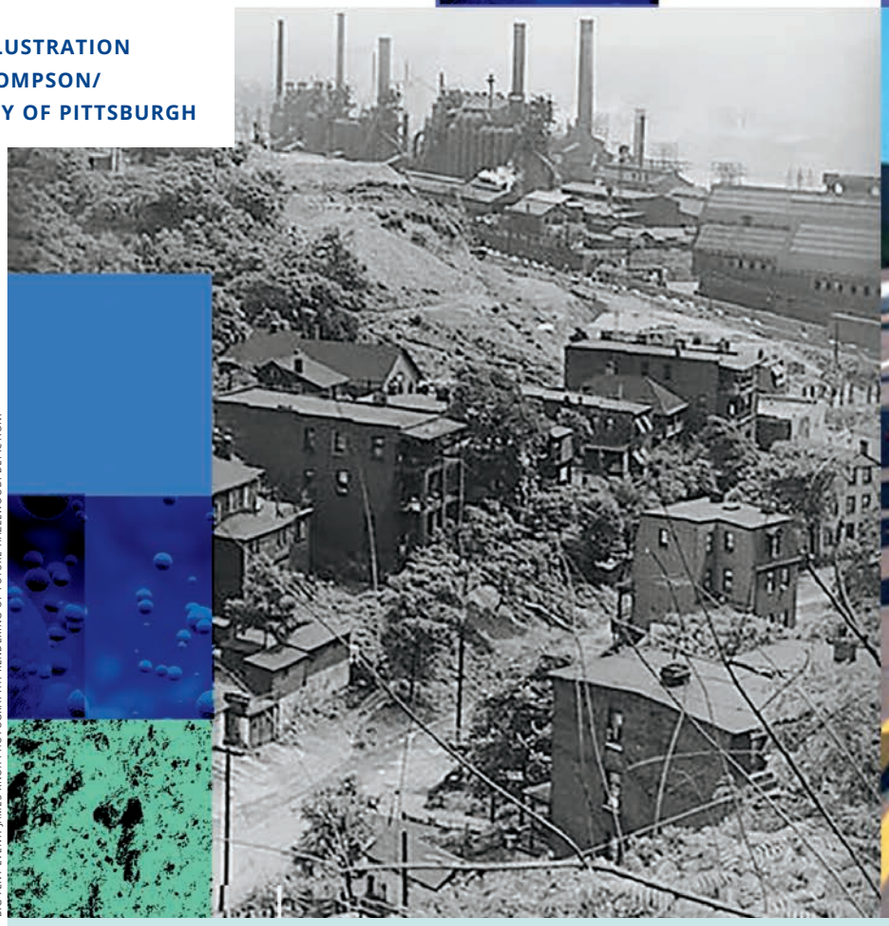
Sahel has several projects in need of biomanufacturing for what he anticipates will be the first-ever clinical trials for treating certain forms of blindness. Likewise, his colleague Leah Byrne, PhD assistant professor of ophthalmology who specializes in engineering biological vehicles for gene therapy, is ready to get started. (See page 22.)

"Having direct access to ElevateBio here in Pittsburgh will allow us to make sure that the purification is optimal. That close collaborative relationship is going to lead to the success of the production," Byrne says.

"This is a really unique opportunity to be here in Pittsburgh at this moment, right while biotech is just taking off. I really think we have all the ingredients that we need to make this a center for biomanufacturing." ■

Erica Lloyd contributed to this report.

PHOTO-ILLUSTRATION BY R.J. THOMPSON/ UNIVERSITY OF PITTSBURGH



HISTORIC HAZELWOOD: KINGSLEY ASSOCIATION/UNIVERSITY OF PITTSBURGH. ACTIVITIES DURING BIG TENT EVENT: JAMES KNOX PHOTOGRAPHY. RENDERING OF FUTURE HAZELWOOD: DEPICTION.

FERTILE GROUND FOR LIFE SCIENCES STARTUPS

Sahel

Byrne

"I never thought I would form a company in my life," says Pitt ophthalmology chair José-Alain Sahel. "But it just happens that if you want to deliver therapies to patients, it's the only way to make things happen."

Sahel, an MD and Distinguished Professor, receives emails every day from people around the world who ask if he has treatments that will restore their vision. In most cases, the answer is: "Not yet." But in some cases, he's able to respond with a satisfying: "Yes." Sahel and collaborators are creating interventions for a wide range of diseases that cause vision impairment and blindness. He has launched a dozen companies to commercialize those therapies.

Recently, along with Leah Byrne, a PhD assistant professor of ophthalmology, and Paul Sieving from the University of California, Davis (former director of the National Eye Institute), Sahel cofounded Avista Therapeutics. Byrne engineers vehicles—called AAVs (adeno-associated virus vectors)—to deliver genetic materials into eye cells for restoring vision. Avista is commercializing products based on her AAV engineering platform, which is nicknamed scAAVengr.

The scAAVengr method, which is still in preclinical development, investigates the performance of multiple AAVs in thousands of cells by tagging every AAV with a barcode and then evaluating whether each cell receives the needed genetic material from the AAV and expresses it. Byrne uses scAAVengr for vision research, though—"The platform could be applied to any tissue type, including the brain, heart, liver, kidney," she says.

Avista intends to collaborate on AAV manufacturing with ElevateBio at BioForge. (See page 16 story.)

At this stage, Avista is funded primarily by UPMC Enterprises. This innovation arm of the health system plans to invest $1 billion in life sciences startups by 2024, according to Jeanne Cunicelli, president of UPMC Enterprises and a veteran venture capitalist.

Billiar

Pitt and UPMC have been collaborating on commercialization since the 1990s, says surgeon Timothy Billiar, the George Vance Foster Professor, as well as chief scientific officer and executive vice president of UPMC. He's chaired Pitt's Department of Surgery for 24 years. In the early days, the commercialization focus was on digital products. About six years ago, Pitt and UPMC created a more formal structure for biological technologies, benefiting from Cunicelli's "very disciplined mindset around how to invest," says Billiar. Several of the resulting companies have already made significant progress and have partnerships with, or been acquired by, pharmaceutical companies.

Cunicelli

Avista is partnering with Roche, notes Rob Lin, a PhD who is CEO of Avista and helped fund its early research when he was vice president at UPMC Enterprises.

Moving breakthroughs into the clinic so they can

Hazelwood yesterday, today and the vision for tomorrow. By partnering with the community, brownfields will be transformed to public green spaces and a life sciences and advanced manufacturing corridor.

Shekhar

benefit patients is a top priority for Dean Anantha Shekhar, an MD, PhD whose own discoveries for psychiatric disorders have been spun off into startups. In 2022, he brought Evan Facher, a PhD and MBA who was already Pitt's vice chancellor for innovation and entrepreneurship, onto his leadership team as associate dean for commercial translation in the School of Medicine. Among other charges, Facher helps discern which med school innovations are truly ripe for commercialization. (In fiscal year 2022 alone, Pitt Med researchers filed 251 patent applications.)

Facher

Facher's team welcomes new companies into a dynamic business environment through LifeX, an organization founded by Pitt that helps early stage life sciences companies in the region secure funding.

Pittsburgh's progress and ambition are exciting for clinicians like Sahel who are eager to respond with "yes" when patients ask: "Do you have any treatments to help me?" *—Cara Masset*

MIRACLE MAKERS

Hsu

Associate professor of medicine Yen-Michael Hsu, an MD, PhD, once oversaw a blood bank—blood transfers, dating back to the ancients, are among the oldest known uses of living cells. He says the most exciting part of his role today as director of the Immunologic Monitoring and Cellular Products Laboratory (IMCPL) at UPMC Hillman Cancer Center is working with investigators on the newest ways of making miracles with living cells.

Projects underway in the laboratory's clean rooms include modifying dendritic immune cells for an HIV vaccine, as well as modifying regulatory dendritic immune cells so patients are better able to accept organ transplants. One of the lab's most successful achievements, Hsu says, has been developing tumor-infiltrating lymphocyte (TIL) therapy. (See page 16 story.)

Yam

Hsu's team is also collaborating with ophthalmology colleague Gary Yam, a PhD research associate professor, to prepare corneal stem cells for clinical trials—carrying on research that the late James Funderburgh pioneered in India to treat patients who could no longer see because of corneal scarring. (Tune in to the 2016 Pitt Medcast about it.) Before Funderburgh died in 2019, he invited Yam, who had been studying similar aspects of the cornea in Singapore, to replace him as principal investigator of Pitt's Corneal Regeneration Laboratory.

Funderburgh

Yam is training staff at the IMCPL to spot the different layers of stem cells in the cornea. Their primary cellular experience is in immune cells for oncology therapies. Eye cells are an exciting new challenge for the team, says Hsu.

The idea, Yam says, is to ultimately create a simple paste of restorative stem cells that can be applied to a patient's eye and fix scarring on the cornea—a feat that would eliminate the need for invasive corneal transplants that only last for a decade or so, while also providing an option for patients in countries where corneal transplants are unavailable. *—CM*

A MOVING STORY

SPINAL CORD STIMULATORS RESTORE HAND AND ARM FUNCTION AFTER PARALYSIS

BY MICHAEL AUBELE

ILLUSTRATIONS BY MICHAEL HIRSHON

No federally approved treatments are effective for treating paralysis in the so-called chronic stage of stroke, which begins approximately six months after a stroke incident. A team of scientists at the University of Pittsburgh and Carnegie Mellon University are working to change that. They've run successful tests on patients who had electric stimulators inserted along their spinal cord, resulting in significantly restored arm and hand function.

Heather Rendulic suffered five brain bleeds over 11 months as a college student and went from running 5K races and horseback riding to having to learn how to walk again. Half her body had become paralyzed from a cerebral cavernous malformation (CCM)—a group of tightly packed, abnormal small blood vessels in her brain that contained slow-moving blood that was clotted.

She was 22 years old and enjoying life at Indiana University of Pennsylvania when the series of strokes, which came without warning, upended everything for her. "I felt like my health was out of my control, and that I couldn't stop from bleeding again," she says. "I really struggled over that year. I was scared it could kill me, and the only way I handled it was taking things day by day and controlling what I could."

LEFT TO RIGHT: Douglas Weber, Elvira Pirondini and Marco Capogrosso are leading the breakthrough study with stroke patients. Study results for the first set were published in Nature Medicine in February 2023.

There are different types of CCMs, including those that form on their own and those that are hereditary. Rendulic had the first kind, which she describes as "just bad luck." Until those small strokes happened, she had no idea she had a CCM.

Doctors told her surgery would put her life at risk because the CCM was buried so deeply in her brain. But surgery "was the only known cure," she says, which meant that she would remain at risk for further bleeding and strokes.

The last stroke proved to be nearly fatal. "My entire left side was paralyzed after the fifth bleed, and it took me nearly two years to learn how to walk again," she says.

As catastrophic as it was, the stroke produced one positive result: It pushed the CCM to a portion of her brain where it could be removed more safely.

That was about 11 years ago, and between now and then, Rendulic has refused to let her condition get in her way. A woman of faith, she believes there has been a plan to all of this and that a "Why me?" attitude would be more damaging than any physical limitation. She finished college and began working full time. And she wrote the book "HeadStrong: Through Life, Love, and Brain Surgery." (Learn more about her perspective at heatherheadstrong.com.)

But Rendulic had no inkling during her recovery that living in the Pittsburgh region would position her to take part in a study that could eventually give hope to others who'd experienced paralysis from stroke: She agreed to undergo experimental surgery in 2021 to temporarily restore function to her left arm. It worked.

That pinnacle achievement in stroke paralysis therapy has its origins in a research lab in Switzerland.

Marco Capogrosso started working on his doctorate in biomedical engineering in 2009 at the Sant'Anna School of Advanced Studies in Pisa, Italy. He focused his research on mobility in patients paralyzed because of spinal cord injuries.

After earning his PhD, Capogrosso began postdoctoral research at the Swiss Federal Institute of Technology in Lausanne (EPFL), publishing the results of studies on restoring gait and balance after spinal cord injury. The therapy, which involved computer simulations and animal testing in rats, used electrical stimulation through spinal implants to restore movement. The studies moved from rats to primates to clinical trials with humans, with Capogrosso very much at the center of it all.

While he was at the EPFL, Elvira Pirondini showed up. She was investigating mechanisms of stroke recovery to understand why a stroke leads to hand paralysis and also exploring strategies to recover hand function. Pirondini's mentor in the lab was Silvestro Micera, who'd mentored Capogrosso at the Sant'Anna School of Advanced Studies. Micera had launched this second lab at the EPFL.

Pirondini says, "While Marco was working on computer modeling, I was working on robotics. I was watching his experiments, and he was watching mine."

"While talking at dinner," adds Capogrosso, "we realized that many of the mechanisms that were making stimulation effective for SCI [spinal cord injury] could actually work in stroke, and possibly even better than in SCI."

Their worlds collided in pursuit of restoring arm and hand function in stroke patients.

And something else happened. Capogrosso and Pirondini developed a romantic bond. They're now married with a child and on the faculty at Pitt; their personal and professional lives have intertwined. He is an assistant professor of neurological surgery. She's an assistant professor of physical medicine and rehabilitation and of neural engineering. When they walk from Oakland to their home in Point Breeze, they fre-

ALL PHOTOGRAPHY: COURTESY UPMC

TOP LEFT: Capogrosso (right) and neurosurgeon Peter Gerszten monitor the surgery on Heather Rendulic in May 2021. BOTTOM LEFT: A team led by Gerszten successfully implants two electrodes along Rendulic's spinal cord by threading them through openings between vertebrae. The electrodes (shown) are 5 centimeters long and, when activated, deliver electric charges to specific locations along the spinal cord. Those bursts of electricity allow patients to accomplish desired movements.

quently spend that time comparing notes.

It was Douglas Weber, a PhD and the Akhtar and Bhutta Professor in mechanical engineering and neuroscience at Carnegie Mellon University, who brought the couple to Pittsburgh.

Weber, who was on the faculty at Pitt before moving to CMU in 2020, had crossed paths with Capogrosso and Pirondini at various conferences and knew Micera well through professional connections. Sometime around 2017, he began to think that because Capogrosso and Pirondini were proving themselves to be rock stars in their field (with an excellent mentor in Micera), that he should recruit them to Pitt's Rehab Neural Engineering Labs. The process took a while, but the researchers arrived in Pittsburgh in 2020.

Soon after Capogrosso and Pirondini came to Pitt, a collaboration with Weber and a larger team of researchers took off, leading to the first clinical trial to use spinal implants to treat arm and hand paralysis in stroke patients. In 2021, with National Institutes of Health funding, they enrolled two patients, including Rendulic.

In May 2021, neurosurgeon Peter Gerszten threaded two small electrodes, thin and long like spaghetti strands, through a small incision in Rendulic's upper back and positioned them in the epidural space over the spinal cord in her neck to engage intact neural circuits.

"I wasn't nervous about the surgery from a safety perspective," says Rendulic. "I knew it was a safe procedure and involved very little risk. But even though my gut was telling me it would work, I was still a little nervous. I didn't want to let anybody down."

The result: For the first time in years, Rendulic was able to fully open and close her fists, lift her arms above her head and cut her own steak.

Prior to the implant, Rendulic had very little movement in her left arm. The stimulation gave her the ability to do everyday tasks she thought she would never do again.

Then in October 2021, Gerszten, an MD and Pitt's Peter E. Sheptak Professor in Neurological Surgery, did the same with the other trial participant.

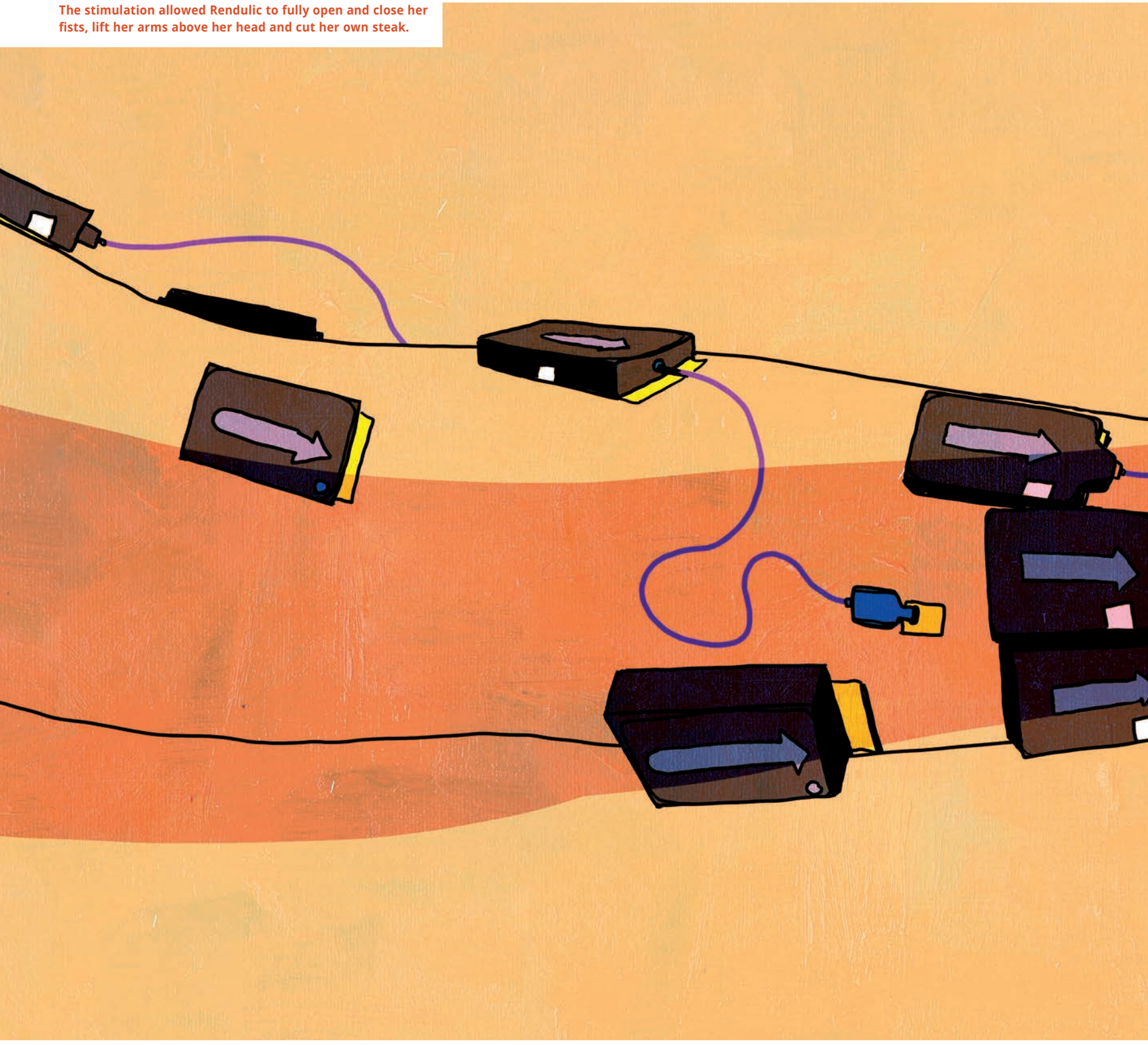
Like Rendulic, that woman experienced marked improvement in arm and hand function. She was able to extend her arm and remove a hollow cylinder from a wooden dowel and place it over another.

Because the woman's deficits were more severe than Rendulic's, her movement wasn't restored to the same extent.

The implant technology delivers pulses of electricity to activate nerve cells inside the spinal cord. Such stimulators have been on the market for years to treat other conditions like high-grade, persistent pain. Those electrodes, however, are placed lower on the spinal column. Additionally, the technology has been shown to restore movement to the legs after spinal cord injury; this is work Capogrosso pursued in Switzerland. Other labs have been working on this, too.

But the unique dexterity of the human hand, combined with the wide range of motion of the arm at the shoulder and the

The stimulation allowed Rendulic to fully open and close her fists, lift her arms above her head and cut her own steak.

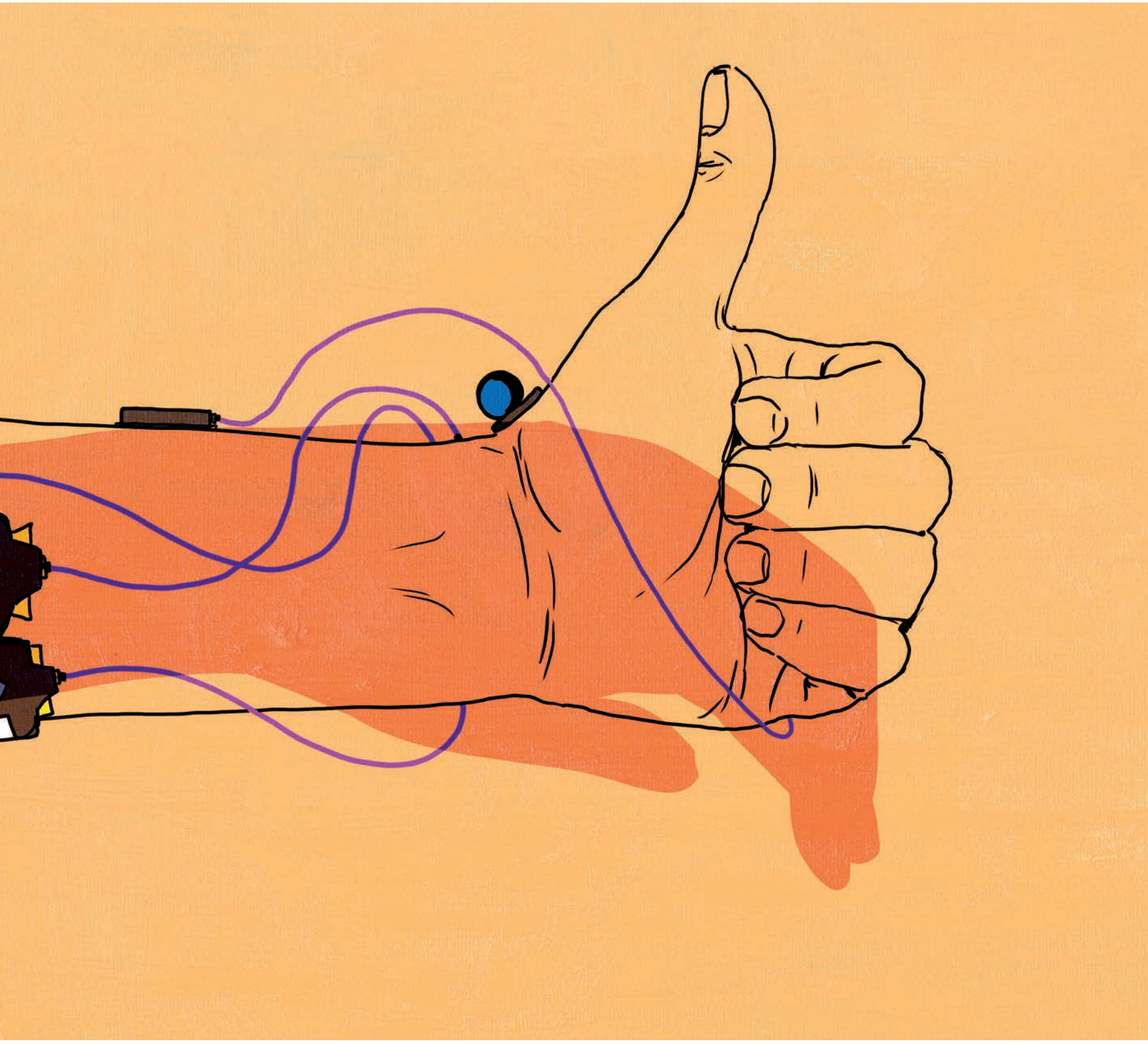


complexity of the neural signals controlling the arm and hand, add a significantly tougher set of challenges.

"The sensory nerves from the arm and hand send signals to motor neurons in the spinal cord that control the muscles of the limb," says Weber. "By stimulating these sensory nerves, we can amplify the activity of muscles that have been weakened by stroke. Importantly, the patient retains full control of their movements." The stimulation strengthens muscle activation only when patients are trying to move.

"The movement was so much easier," Rendulic says. "To feel like you have control is such a surreal experience, especially after going nearly a decade without moving your arm or your hand."

The researchers hope that the approach can do the same for other patients who've also had moderate to severe strokes. The team will be completing clinical tests on a total of eight patients using the NIH funding; they expect to conclude their studies in the fall 2024.



"We discovered that electrical stimulation of specific spinal cord regions enables patients to move their arm in ways that they are not able to do without the stimulation," says Capogrosso.

There was an unexpected benefit, as well: The team learned there could be lasting mobility improvements. "We found that after a few weeks of use, some of these improvements endure when the stimulation is switched off, indicating exciting avenues for the future of stroke therapies."

Capogrosso and team published the trial results for the first two patients in Nature Medicine in February 2023.

When it comes to strokes, cardiologists predict a grim future: Globally, one in every four adults over the age of 25 will suffer a stroke in their lifetime, and 75% of those people will have lasting deficits in motor control of their arm and hand, severely limiting their physical autonomy. Currently, no federally approved treatments are effective for treating paralysis in the so-called chronic

stage of stroke, which begins approximately six months after a stroke incident.

"Creating effective neurorehabilitation solutions for people affected by movement impairment after stroke is becoming ever more urgent," says Pirondini. "With the increase of life expectancy [globally], it is estimated that these numbers will increase. And COVID-19, unfortunately, has contributed significantly to an increase in the number of people suffering a stroke.

"Even mild deficits resulting from a stroke can isolate people from social and professional lives and become very debilitating, with motor impairments in the arm and hand being especially taxing and impeding simple daily activities, such as writing, eating and getting dressed."

During this first phase, trial participants must be in the lab for their implants to be activated. Should all go according to plan with this first trial, the team will launch a second, longer-term trial to test the efficacy of an implant patients can use at home.

Based on the expectation that their trials will succeed, Weber, Capogrosso and Gerszten have launched a start-up called Reach Neuro to make the technology widely available for therapeutic use. Marc Powell, a PhD biomedical engineer who worked in Capogrosso's lab as a postdoc, serves as the company president.

"We started Reach Neuro because we realized there's a high likelihood the technology could be translated to the clinic," Capogrosso says. In the realm of biomedical breakthroughs, "your goal," adds Capogrosso, "essentially, is to build interest around your idea, and the only way to move forward is with a company that develops the technology with FDA approval"—in this case, for stroke therapy. Without that approval, doctors aren't able to offer the therapy to their patients.

"I live one-handed in a two-handed world, and it's frustrating because there are a lot of things you need two hands to do," says Rendulic.

It was two years ago, yet Rendulic vividly recalls the emotions she went through during her first day in the lab, as she began the trial spanning four weeks with the implant in.

"That very first day, none of us knew for sure if it was going to work, or how it would feel if it did," she says. "But that very first day in the lab, I opened and closed my hand for the first time in the nine years since my stroke. My husband and my mom were there, and when I opened that hand, there were just tears of joy.

"I probably cried every day in the lab for four weeks."

With the stimulation on, which she said felt like a tickle, Rendulic regained hand and arm function and could feel the sensation of making a fist and moving objects.

Rendulic's experience attracted a lot of attention. Local, regional and national media outlets, including The New York Times, USA Today and CNN, covered her story. People around the world have seen a video of her raising her arm over her head, rotating her wrist and picking up and moving a can of Campbell's soup.

The benefits of the stimulation remained somewhat after her temporary implants were removed. (She had a permanent implant in November 2021 for pain in her left arm.) She hopes that the FDA will ultimately approve the implants for stroke therapy, and that she can have a permanent device implanted for mobility.

"I wholeheartedly believe this technology can change millions of lives," Rendulic says. "So many people are affected by this.

"The future of this is so exciting. I know it will give me an added sense of independence."

Rendulic, thankfully, didn't experience any cognitive decline with her strokes. Her ability to return to school and graduate magna cum laude paid dividends. She's now a human resources executive.

"It actually has been a blessing," she says of her entire experience after her fifth stroke.

"It's more than 10 years out. I've written a book and have been able to do some motivational speaking. This really has opened doors for me to help people.

"My message has always been that we can't always control what happens to us, but we can control how we react to those situations." ■

—Anastasia Gorelova contributed to this report.

TOP: Researchers attach sensors that record the electrical activity of muscle tissue to Rendulic. ABOVE: Rendulic shows off her ability to pick up and move a can of soup, something she wasn't able to do with her left hand for nearly a decade after suffering a massive stroke.

BEHIND THE BREAKTHROUGH

Pitt Med students advance stroke recovery research

All Erick Carranza can figure is that his interest in disability research stems from a childhood experience.

It wasn't a traumatic one.

"No one in my family has a disability, but my whole interest in technology is helping people with disabilities," he says. "I remember seeing a cartoon when I was younger about a kid who had a prosthesis, and I was amazed by it. That was it, probably."

Growing up in Peru, Carranza said he was mesmerized by the science unfolding in developed countries, like the advancements in prostheses, which he used to consider the stuff of science fiction.

Coming to Pitt Med in 2019 with a background in robotic devices and automation, Carranza is now a PhD student working in the Rehab Neural Engineering Labs (RNEL), where he is advised by Elvira Pirondini, a PhD assistant professor of physical medicine and rehabilitation and of bioengineering. He's played an integral role in a stroke paralysis research study run by a team of Pitt and Carnegie Mellon University scientists that restored significant arm function to patients through spinal implants. (See "A moving story," page 24.)

ALL PHOTOGRAPHY: COURTESY UPMC

Capogrosso and Rendulic surrounded by the team that worked with her in the lab, including Pitt Med PhD students Erynn Sorensen (far left) and Erick Carranza (third from right).

"It's the person doing what they want to do as they want to do it, as opposed to something external doing it for them," says Erynn Sorensen, about her inspiration to be on the team. Sorensen is also a PhD student in the lab where she is advised by Marco Capogrosso, a PhD assistant professor of neurological surgery. She is a co-lead author on a paper published with Carranza and the Pitt/CMU team in Nature Medicine about the study.

No approved treatment exists for regaining hand movement in the chronic stage of stroke. The Pitt/CMU team's approach was to thread electrodes through the vertebrae of study participants, delivering electric charges to specific locations along the spinal cord and allowing the patients to make desired movements.

Sorensen joined the lab to merge her neuroscience background with a more clinical approach, and she and Carranza are among several graduate students and trainees who've taken leading roles on the ongoing study—including Souvik Roy (MD '23), who was completing a research fellowship, as well as students from the Swanson School of Engineering and CMU. Along with evaluating whether the device helps patients with their movements, Sorensen helps to run experiments and coordinate them. Carranza's main role has been developing and assessing tasks during which patients use a Kinarm, an exoskeleton that supports the patient's arm and measures movement (while the nerves are stimulated through the implanted electrodes).

Each patient's disability is distinct, so developing appropriate tasks for them to attempt can take days of fine-tuning. "We customize the task to each patient's limitations and try to challenge the patient to do things they can't normally do," Carranza says.

The project has reinforced his desire to work at a company that uses technology to help patients affected by stroke or other neurological diseases. "I have never seen a technology before that makes such a big difference in such a short period of time," he says. "If I can do this for the rest of my life, that would be so cool."

—Michael Aubele

—Patrick Monahan contributed to this report.

MATCH RESULTS
CLASS OF 2023

ANESTHESIOLOGY

Cifuentes, Elizabeth
Temple University Hospital, Pa.

DeWalt, Joshua
UPMC/University of Pittsburgh, Pa.

Evankovich, Maria
UPMC/University of Pittsburgh, Pa.

Fenner, Maxine
Mount Sinai Hospital/Icahn School of Medicine at Mount Sinai, N.Y.

Gao, Timothy
Mount Sinai Hospital/Icahn School of Medicine at Mount Sinai, N.Y.

Hildreth, Brianna
UPMC/University of Pittsburgh, Pa.

Hossainian, Darius
UPMC/University of Pittsburgh, Pa.

Jain, Naveen
New York Presbyterian/Weill Cornell Medical Center

Lebowitz, Steven
UPMC/University of Pittsburgh, Pa.

Nguyen, Eileen
Ronald Reagan UCLA Medical Center/ University of California, Los Angeles

Peretti, Marc
UPMC/University of Pittsburgh, Pa.

Rivera, Kevin
Medical College of Wisconsin Affiliated Hospitals

Rooney, James
UPMC/University of Pittsburgh, Pa.

Smith, Austin
UPMC/University of Pittsburgh, Pa.

Weigel, Tyler
UPMC/University of Pittsburgh, Pa.

Zalewski, Adrian
University of Illinois

CHILD NEUROLOGY

Glanzman, Jason
University of Colorado

DERMATOLOGY

Lamb, Jordan
Barnes-Jewish Hospital/Washington University, Mo.

Nguyen, Breanna
Johns Hopkins Hospital/Johns Hopkins University, Md.

Xiao, Amy
UPMC/University of Pittsburgh, Pa.

EMERGENCY MEDICINE

Georgiadis, Rebecca
UPMC/University of Pittsburgh, Pa.

Gramm, Erin
UPMC/University of Pittsburgh, Pa.

Knudsen-Robbins, Chloe
University of Cincinnati Medical Center, Ohio

Opitz, Samantha
Hospital of the University of Pennsylvania

Osigwe, Chinweoke
Stanford Health Care/Stanford University, Calif.

Ratnayake, Charith
Hospital of the University of Pennsylvania

Skiba, Justin
Hospital of the University of Pennsylvania

Wilson, David
Madigan Army Medical Center, Wash.

FAMILY MEDICINE

Apfelbaum, Hannah
Washington Hospital, Pa.

Cuevas, Amelia
UPMC St. Margaret/University of Pittsburgh, Pa.

Lai, Julia
University of Arizona

Seraly, Paul
University of Kansas

Zelenkov, Nenad
UPMC McKeesport/University of Pittsburgh, Pa.

INTERNAL MEDICINE

Avula, Raghunandan
Thomas Hospital, Ala.

Bidani, Shruti
NewYork-Presbyterian Hospital/Columbia University Medical Center

Byrapogu, Venkata Kalyan
Eastern Idaho Regional Medical Center

Castro, Alexander
Beth Israel Deaconess Medical Center/ Harvard University, Mass.

Connolly, Brendan
University Hospital/University of Michigan

D'Alesio, Mark
UPMC/University of Pittsburgh, Pa.

Deirmenjian, Christina
Huntington Hospital, Calif.

Dilip, Mridula
Cedars-Sinai Medical Center, Calif.

Donohue, Joseph
UPMC/University of Pittsburgh, Pa.

Eibel, Adam
UPMC/University of Pittsburgh, Pa.

Espinal, Alexis
University Hospital/University of Michigan

Gandhi, Nimit
University of North Carolina Medical Center

Gray, Zane
University of Texas Southwestern Medical Center

Hafeez, Neha
Hospital of the University of Pennsylvania

Harvey, Lloyd
Ronald Reagan UCLA Medical Center/University of California, Los Angeles

McDermott, Anne
University of Chicago Medical Center, Ill.

McDonald, Mackenzie
Hospital of the University of Pennsylvania

Mitchell, Chandler
University of Texas Southwestern Medical Center

Mohammad Nader, Metrah
Medical City Dallas, Texas

Murali, Anjana
Hospital of the University of Pennsylvania

Owiredu, Shawn
Cooper Medical School of Rowan University, N.J.

Patel, Vaidehi
NewYork-Presbyterian/Weill Cornell Medical Center

Pressimone, Catherine
UPMC/University of Pittsburgh, Pa.

Robinson, Mayumi
Beth Israel Deaconess Medical Center/ Harvard University, Mass.

Shaikh, Sahar
Montefiore Hospital/Albert Einstein College of Medicine, N.Y.

Sharma, Rishaan
University Hospitals Cleveland Medical Center/ Case Western Reserve University, Ohio

Vessel, Kathryn
UPMC/University of Pittsburgh, Pa.

Wollstein, Yael
University of Chicago Medical Center, Ill.

MEDICINE–PEDIATRICS

Dwyer, Gaelen
University Hospital/University of Michigan

Yoon, Hyunho
Los Angeles General Medical Center/University of Southern California

NEUROLOGICAL SURGERY

Abdallah, Hussein
UPMC/University of Pittsburgh, Pa.

Anthony, Austin
Barrow Neurological Institute at St. Joseph's Hospital & Medical Center, Ariz.

Casillo, Stephanie
UPMC/University of Pittsburgh, Pa.

Duehr, James
Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, N.Y.

Muthiah, Nallammai
Barnes-Jewish Hospital/Washington University, Mo.

OBSTETRICS AND GYNECOLOGY

Ayinon, Caroline
Johns Hopkins Hospital/Johns Hopkins University, Md.

Bender, Tierra
Brigham & Women's Hospital/ Harvard University, Mass.

Eleazu, Rachel
Baylor College of Medicine, Texas

Fogel, Rachel
Western Pennsylvania Hospital, Pa.

Heres, Caroline
Jersey City Medical Center/Rutgers University, N.J.

Johnson, Adriana
Tufts Medical Center/Tufts University, Mass.

Longo, Sadie
The Ohio State University Wexner Medical Center

Muluk, Sruthi
UConn John Dempsey Hospital/ University of Connecticut

Patnaik, Sneha
Newark Beth Israel Medical Center/ Rutgers University, N.J.

Pollard, Aja
UPMC/University of Pittsburgh, Pa.

Ripple, Katelyn
UPMC/University of Pittsburgh, Pa.

Spigner, Sabina
McGaw Medical Center of Northwestern University, Ill.

When the clock struck noon at the Petersen Events Center on March 17, nervous chatter turned into an outpouring of cheers, dances and hugs as the Class of 2023 opened envelopes revealing their residency matches. In his remarks, Dean Anantha Shekhar encouraged the class to use what they learned at Pitt to become "true leaders" at their new destinations: "It's not so important what place you go to, but what difference you will make."

OPHTHALMOLOGY

Atta, Sarah
Cleveland Clinic Cole Eye Institute/
Case Western Reserve University, Ohio

Wesalo, Joshua
Northwestern Memorial Hospital/
Northwestern University, Ill.

Zaheer, Haniah
UPMC/University of Pittsburgh, Pa.

ORTHOPAEDIC SURGERY

Charles, Shaquille
UPMC/University of Pittsburgh, Pa.

Fogg, David
William Beaumont Army Medical Center, Texas

OTOLARYNGOLOGY

Harley, Randall
Hospital of the University of Pennsylvania

Johnson, Solomon
University of Washington Medical Center

Palmieri, Daniel
Keck Medical Center/University of Southern California

PATHOLOGY

Molina, Laura
UPMC/University of Pittsburgh, Pa.

Tashman, Joshua
Brigham & Women's Hospital/
Harvard University, Mass.

PEDIATRICS

Anderson, Nathan
Massachusetts General Hospital/
Harvard University, Mass.

Chandra, Ashay
UPMC Children's Hospital of Pittsburgh/
University of Pittsburgh, Pa.

Clarke, Alison
UPMC Children's Hospital of Pittsburgh/
University of Pittsburgh, Pa.

Dosunmu-Ogunbi, Atinuke
Boston Children's Hospital/Harvard University, Mass.

Legan, Olivia
Children's Hospital of Philadelphia/
University of Pennsylvania

Mathier, Abigail
Emory University School of Medicine, Ga.

Milne, Emma
Johns Hopkins All Children's Hospital/
Johns Hopkins University, Md.

Muenzer, Maya
Children's Hospital of Philadelphia/
University of Pennsylvania

Picciarelli, Zachary
UPMC Children's Hospital of Pittsburgh/
University of Pittsburgh, Pa.

Powell, Koehler
UPMC Children's Hospital of Pittsburgh/
University of Pittsburgh, Pa.

Schwalbe, Marie
Penn State Health Milton S. Hershey Medical Center/
The Pennsylvania State University

Skinner, Camille
University of Washington Medical Center

PHYSICAL MEDICINE AND REHABILITATION

Cuevas Villagomez, Alan
McGaw Medical Center of Northwestern University, Ill.

Rajakumar, Vinod
Stanford Medical Center/Stanford University, Calif.

Rivetti, David
UPMC/University of Pittsburgh, Pa.

PLASTIC SURGERY–INTEGRATED

Beiriger, Justin
UPMC/University of Pittsburgh, Pa.

Lee, Phoebe
University of Utah Health

PSYCHIATRY

Ifidon, Ayomipo
University of Texas Southwestern Medical Center

Martinez-Meehan, Deirdre
University Hospitals Cleveland Medical Center/
Case Western Reserve University, Ohio

Myal, Stephanie
UPMC/University of Pittsburgh, Pa.

Stern, Natalie
NYU Langone Health/New York University

Zhou, Amanda
UPMC/University of Pittsburgh, Pa.

RADIATION ONCOLOGY

Schad, Michael
Hospital of the University of Pennsylvania

RADIOLOGY DIAGNOSTIC

Chen, Joseph
Boston Medical Center/Boston University, Mass.

Omar, Mahmoud
University Hospitals Cleveland Medical Center/
Case Western Reserve University, Ohio

SURGERY–GENERAL

Cluts, Landon
University of Toledo Medical Center, Ohio

Flaherty, Emily
Mayo Clinic School of Graduate Medical Education, Minn.

Gabriel, Lucine
George Washington University Hospital,
Washington, D.C.

Kolich, Brian
UPMC/University of Pittsburgh, Pa.

Puyana, Jacob
UPMC/University of Pittsburgh, Pa.

SURGERY–PRELIMINARY

Agyekum-Yamoah, Archibald
Morehouse School of Medicine, Ga.

Rodriguez-Torres, Sebastian
UCSF Health/University of California, San Francisco

Roy, Souvik
Tulane Medical Center/Tulane University, La.

Sigler, Timothy
Hackensack Meridian Jersey Shore
University Medical Center, N.J.

THORACIC SURGERY

Aranda-Michel, Edgar
Stanford Medical Center/Stanford University, Calif.

Hyzny, Eric
Keck Medical Center/University of Southern California

TRANSITIONAL YEAR

Chen, Joseph
UPMC/University of Pittsburgh, Pa.

Hay, Jordan
Naval Medical Center Portsmouth Health Services, Va.

Kazi, Eman
Nassau University Medical Center, N.Y.

Lamb, Jordan
Mount Carmel Health System, Ohio

Rajakumar, Vinod
WellStar Kennestone Regional Medical Center/
Augusta University, Ga.

Zaheer, Haniah
UPMC/University of Pittsburgh, Pa.

TRIPLE BOARD (PEDIATRICS/PSYCHIATRY/CHILD PSYCHIATRY)

Cheung, Christina
Mount Sinai Hospital/Icahn School of Medicine at
Mount Sinai, N.Y.

UROLOGY

Erpenbeck, Sarah
Medical College of Wisconsin

Ghanta, Siddharth
NewYork-Presbyterian Hospital/
Columbia University Medical Center

Krampe, Noah
UPMC/University of Pittsburgh, Pa.

Morrill, Christian
Arizona Health Science Center/University of Arizona

VASCULAR SURGERY

Binko, Mary
UPMC/University of Pittsburgh, Pa.

Dai, Yancheng
University of Massachusetts

CLASS NOTES

'80s

He came from humble beginnings, still **Karl Thor** (PhD '85) has forged a successful career as a neuropharmacologist. "I was born the son of a high school dropout bus driver," he says. "My career started at Pitt. It's one of the biggest foundations to my success." Thor is a founder of North Carolina–based Dignify Therapeutics, focusing on restoring bowel and bladder control to people with spinal cord injury or multiple sclerosis. Thor's son is quadriplegic, "So I have a personal and professional interest in restoring these functions," he says. Dignify Therapeutics is running trials on drugs designed for other uses that might be able to be used alone or in tandem with other drugs to treat the loss of bowel and bladder control.

Thor

DePietro

'90s

The rate at which children are being diagnosed with autism spectrum disorder "has gone up substantially" since **Frank DePietro** (MD/PhD '97, Psychiatry Resident and Child and Adolescent Psychiatry Fellow '02) started practicing, but that doesn't necessarily mean more kids are being born with the disorder, he says. "Are the kids more symptomatic? I don't know. But I think the biggest piece is recognition. Teachers, for instance, know what they're seeing [now]." A Pitt Med assistant professor of psychiatry, DePietro also has a PhD in biochemistry. He's grateful his career path landed him at UPMC Western Psychiatric Hospital, where he enjoys the team atmosphere: "The folks here, my colleagues, all get along very well."

He recently coauthored "Comeback Kids: A Pocket Guide to Post-Pandemic Parenting" with Jacquelyn Lazo.

White

R. James White III (MD/PhD '97) served Pittsburgh's unhoused population well before Street Medicine at Pitt coalesced into the formal outreach it is today (see "Outside influences" in our Spring issue). He recalls organizing service opportunities in the '90s for himself and other Pitt Med students to help people on the streets. He stepped up in other ways, too, including volunteering with Habitat for Humanity. White is a professor of medicine, of pediatrics and of pharmacology and physiology at the University of Rochester. He focuses his research and clinical work on pulmonary arterial hypertension.

'00s

Mark Lanasa (PhD '00, MD '02) says he felt well prepared for his career after graduating from Pitt. Early on, he studied the genetics of chronic lymphocytic leukemia in his lab at Duke University. He then shifted into industry, holding multiple positions at AstraZeneca, including vice president in clinical development; he's now senior vice president, chief medical officer for solid tumors at BeiGene. A proud alumnus, he is glad to maintain a connection with research and faculty at Pitt through his work at BeiGene and to engage with alumni and students through the Pitt Career Network.

Lanasa

Abby Spencer (MD '02, MEd and General Internal Medicine Fellow '07) is professor and vice chair of education for the Department of Medicine and director of the Academy of Educators at the Washington University School of Medicine in St. Louis, where she places a lot of her attention on helping faculty and trainees grow. She's sought out as a speaker, and if the subject matter isn't medical education, it's across multiple areas within medical education including mitigating bias, delivering effective feedback, establishing a positive learning climate and building curriculum. Spencer is also an advocate and supporter of women in medicine. She married her anatomy lab partner, Scott Starenchak (MD '02), a primary care physician with Washington University Physicians.

Spencer

Hess

Rachel Hess (MS and General Internal Medicine Women's Health Fellow '04) became associate vice president of research at University of Utah Health in 2022, in addition to being a professor of population health sciences and of internal medicine at the University of Utah. She oversees research at the university's schools of dentistry and medicine and colleges of nursing, pharmacy and health and stewards $460 million in research funding, a total that has continued to increase. "The growth has been across all of our schools, and it's really exciting," she says. She served as an assistant professor of medicine at Pitt Med from 2005-2011 and associate professor from 2011-2014.

Zarit

'10s

The Mid-Atlantic Mothers' Milk Bank provides pasteurized human milk from carefully screened donors to newborns in need when a mother's milk isn't available. **Jennifer Zarit** (MD '11), an assistant professor of pediatrics at Pitt, has been appointed medical

director for the nonprofit. She donated to the milk bank in its early years and hopes to raise awareness about and availability of pasteurized donor breast milk, which is primarily used for medically fragile infants and has been shown to improve health outcomes compared to formula.

Wack

Katy Wack (PhD '14) is the vice president of clinical development at PathAI, in Boston. When she joined the team in 2019, she was among roughly 70 employees; today she's one of about 700. Wack says of her work, "We are building AI-based pathology tools to get the right therapies to the right patients." Among other things, PathAI uses algorithms to measure the efficacy of certain drugs and build tools for diagnostics that ensure patients get the medicine they will best respond to. "I'm focused on how we develop things that solve the problems we're trying to solve. For instance, 'What's the biology we should be training our models to recognize?'"

—Michael Aubele and Phoebe Ingraham Renda

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.

STEP UP: PITT MED TRIVIA

GETTY IMAGES/CAMPWILLOWLAKE

Can you answer these without going online?

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

1. A Pitt Med professor helped develop the CPR doll Resusci Anne. This professor also said many modern discoveries are "re-discoveries," meaning that research and treatments once abandoned often return as best practices. Who was it?

A. Virginia Apgar
B. Peter Safar
C. Bernard Fisher

2. This longtime UPMC Shadyside attending was depicted as Rafiki, the king's most trusted advisor, in the Class of '20 Scope and Scalpel production of "The Lyme King." (Hint: He's also an adjunct professor of theology at Duquesne University.)

3. More women than men were registered as MD students at Pitt Med in the 2021/22 academic year. A total of 610 students were registered. What was the breakdown?

A. 307 women and 303 men
B. 323 women and 287 men
C. 334 women and 276 men

4. Julane Hotchkiss and Ernst Knobil were a power-science couple at Pitt Med. To what did they contribute foundational knowledge?

A. The menstrual cycle
B. The stabilizing effects of tau protein
C. Mitochondrial diseases

5. David Charp (MD '70), a former pitcher for Rutgers University, used to hang here in the late innings. (How closely have you read this issue?)

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.

THEY DECIDED IT'S TIME TO DO SOMETHING.

The annual cost of medical school for those in the Class of 1970 was less than 2% of what it is today and represented about 9% of the median annual household income in the United States that year. Compare that with today's tuition, which costs about 87% of the median household income, according to U.S. Census figures.

"It wasn't this bad back then," says **William Young**, a retired obstetrician/gynecologist living in New Hampshire.

Young and four others from the Class of '70 have established a fund for students underrepresented in medicine.

Retired pediatrician **Mark Friedman** got the fundraising effort going. Friedman had become frustrated reading about health inequities. He saw little progress in solving those problems and began asking himself where he could make a difference, however small. The idea that appealed the most was helping students whose passion is the same as his—caring for others through medicine.

"I had been hearing a lot of general talk about needing to do things, but decided it's time for action, not just talk," he says. (To note, Friedman, like the other fund founders, has been giving back in many ways. For instance, the Friedmans are leading a committee in Boston, where they live, that sponsors an Afghan immigrant family. Friedman gets animated talking about the family's successes in their newly adopted city.)

It was in 2019 that Friedman and Young found themselves helping to plan their 50th class reunion for the following year. The formal event didn't happen until the fall of 2022 because of the pandemic, but the experience brought them closer to classmates **Graham Johnstone**, **David Laman** and **Michael Linver**. These five alumni founded the fund, meeting routinely over Zoom to hash out the details and forming friendships in the process.

"I was friendly with David Laman but not close friends with the other guys," Friedman says. "That's all changed. The guys in this group . . . we all listen to each other and get along very well together. Michael Linver is the best at keeping us together through emails. It's been great."

The fund, created in the name of the Class of '70, is a roughly $30,000 allotment that Pitt Med's Office of Diversity, Equity and Inclusion oversees. **Chenits Pettigrew**, EdD associate dean for diversity, equity and inclusion in the School of Medicine, notes the money is being used as gap funding, primarily to help students attend national conferences and pursue professional development opportunities.

Recently, his office was able to send 13 medical students to the Student National Medical Association's (SNMA) Annual Medical Education Conference in Connecticut using the fund. Three of those students will hold leadership positions with the SNMA in 2024, including **Ja'Nia McPhatter**, who will serve as president (see story on right).

"There are holes to fill that further enhance their experience," Pettigrew says. "This support is making that possible."

Johnstone, a retired orthopaedic surgeon, and Linver, a radiologist, both say they owe much to Pitt Med, and they want to pay it forward.

"I have dedicated my professional life to trying to make the world a better place for others through my work on breast cancer detection," says Linver, "and the opportunity to help make the lives of some Pitt Med students a little better is yet another way for me to follow that path."

Laman wants more of his classmates to support the fund. "I encourage them to share their money generously with the medical school," says the retired pulmonologist. "I personally owe a great deal of my success to the school."

Says Friedman, "My children also see this as very important and often honor me by making donations to the fund for my birthday or Father's Day. That is the best gift because seeing the fund become reality has been a very rewarding experience for me." *—MA*

TIME OUT

Shown here—scenes from the 1970 Hippocratean yearbook. Can you identify these snoozers? Let us know.

Since refreshed from their med school days, five classmates from 1970 have joined forces to build a fund in support of underrepresented students. See "MAA Says."

PHOTOS FROM 1970 HIPPOCRATEAN

FROM GROUNDOUTS TO GROUNDWORK: **DAVID CHARP**

David Charp, a retired internist living in Northern California, knows how to put the proper spin on things.

"Though I had a medical career with no particular academic honors," he says, "I did see a lot of patients for free, probably made 3,000 house calls and never sent a patient to a collection agency.

"And maybe no med school alum has a better fastball and slider."

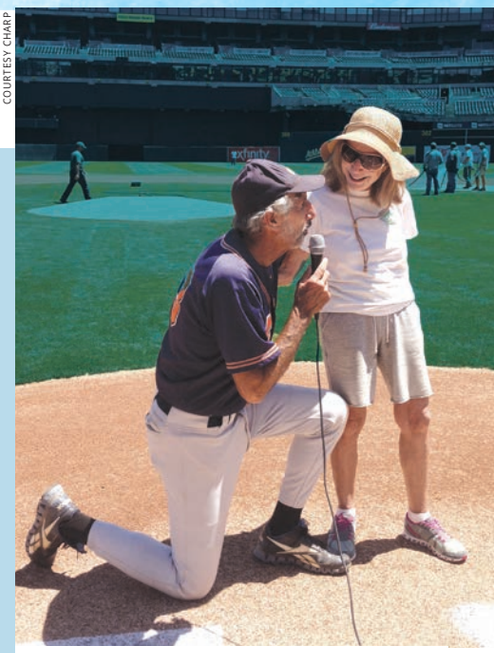
At 79, Charp (MD '70) still laces up his cleats each week as a player in the Northern California Baseball League—a league for the average guy who loves the game and for retired professional players.

Charp pitched for Rutgers University in the 1960s before coming to Pitt Med. He recalls catching the tail end of Pittsburgh Pirates games at Forbes Field after his classwork was done for the day.

"They were an up-and-coming team but weren't drawing crowds," says Charp. "They would open up the stadium in the 6th inning to anyone who wanted to watch. I would go in and purposefully sit in right field so I could watch Roberto Clemente. He could throw a bullet from right field to third base."

But while America's Pastime is a big part of his life now, it fell off Charp's radar for years after becoming a practicing physician and raising a family.

COURTESY CHARP



David Charp reproposes to his wife, Gail, at home plate in Oakland Coliseum on their 50th anniversary.

He and his wife, Gail, headed west after he graduated from Pitt Med. Charp took a job with the U.S. Public Health Service and practiced in southern New Mexico for a couple of years, doing everything from treating snake bites to delivering babies.

After landing permanently in Santa Rosa, California, Charp opened a private office that he ran for 40 years.

About the time he retired in 2014, Charp worked with a few other physicians to launch the Jewish Community Free Clinic in Santa Rosa. At the start, the clinic was open one evening every week or two in a synagogue. A family then donated a house, which Charp and his colleagues converted into a four-exam-room clinic.

After the donation of the house, the clinic was no longer just an evening operation, and Charp volunteered there until about a year ago.

Charp estimates the clinic, which is still running, has saved the city and state millions of dollars because "half of these people would've gone straight to the emergency room." *—MA*

ONE TO WATCH: **JA'NIA MCPHATTER**

Rising third-year Ja'Nia McPhatter will lead the Student National Medical Association (SNMA) next year, becoming national president of the country's oldest and largest organization dedicated to supporting students underrepresented in medicine. McPhatter, who has an MBA in health systems management, will be the second student from Pitt Med to hold the post.

"The culture of connectedness, outreach and networking opportunities was something I knew I wanted to be a part of," McPhatter says. Since joining the local SNMA chapter, she has been inspired by the mission to increase the number of clinically excellent, culturally competent and socially conscious physicians in the health care pipeline. When the presidency position went unfilled, she thought, "How could I not step up?"

The student fund created by the Class of 1970 (see "MAA Says," left) helped McPhatter and several others attend the SNMA's national conference in April. McPhatter is also a recipient of an MAA Scholarship.

She is thankful for her supporters who keep her grounded, notably **Rachel Eleazu** (MD '23), past national vice president of SNMA and peer-mentor to McPhatter, and former SNMA president **J. Nadine Gracia** (MD '02, Res '05), who has served in leadership roles in the U.S Department of Health and Human Services and is now CEO of Trust for America's Health.

The best advice Gracia has given to McPhatter? "Be a sponge." The first year is one of learning, during which she will prepare her executive agenda.

"It's great for Pitt Med to have a national figure, as far as recruitment efforts and more," McPhatter says. "I'm lucky to have family and friends here to support me in striving to be my best self while leading the organization that's given me so much."

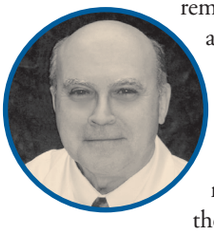
—Micaela Corn

E. LEON BARNES JR.

APRIL 28, 1941—FEB. 24, 2023

E. Leon Barnes Jr. (Res '72) was a Pitt pathologist who demonstrated how biomarkers could be used to classify cancer.

After earning his MD at the University of Arkansas for Medical Sciences in 1966, Barnes came to Pitt Med for a residency in anatomic and clinical pathology. He became an assistant professor of pathology, and except for one year in private practice, remained at Pitt Med until his retirement in 2010 as a professor of pathology emeritus.



Barnes

The University established an endowed chair in the Department of Pathology in his name.

Barnes wrote seven pathology textbooks and more than 200 peer-reviewed manuscripts. He received the Distinguished Alumni Award from the University of Arkansas for Medical Sciences in 1995 and was awarded the European Society of Pathology Honorary Diploma. In 2012, he received the Fred Waldorf Stewart Award from Memorial Sloan-Kettering Cancer Center Department of Pathology.

"Leon was one of only two or three in the world who helped define head and neck pathology," says Jonas T. Johnson, an MD and Distinguished Service Professor of Otolaryngology, and former chair of that department.

George K. Michalopoulos, an MD, PhD and Maud L. Menten Professor of Pathology and former chair of pathology, says Barnes' classifications of head and neck tumors are standards in the field and can be directly linked to therapies for those cancers.

"The whole field of pathology, from here to Alaska to Australia, relating to what are the classifications of head and neck cancers and how the therapies work" stems from Barnes' research, Michalopoulos says.

Robert Ferris, an MD, PhD, the Hillman Professor of Oncology and director of the UPMC Hillman Cancer Center, says of Barnes' contributions: "Leon defined the concept of biomarkers before we really even knew what those were and how important they could be for patient selection to optimize outcomes and guide treatment intensity. Many of the pathologic features of risk that he identified in the 1980s have been validated and are now integrated into the American Joint Committee on Cancer staging system across the world for head and neck cancer."

Johnson talked to Barnes' widow and their two daughters a few days after his death and learned that he was the consummate family man who doted on his wife, kids and grandchildren.

His daughter notes that his legacy lives on through his family and the graduates of his program who are distributed all over the world and are "the future of head and neck pathology." —*MA*

MARTICA "TICA" HALL

MARCH 14, 1959—MARCH 18, 2023

Hall

"You know how people say, 'Oh, they'd give you the shirt off their back'?" asked Samantha Moatz, founder and executive director of the breast cancer nonprofit 412Thrive. "Well, Tica once literally gave someone the pants off her [back-end]!"

Just weeks before her death, Martica "Tica" Hall (PhD '96) acquired auction items, invited sponsors and participated in a photoshoot to promote a 412Thrive fundraiser. During that shoot, two fellow "thrivers" didn't have jeans that fit them because of their treatment-related weight fluctuations. This presented an issue as jeans were the designated uniform for the shoot. Hall promptly removed her own so that the women could take turns wearing them for their photos.

Hall, a University of Pittsburgh professor of psychiatry, of psychology, and of clinical and translational science, was born in San Tomé, Venezuela. She traveled extensively, visiting every continent except Antarctica.

Hall was a world-renowned expert in sleep and circadian science but according to an interview she gave in 2021 for the American Psychosomatic Society, discovering her research focus was a "total accident." While in graduate school, a classmate told her he was conducting an experiment on REM sleep deprivation and long-term strengthening of effective neuronal connections in the brain. This piqued her interest in slumber, and Hall searched for an article that proved sleep is a mediator of the relationship between stress and the immune system to present at her department's next journal club meeting.

She found only five articles. Excited at the possibility of filling that research void, Hall declared, "I found my muse. You have to have your eyes open and an open heart to be able to see that this accident isn't just something to forget about."

It was with that open heart that Hall came to Pitt, notes David Lewis, an MD, Distinguished Professor of Psychiatry and chair of that department. "Tica was a superb scientist, dedicated mentor and excellent teacher. She was a consummate colleague to those who had the opportunity to work with her."

Hall is honored through the Academy of Behavioral Medicine Research's Tica Hall Mentorship Award and the American Psychosomatic Society's Dr. Martica Hall Award in Sleep Medicine.

When asked in that 2021 interview what she considered her single greatest accomplishment, Hall said, "It's not going to be any one thing I wrote. It's going to be the people who, because of the things I wrote and said, developed and integrated sleep and rhythms into their research."

—*Nicole Matthews*

IN MEMORIAM

'50s

STANLEY HIRSCH, MD '57
FEB. 26, 2023

ROBERT WHITMAN, MD '54
MAY 21, 2023

'60s

GEORGE MEINDL, MD '60
APRIL 22, 2023

JACK ROZEN, MD '62
FEB. 21, 2023

MICHAEL WARHOL, MD '69
FEB. 14, 2023

'70s

JAMES STEPHEN CARTER, RES '73
MARCH 10, 2023

CARROLL P. OSGOOD, FEL '73
MAY 7, 2023

LEONARD SELEDNIK, MD '78, RES '82
APRIL 3, 2023

'80s

GEORGE CARVELL, PHD '86
MARCH 5, 2023

MICHAEL D. MINTON, MD '81, RES '84
JUNE 3, 2023

VALERIE PRICENER-SLAVIC, MD '87
MAY 2, 2023

WILBERT RUMP, MD '82
APRIL 20, 2023

ERIC R. WOLF, RES '82
FEB. 19, 2023

LEAVING VIROLOGY, FINDING ARCHAEOLOGY: GAIL WERTZ

By Roberta Zeff

COURTESY WERTZ

Wertz unearthed a second career on the family farm.

Gail Williams Wertz (PhD '70) has really had her hands full this spring.

"This happens to be calving season," she explains in an April call. "I was [just] holding a bottle for a newborn calf that was having a little trouble adjusting to the world."

She and her husband, L. Andrew Ball, a biochemist, have 425 acres of farmland along the Rappahannock River in Virginia, where they maintain two breeding herds of Black Angus—about 40 to 50 total head of cattle.

Accidentally finding Native American artifacts on the land led Wertz, a trailblazer in RNA virus research, to go back to school in her 70s to pursue an entirely different field: historical archaeology.

Wertz received her PhD in microbiology in 1970 from Pitt Med and went on to a career as a researcher and professor at the University of North Carolina and the University of Virginia. Her laboratory has advanced scientists' understanding of respiratory syncytial virus (RSV) and developed a method for genetically engineering RNA-based viruses—work that is credited as the platform for the Ebola vaccine.

"Gail Wertz made enormous contributions to an understanding of how viruses replicate in cells and trained many students and postdoctoral fellows who proudly carry her legacy forward," says Terence S. Dermody, an MD, the Vira I. Heinz Distinguished Professor of Pediatrics, chair of pediatrics and professor of microbiology and molecular genetics at Pitt Med. "Her mentoring extended to junior colleagues as well and helped shape an entire field."

After she left Pitt, Wertz stayed close to her mentor, the virologist Julius S. Youngner, who died in 2017 and was known for his contributions to the development of the polio vaccine with Jonas Salk, for advances leading to vaccines for equine influenza (with Patricia Dowling) and type A influenza, and for infectious disease and cancer treatments. He was also known for getting things right.

She says of the weekly meetings she had with Youngner, "He'd be supportive of the research and the interpretation, but he had a subtle way of asking questions that let you know that you really could have designed that experiment just a little bit better, really might have gotten a little bit more information. So, it was a wonderful experience in learning, 'Don't be satisfied with what you've done.'"

Wertz received 38 years of National Institutes of Health funding, including two MERIT awards. Among other honors, she served as president of the American Society for Virology and was a member of the advisory council to the National Institute of Allergy and Infectious Diseases.

When her parents were having health issues, Wertz wanted to be closer to them and moved to the farm in 2005.

"Whenever I set out to plant anything, I'd stick a shovel in the ground, start digging in, and in almost no time I would find a Native American artifact," she says. Some were 5,000 or 10,000 years old, and she wanted to learn about them.

She applied to a graduate program at William & Mary, where she'd attended college, and received her master's degree in anthropology, specializing in archaeology. To focus her studies, she asked tribal leaders what they wanted to learn from the artifacts she was unearthing. The leaders were particularly interested in where their ancestors had lived, and when and why they'd moved.

Had it not been for the COVID pandemic, Wertz would have pursued another PhD.

She was eager to be vaccinated against SARS-CoV-2 and took the first dose available to her in March 2021. Eight days later she mounted a severe inflammatory response: chills by day, sweats at night and muscle inflammation that left her unable to walk for days. It took months to recover, and she says she still cannot walk with freedom. She and her doctor decided it would be dangerous to take additional doses of the vaccine.

Being an RNA researcher who cannot take an mRNA vaccine is a cruel paradox, yet: "The beauty of archaeology is that it can be done outside and can be distanced," she says. "And we have the farm. We raise most of our own vegetables. So COVID gave us a reason to legitimately become pioneers, isolated pioneers, without people thinking we'd totally lost it." ■

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

'00s

LORETTA KATHLEEN BERGER, MD '07
MAY 4, 2022

FACULTY

JOAN EHLER AMMER, MD '58, RES '60
MAY 19, 2023

ROBERT ATWELL, MD '54
MARCH 19, 2023

BARRY KAPLAN, PHD
APRIL 15, 2023

GETTY IMAGES/DOBLE-D

What can you do if clickbait makes you feel, well, not-so-great?

FOR REAL! TWEEN SCIENCE

With just a few clicks of your fingers on a screen, you have the world in your hands. Could you use a chuckle? You gotta see these cats playing Ping-Pong! Want to ace a test? You'll [heart] these studying tips! Social media seems to be the place to be.

Although it can act as a companion or teacher, social media can also work against us. We might find it hard to navigate our feelings as easily as we navigate the apps on our phones.

Those apps have a way of feeding self-doubts. They can set the stage for comparing ourselves to others—and that's hardly ever healthy. This happens a lot with girls, especially.

So, what can you do if clickbait makes you feel, well, not-so-great?

Next time you're swiping on Instagram or Snapchat or wherever, check in with yourself.

Ask, "Is this experience making me feel like I'm not good enough?"

"How is what I'm doing helping me? How does it enrich me?"

If you are feeling down, it's probably a good time to put your phone down.

Simple activities, such as taking a walk, connecting with a friend or taking a long break from some apps, might do you a world of good. Even dropping off to play a video game could help you reground yourself. A change of "screen" might just be all you need. *—Lynnette Tibbott*

Thank you to Pitt's Jaime Sidani, a PhD, MPH assistant professor of public health and member of the Center for Social Dynamics and Community Health, for sharing her expertise. Sidani studies adolescent health, with a focus on tobacco-use prevention and media. We'd follow her anytime.

CALENDAR

FOR ALUMNI & FRIENDS

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

WHITE COAT CEREMONY
JULY 30
Soldiers and Sailors Memorial Hall

REUNION WEEKEND AND HOMECOMING
OCTOBER 13-14
pi.tt/hsalumniweekend

To find out what else is happening at the med school, visit health.pitt.edu and maa.pitt.edu.

Pitt Med Trivia *(from page 35)*

Answers:

1. Peter Safar
2. Elmer Holzinger
3. 334 women and 276 men
4. The menstrual cycle
5. Forbes Field

Pitt Health Sciences

Alumni weekend

–2023–

October 13-14

Pittsburgh, Pennsylvania

Join your classmates, colleagues and leadership from the six health sciences schools this October. Learn about special events for your school and how you can connect with your classmates at pi.tt/hsalumniweekend.

RSVP by September 24.

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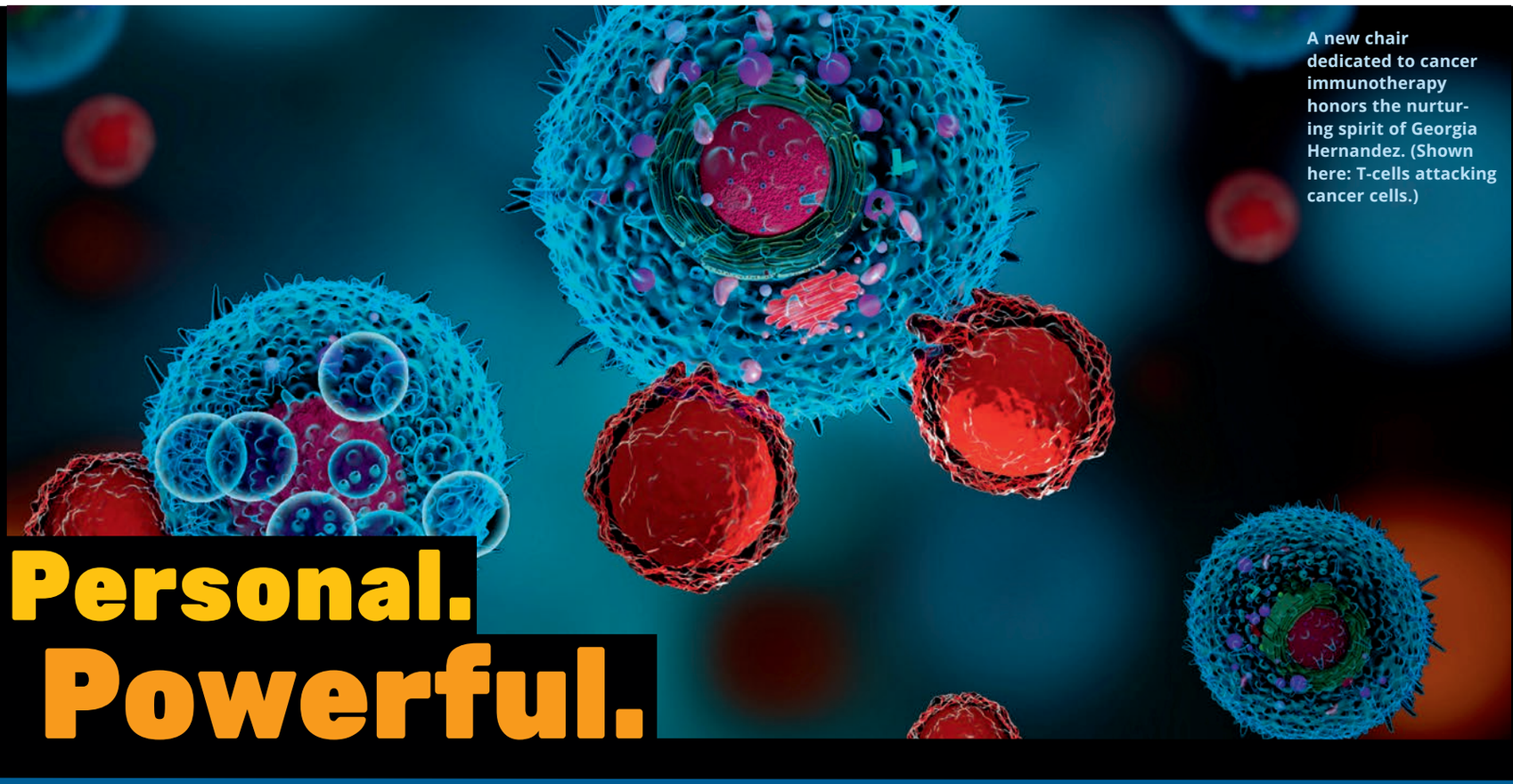

A new chair dedicated to cancer immunotherapy honors the nurturing spirit of Georgia Hernandez. (Shown here: T-cells attacking cancer cells.)

SCIENCE: GETTY IMAGES; PORTRAIT: COURTESY HERNANDEZ

Personal. Powerful.

Robert Hernandez remembers going to his brother's house one Christmas to find his three nieces "causing a ruckus." None of the adults seemed to be able to settle the kids—until his wife, Georgia Hernandez, took a crack at it.

Almost instantly, the girls calmed down. "She was a child whisperer," says Hernandez, who first met Georgia when the two were kindergartners living in Brookline. "That just came to Georgia naturally."

Georgia Hernandez, who died of uterine cancer in 2016 at the age of 71, dedicated her four-decade career to children. At Beth El Nursery School in Green Tree, she was a teacher and later became the school's director, retiring in 2002. She served for more than a decade as chair of the Allegheny County Department of Human Services Office of Children, Youth and Families advisory board.

In 2016, shortly before her death, the county established the Georgia Hernandez Award for Excellence in Child Welfare Practice, now presented each year to a caseworker during National Child Abuse Prevention Month.

When Georgia Hernandez was diagnosed with mixed Mullerian uterine cancer, UPMC gave her the best care possible, Hernandez believes. But an autoimmune disorder brought on complications: After an immunotherapy treatment initially showed strikingly beneficial results, side effects forced her off the drug. "That convinced me there was a need for more research in the area," says Hernandez, a 1966 Pitt alumnus, former vice chair of the board and CFO of USX Corporation, an emeritus trustee at Pitt and former chair of the UPMC Board of Directors' finance committee.

Robert and Georgia Hernandez

So Hernandez, who is now partnered with Pitt alumna Karen Blumen, endowed the Georgia C. Hernandez Chair in Immunology and Autoimmune Regulations at the School of Medicine. The new position will advance research to improve cancer treatments for those who are immunocompromised.

Although Hernandez knows that breakthroughs take time, he hopes that the resources committed to this work will encourage those facing the same challenges Georgia did. She would have liked that.

"Georgia had a nurturing spirit," says Hernandez. "She was the most generous person I have ever known, not just financially but spiritually."

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