

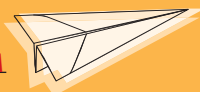
UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE | SPRING 2021

# PITTMED



*Be Well*

CLINICIANS ARE STRUGGLING  
TO TAKE CARE OF THEMSELVES



### HISTORICAL TIES

While reading about the anniversary of the Salk team’s polio vaccine in the New York Times, I opened a link to a collection of Pitt stories [pi.tt/poliohope] and felt compelled to respond. I was part of the clinical trials when I was about 11.

I attended St. Bernard’s School. After we recited the Pledge of Allegiance, the teacher passed out slips of paper with our name and the time when we would be excused. We would line up and wait our turn. Sometimes, it was for a shot, and other times for a blood draw. I remember feeling anxious and being in the midst of many nurses in uniform. The smell of rubbing alcohol was ever present.

During one appointment, as the needle was placed in my arm for what seemed like minutes, I was calmed by Dr. Salk, who introduced himself. He commented that the pattern of the maroon-and-blue jumper I was wearing would make a nice necktie.

I am so proud of being part of this medical trial and subsequent victory over polio.

Maryanne Bromberick Vigneaux  
Coram, NY

### WHAT WE’RE MADE OF

For our “Pulled Away from the Lab” story on page 21, writer Cristina Rouvalis asked graduate students to send her thoughts on their experiences from the past year. We thought you might enjoy this excerpted response:

Initially, I was concerned about attending lec-

tures through Zoom, particularly for a course like Human Anatomy, where we would normally have had access to a cadaver. . . .

As it turned out, getting into virtual space as an avatar required that I collaborate even more with my classmates than if we’d been in person, which reduced my feelings of isolation. We were divided into teams, and if a team member got removed from the lab space because of technical issues, another member was charged with using Zoom to get the student (and their avatar) quickly back into the virtual space. The more that went wrong, the more the class came together to make things work. Course director Dr. Sandra Murray (who created the virtual lab) would say, “It is during the hard times that you show what you are made of; don’t complain but use the challenge to find the opportunities.” Our class tried to live up to those words.

In addition to our time in virtual space, we went to the gross anatomy lab for a day. If the experiences from taking human anatomy during COVID-19 have taught me anything, it’s an appreciation for the miracles, beauty and capacity of the human body. I am beyond grateful for the ability to live and experience life with a fully functioning body.

Through this pandemic experience, my motivation to become a doctor and to help patients was reinforced. I learned recently that I was accepted to medical school. Talk about a real silver lining!

Nana-Hawwa Abdul-Rahman  
Pitt Biomedical MS, Class of 2021  
MD, Class of 2025

### RECENT MAGAZINE HONORS

2020 Press Club of Western Pennsylvania Golden Quill Awards  
• Best in Show: Ray Sprigle Memorial Award—Magazines  
• Excellence in Written Journalism, Magazines—Medical/Health (G. Jenkins, “Oct. 27, 2018: Pittsburgh’s Darkest Day and the Mass Casualty Response”)

2020 Press Club of Western Pennsylvania Golden Quill Award  
• Excellence in Corporate, Marketing and Promotional Communications—Written, Medical/Health (G. Jenkins, “Surviving Survival”)

2020 Press Club of Western Pennsylvania Golden Quill Award  
• Excellence in Corporate, Marketing and Promotional Communications—Audio, Medical/Health (E. Vitone, J. Faust, M. Palko and E. Lloyd, Pitt Medcast: “Polio Pioneers”)

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When CARA MASSET [“Be Well” and “Sanctuary”] was in kindergarten, she had an appendectomy. Afterward, she wrote about and illustrated her experience—her first foray into medical writing. She would go on to earn a bachelor’s in English and an MFA in writing from Pitt. After grad school, she worked in Pitt’s office of communications for more than a decade. Masset is now Pitt Med’s contributing editor. In “Be Well,” she addressed the struggle clinicians who care so well for others often face in caring for themselves.

MICHAEL HIRSHON [cover and “Be Well”] always knew he wanted to tell stories, but it was only after doodling his way through creative writing class that he chose illustration as his method. He earned his MFA at the School of Visual Arts and has worked as a freelance illustrator for over a decade. He is also an assistant professor of illustration at the University of Utah.



### YUK IT UP

Mr. Yuk, the poster child for poisoning prevention, debuted in 1971. Hear the story behind that famous grimace, as told by his creator, Richard Moriarty (MD ’66), on the latest episode of Pitt Medcast.

[pi.tt/pittmedcast](http://pi.tt/pittmedcast)



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UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE MAGAZINE, SPRING 2021  
VOL. 23, ISSUE 2



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Many clinicians struggle with their mental health. "When it's you, you might not see it," says Sansea Jacobson. (Cover: Michael Hirshon © 2021.)

# PITTMED

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**I** raise up my voice—not so  
 I can shout but so that those  
 without a voice  
 can be heard.  
 —Malala Yousafzai

Associate professor of psychiatry Sansea Jacobson told our cover story writer, Cara Masset, how a student helped spark a transformation process at UPMC. A few years ago, a med student applying for a psychiatry residency asked Dr. Jacobson, “What does your residency program do for wellness?” The student knew that the intense clinical training could exact a toll on mental health.

There wasn't a formal structure in place then, but there is now—thanks, in part, to that applicant's inquiry. Several residency programs had been attempting to help clinicians with personal resilience. Today, Dr. Jacobson and associate professor of plastic surgery Vu Nguyen cochair a committee that works across UPMC residencies to make deeper changes to the systems that contribute to burnout; it's called WELL (Wellness, Environment, Learning and Living). The initiative has not only enriched UPMC residencies—the online toolkit developed by the program organizers also is being adopted by the national accrediting body for graduate medical education as a model. (Learn more about addressing clinician mental health issues in “Be Well,” our cover story starting on page 25.)

Young people have been a catalyst for change at Pitt Med, as they have been, historically, throughout the world. University of Pittsburgh students have stood up to inequity, injustice and structural racism. Pitt students have been strong advocates against environmental degradation. They've shown us that there are many ways to initiate transformations through individual actions: They've found a way to recycle plastic medical waste. They've designed a device to generate oxygen for under-resourced hospitals. They have worked with communities to combat health disparities. And much more.

Pitt students saw a community struggling during the pandemic, so they stepped up: They volunteered to provide childcare so that local clinicians could see patients. They delivered medications to the most vulnerable. They nurtured incoming medical students—who were physically distanced from their classmates and professors from their first days here—in a variety of creative ways, from individual mentoring to compiling a cookbook of favorite recipes submitted by members of the Pitt Med community.

Despite an extraordinary final year full of challenges created by a pandemic—reduced clinical operations, canceled off-site rotations, travel restrictions and virtual residency interviews—the Class of 2021 graduated with great flourish, and had one of the best residency match outcomes. This issue's “What a Finish!” and “Pulled Away from the Lab” stories celebrate our MD and PhD students and how they managed during these trying times.

I'm so proud of our students. It is not just their advocacy and heart that I admire, but also their catalytic role in transforming our society.

Anantha Shekhar, MD, PhD

Senior Vice Chancellor for the Health Sciences

John and Gertrude Petersen Dean, School of Medicine

AIMEE OBIJINSKI/UNIVERSITY OF PITTSBURGH



# Special COVID-19 Report

See [pi.tt/variant](https://pi.tt/variant) for more.



and that person gives it to someone else,  
then it can start to spread

COURTESY UPMC

## Insight on Variants

Pitt Med's **Paul Duprex** and **Kevin McCarthy** have helped scientists understand one way that new variants arise in the novel coronavirus. In a recurring pattern of evolution, SARS-CoV-2 evades immune responses by selectively deleting small bits of its genetic sequence.

When these deletions happen in a part of the sequence that encodes for the shape of the spike protein, the formerly neutralizing antibody can't grab hold of the virus, the researchers report in a Feb. 3 paper in *Science*. And because the molecular "proofreader" that usually catches errors during SARS-CoV-2 replication is "blind" to fixing deletions, they become cemented into the variant's genetic material.

"You can't fix what's not there," said study senior author Duprex, director of the Center for Vaccine Research at the University of Pittsburgh. "Once it's gone, it's gone."

Since the paper was first submitted as a preprint in November, the researchers watched this pattern play out as several variants of concern rapidly spread across the globe. The variants first identified in the United Kingdom (known as B.1.1.7) and South Africa (B.1.351) have sequence deletions.

Duprex's group first came across these neutralization-resistant deletions in a sample from an immunocompromised patient who was infected with SARS-CoV-2 for 74 days before ultimately dying from COVID-19. That's a long time for the virus and immune system to play "cat and mouse," and gives ample opportunity to initiate the co-evolutionary dance that results in the kinds of worrisome mutations in the viral genome that are occurring all over the world.

Lead author McCarthy, assistant professor of microbiology and molecular genetics at Pitt, who's an expert on influenza virus (which is a master of immune evasion), says: "How far these deletions erode [vaccine] protection is yet to be determined."

—Erin Hare

**Speaking of variants:** In the March 24 issue of *Scientific American*, Pitt evolutionary biologist Vaughn Cooper writes that SARS-CoV-2 may be settling in to a limited number of variations. The professor of microbiology and molecular genetics writes, "This may not be the multifront war that many are dreading." But only if we don't let down our guard. "These viral adaptations are already rewriting our biology textbooks . . . let's strive to limit new material."

Cooper proposes initiatives to help end this pandemic—as do Pitt Med's Kevin McCormick, Jana Jacobs (Public Health PhD '14) and John Mellors in a *Science* piece published that same week. Rapidly spreading variants are a cause for broad concern and action, the infectious disease faculty note: "Partial roll-out and incomplete immunization of individuals" could breed variants that render existing vaccines ineffective. The scientists advocate for increased surveillance of viral mutations and comprehensive inoculations; they suggest that vaccine boosters and antibodies are likely to help keep us protected from variants. —Erica Lloyd

Sources for this special section include Pitt and UPMC reports.

TOM ALTANY/UNIVERSITY OF PITTSBURGH



The Pitt team helping with the “60 Minutes” segment, from left: Will Hinson, Lindsey Robinson-McCarthy, Kevin McCarthy, Paul Duprex, Sham Nambulli, Ghady Haidar and Linda Murphy.

## Behind the Scenes

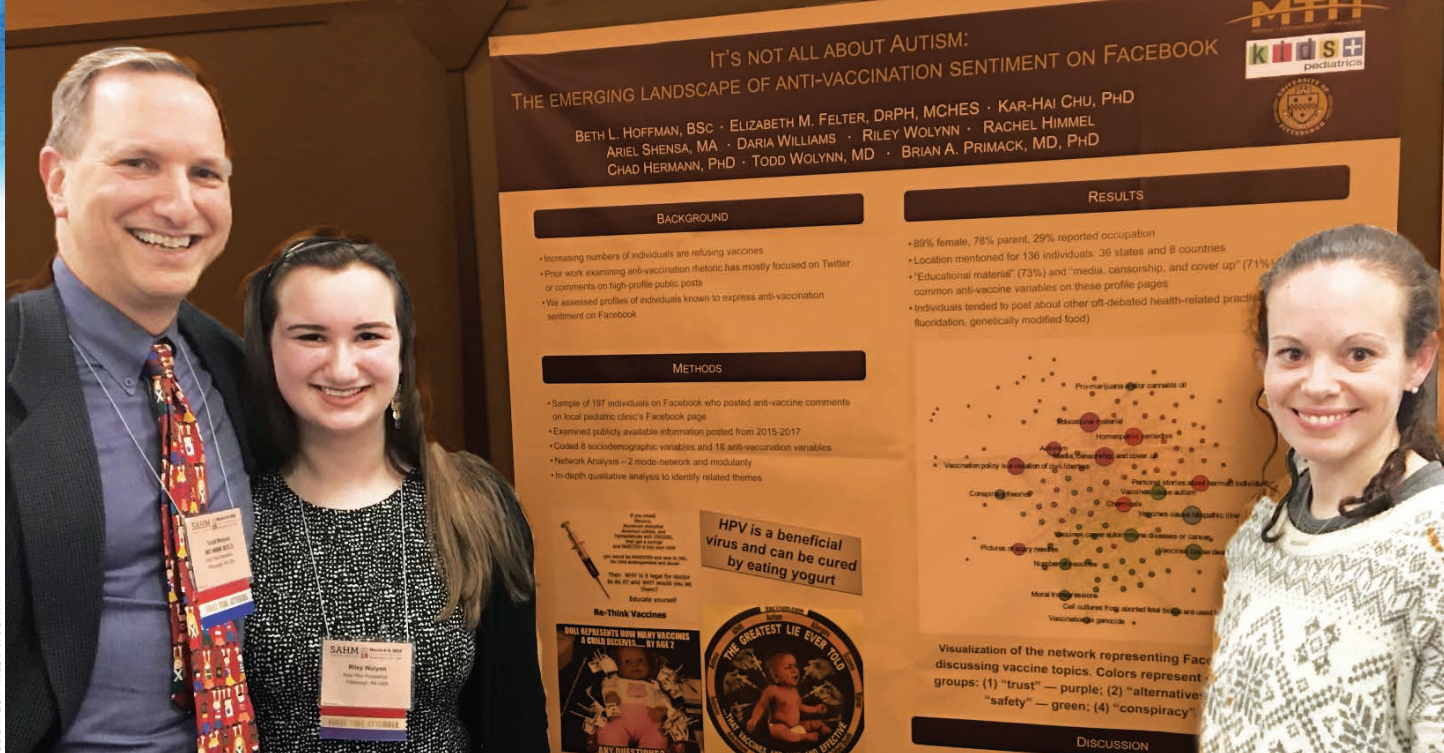
Researchers with Pitt’s Center for Vaccine Research were featured on CBS’s “60 Minutes” on March 14. To help explain and visualize variants to the novel coronavirus, center director Paul Duprex used a nearly 5-inch-tall 3D model of the coronavirus spike protein—a precise representation, though blown up 800 times from what would actually be found on the surface of the virus. (See photos above.) The bright-red model was made by Will Hinson of Pitt’s Center for Teaching and Learning. Hinson received a request to print the model of the coronavirus spike on a Monday. By that Saturday, he had completed it, working well into the night to hand-paint the finishing touches on the model that took more than 70 hours to print. “It was one of the most fun projects I’ve worked on,” says Hinson. —Anastasia Gorelova



## Vaccine Venue

The University partnered with Allegheny County to offer its facilities and staffing for Allegheny County COVID-19 vaccine clinics this spring. As of April 6, the partnership had provided 12,000 doses at the Petersen Events Center (shown here) and elsewhere, with many more to come. “We will continue to work to provide vaccinations to our University community and community partners as vaccine is available,” says Melissa McGivney, associate dean for community partnerships at the School of Pharmacy, who is leading the effort. Through the first week of April, the partnership had held 17 clinics with help from more than 700 volunteers from Pitt. Seven second-dose clinics were planned for later in the month.

—Gavin Jenkins



## Hijacked on Social

Coauthor a journal paper with your dad? Pitt undergrad Riley Wolynn has.

Wolynn, a sophomore health sciences major, and her father, Todd Wolynn (MD '92), a pediatrician and CEO of Kids Plus Pediatrics, both contributed to a paper published April 13, 2021, in *Vaccine*. The study analyzes tweets that use the hashtag #DoctorsSpeakUp, which was originally a pro-vaccine hashtag until anti-vaccine activists co-opted it. In a coordinated attack, the activists employed the hashtag in tweets citing bogus studies and spreading misinformation and fear.

"Replace all #Vaccines with #Vitamin shots. #DoctorsSpeakUp," writes one Twitter user. The original intention of the hashtag was more along the lines of: "#DoctorsSpeakUp about how vaccines save lives."

This wasn't Wolynn's first time studying the anti-vaccine movement; nor was it her first research project with her dad. As a junior in high school, she became involved in a study of an anti-vaccine Facebook attack against her father's practice.

Beth Hoffman, a Public Health PhD student in behavioral and community health sciences, oversaw Wolynn's work on the Facebook study and was more than happy to have her as a research assistant once she started her first year at Pitt. "We'd been really pleased with her work on that first vaccine paper," says Hoffman, an MPH who is with Pitt's Center for Behavioral Health, Media and Technology.

After the Facebook attack, Todd Wolynn created the nonprofit Shots Heard Round the World, which encourages doctors to respond to vaccine misinformation on social media. Shots Heard went on to collaborate with physician and internet personality Zubin Damania, who organized a social media event around #DoctorsSpeakUp.

Hoffman and Riley Wolynn were at the ready to study the activity around the event. "We learned some really constructive lessons" from the anti-vaccine response, says Hoffman. Their takeaways (see [pi.tt-co-opted](#)) were published in the April 13 paper. Hoffman was the lead author on that paper with Jaime Sidani, assistant professor of medicine and a core faculty member in the center, as the senior author.

Wolynn hopes to attend the accelerated program at Pitt Public Health on the Behavioral and Community Health Sciences track and continue working on topics involving media and health.

—Sarah Stager

Dad and daughter duo, Todd and Riley Wolynn, team up with Beth Hoffman (right) and Jaime Sidani (not shown) against misinformation online.

## Support to Stop the Spread

Even before the first COVID-19 vaccine candidates were approved and administered, false information was spreading on social media sites about the vaccines.

"We saw some national surveys indicating many people were hesitant to get the COVID-19 vaccine, even before a vaccine candidate became available, and that was increasing over time with each subsequent survey. But they didn't really explain why or how," says Jaime Sidani, assistant professor of medicine.

"We're using social network analysis to see how messages spread among groups and into other groups," says Sidani, "but also to learn more about the reasons for hesitancy and develop educational messaging to counter that."

In October 2020, the researchers received a \$117,000 grant from the **Richard King Mellon Foundation** to support their efforts.

"A vaccine that is scientifically proven to be 95% effective still will be ineffective if it is distrusted and shunned by significant percentages of the population," says Sam Reiman, director of the Richard King Mellon Foundation.

Another group passionate about inoculations is getting a boost(er), so to speak. **The Influenzers**, a new interdisciplinary science policy student group at Pitt, was awarded a **Research!America** Civic Engagement Microgrant. The Influenzers work to educate the Pittsburgh community about facts and myths surrounding immunizations. The students are also exploring the feasibility of making dentists eligible to administer vaccines.

Shreyaa Nagajothi, a first-year neuroscience student and member of the Influenzers, told the Pitt News that during the pandemic, "We all feel a bit helpless." Yet: "Being part of an organization that is encouraging people to get the vaccine, encouraging people to stay healthy and taking active roles in health policy is truly the best thing that anyone can do to help out during this time."



## Poison Center Pinch Hits

When the pandemic hit, the Allegheny County Health Department was suddenly flooded with hundreds of calls a day: Could I have COVID? Where can I get tested? What does “quarantine” really mean?

“They just couldn’t keep up,” says **Amanda Korenoski** (PharmD ’12), shown left, managing director of the Pittsburgh Poison

Center of UPMC. “So they reached out to us. We, of course, were willing to help. We already had the infrastructure.” Since then, all of the county’s medical-related COVID-19 calls have been routed to the center.

The center is a natural fit for this: staffed 24/7 by a team of 14 RNs, each of whom has years of experience in emergency medicine or critical care. They’re seasoned in the delicate art of guiding people over the phone through moments of utter panic—and calming callers enough to answer questions that will be crucial to their care. Without the benefit of vital signs or even facial cues, the nurses assess callers, triage them and connect them with whatever they need: maybe an ambulance, maybe just management at home.

The center, whose medical director is **Michael Lynch** (MD ’04, Res ’07, Fel ’09), has continued to evolve with each new wave of needs. SOS calls for necessities like rent and food prompted a partnership with 211, the United Way’s community services helpline.

The addition of a backdoor line to arrange COVID-19 testing for emergency responders solved another problem: “Police, fire and EMS were getting exposed in their day-to-day work,” says Korenoski, “which was keeping them away from work when we really needed them.”

And as the first crop of laypeople received their vaccines, UPMC created a dedicated poison center line for questions about side effects. “Vaccines are very safe,” Korenoski stresses. “Usually, it’s just reassuring them that their body aches and fatigue are OK. But we’re 24/7. If someone wakes up in the middle of the night and starts to feel not so great, they can call and talk to a health care professional.”

Throughout the pandemic, the center team continues its original day job: serving as a round-the-clock emergency call center for poisoning queries in 44 counties across western and central Pennsylvania—from the western border of PA to just about the Susquehanna River.

Like its 54 sister centers across the United States, the Pittsburgh Poison Center is staffed by health care pros who’ve completed stringent training in toxicology. The poison control number, 1-800-222-1222, is the same throughout the country and routes to the nearest poison control center. —*Elaine Vitone*

*Hear the origin story of these centers and Mr. Yuk, the poster child of accidental poisoning, on Pitt Medcast at [pi.tt/pittmedcast](http://pi.tt/pittmedcast).*

## Big Stakes, Big Stats

By Sharon Tregaskis

When we hear about clinical trials, we might picture doctors and patients partnering to test new therapies. What we might not think about are the teams of other professionals and scholars who make those studies happen and figure out what the results mean.

In the search for new and better treatments, those roles are critical in normal times. In a pandemic, the work becomes all the more urgent.

Take, for instance, **Maria Mori Brooks**. In the three decades since she earned her PhD in statistics, the Pitt professor of epidemiology and biostatistics has proved her mettle, making sense of the numbers generated by multicenter research collaborations. As codirector of the Graduate School of Public Health’s Epidemiology Data Center, she’s helped dozens of National Institutes of Health–funded scientists design and optimize data collection and management, as well as formulate computing and statistical methods for clinical studies. She also serves as principal investigator for the data coordinating centers of three multicenter investigations.

Still, nothing quite prepared Brooks and her colleagues for their roles since June with ACTIV-4 Antithrombotics, a set of clinical trials funded through Operation Warp Speed. The study is part of the U.S. government’s public-private partnership Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV). ACTIV-4 Antithrombotics evaluates how well blood thinners (anticoagulants) work in treating COVID-19 patients.

The trials consortium will yield outcomes from three distinct COVID-19 patient populations—inpatient, outpatient and post-discharge.

Many COVID-19 deaths are caused by microscopic blood clots.

Before this pandemic, doctors often gave patients low-dose blood thinners during extended hospitalizations to prevent clots that might form because of reduced physical activity. Given that COVID-19 clotting can cause lung damage, strokes and heart attacks, higher-dose blood thinners seemed like a good idea for people with COVID-19.

Yet, that was just a hunch. Or a hope. The treatment had not been vetted in clinical trials, so physicians didn’t have any evidence to guide their practice.

“Some people are treating their patients with anticoagulants and some aren’t,” **Alison Morris**, Pitt’s division chief for pulmonary, allergy and critical care medicine, noted in January. But now, ACTIV-4 Antithrombotics inpatient arm has given doctors some answers.

The trial randomized participants, with a goal of enrolling 2,000, to receive either high-dose heparin or the standard anticoagulant regimen used as a preventive among hospitalized people.

ACTIV-4 Antithrombotics inpatient arm is one of three collaborating multicenter studies of hospitalized patients—the others are based in the U.K. and Canada—that together span 300 hospitals on four continents, all working in parallel on the blood thinner question.

A typical multicenter clinical trial team spends years detailing proto-







cols and enrollment plans, garnering approval from institutional review boards and vetting contracts. Patient recruitment, data collection, analytics and the publication of findings often span multiple five-year grant cycles. With ACTIV-4 Antithrombotics, everyone involved has hustled like never before, says epidemiologist **Steve Wisniewski** (PhD '94), who leads coordination of the entire ACTIV-4 Antithrombotics effort.

“The train tracks were being put down as the train was coming down the path,” says Wisniewski, who is Pitt vice provost for budget and analytics and codirector with Brooks of the Epidemiology Data Center. The EDC team works with Berry Consultants, a private firm that analyzes multicenter clinical trial data and has aggregated all of the data from ACTIV-4 Antithrombotics and its partners abroad.

Brooks is lead statistician for the outpatient protocol, which was initiated in September 2020. For the inpatient protocol, which launched first, she was responsible for presenting preliminary results to the ACTIV-4 Antithrombotics data safety monitoring board (DSMB). DSMBs evaluate issues like study integrity and safety for participants, explains Brooks from behind the closed door of her home office. (Like many families, hers has been schooling and working remotely since March 2020.)

She's served on a number of external DSMBs in the past two decades. For the conventional clinical trial, such reviews might occur every six months.

For the inpatient population, Brooks presented monthly, yielding two major announcements in a matter of months:

In late January, the NIH announced some good news. Among those hospitalized with moderately severe infections, full-dose heparin reduced their need for mechanical ventilation and other life support. The results were convincing

enough to close enrollment for the inpatient arm.

This was after the DSMB closed recruitment of critically ill patients in late December; interim analysis suggested that it was futile to give full-dose heparin to these patients—the treatment could even worsen their condition.

Pitt physicians have taken major roles with ACTIV-4 Antithrombotics, as well: **Matthew Neal**, the Roberta G. Simmons Associate Professor of Surgery, cochairs the ACTIV-4 Antithrombotics inpatient study; **Frank Scirba**, a professor of medicine and education, cochairs the outpatient study; and Morris cochairs the ACTIV-4 Antithrombotics post-discharge study.

Says Morris: “Despite the hopefulness around the vaccine, people are still getting sick and dying. We still really need studies like this to figure out how to treat patients.”

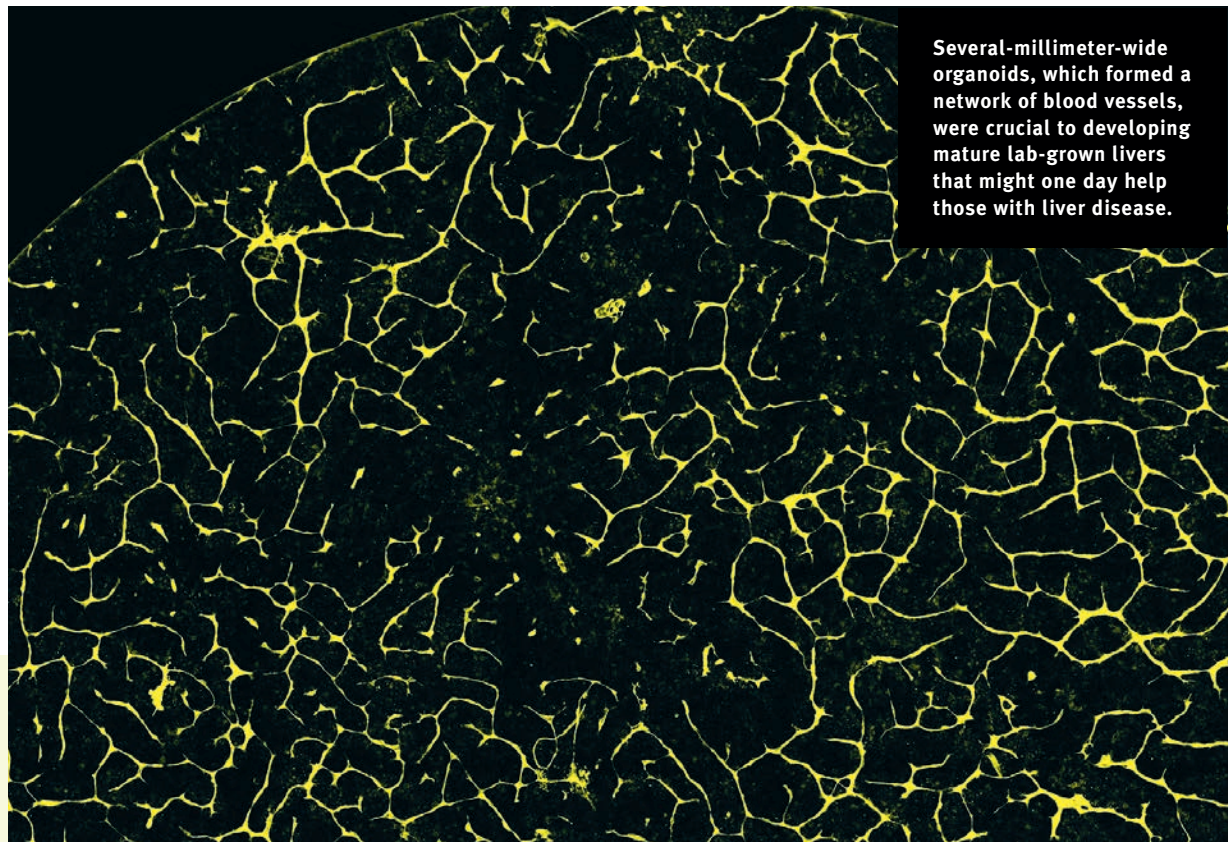
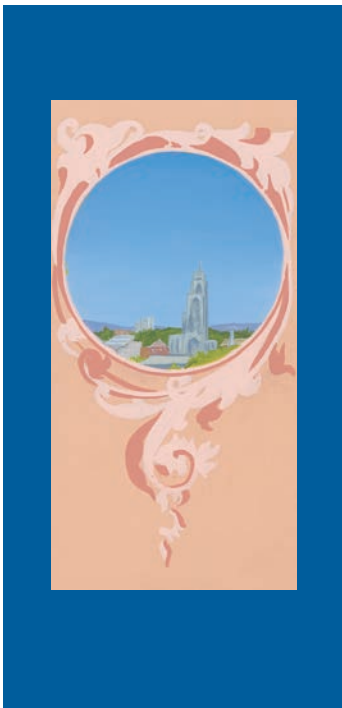
## Wheels Up

The conventional way to organize clinical trials compares a single treatment to placebo and takes years to generate results. All of the study infrastructure—enrollment protocols, electronic records and analytics—serves that single comparison. It's as though each airplane flying into a region had its own control tower and airport, and those airports were torn down after passengers disembarked.

ACTIV-4 Antithrombotics, which evaluates the effectiveness and safety of treating COVID-19 patients with varying types of blood thinners, is a multiplatform adaptive trial. This is the new, high-powered and, frankly, more sensible, way to get answers about treatments. In tandem with the Pitt co-led international REMAP-CAP platform (which has pivoted from pneumonia studies to COVID-19 trials), it uses a single, overarching experimental infrastructure to briskly collect a wide range of clinical and laboratory data. Think of it as an international airport of randomized clinical trials, serving passengers of existing airlines, as well as those still to be founded.

As additional questions arise regarding blood thinners, ACTIV-4 Antithrombotics will tackle those, too. —SRT

*Devoted to noteworthy happenings  
at the medical school*



Several-millimeter-wide organoids, which formed a network of blood vessels, were crucial to developing mature lab-grown livers that might one day help those with liver disease.

## HEALTH AGE IN SIGHT

Earlier this year, the University of Pittsburgh joined the Leap Health Breakthrough Network. By signing a multiyear partnership with the nonprofit Wellcome Leap, Pitt has committed to partnering to solve the world's most serious health challenges at record speed.

Pitt's goals include breakthrough scientific and technological solutions in human physiology and bioengineering within a decade.

"With our deep bench of health sciences innovators and bioengineering pioneers, Pitt can and will help fuel this ambitious global push to realize breakthroughs for society's gain," says Pitt Chancellor Patrick Gallagher.

The network's mission is to spark a "Health Age," using the organizational model of the DOD's Defense Advanced Research Projects Agency (DARPA) to fast-track potentially transformational science.

"Science and engineering should move at the pace of breakthroughs, not the pace of contracting," says Wellcome Leap CEO Regina E. Dugan, who was a leader at DARPA. One of Wellcome Leap's first funding efforts is its \$50 million Program in Human Organs, Physiology and Engineering (HOPE). That program aims to leverage the power of bioengineering to advance work on stem cells, organoids and whole organ systems and to forge connections to answer the "what-ifs" of health care.

"The University is honored to be joining such an incredible initiative," says Pitt's Anantha Shekhar, the John and Gertrude Petersen Dean and senior vice chancellor for the health sciences. "The global scale of this effort is intentional—and absolutely essential if we want to solve some of the most daunting health care challenges of our time."

—Amerigo Allegretto

## Tiny Livers

Five years ago, **Mo Ebrahimkhani** wondered if he could program stem cells to develop into mature lab-grown livers that would increase the lifespan of those with liver disease. The associate professor of pathology and member of the Pittsburgh Liver Research Center found he could combine machine learning, genetic engineering and synthetic biology to generate tissue that formed into almost mature mini-livers. His lab was able to generate the tissue in just 17 days, extending the lives of mice with failing livers.

Through machine learning, Ebrahimkhani's team identified genes vital to producing the multiple mature cell types a functioning liver requires. They then altered the genes to turn immature liver cells into adult organoids—lab-grown mini-organs—in a fraction of the time mature human livers develop during pregnancy. These several-millimeter-wide organoids, which formed a network of blood vessels, were able to synthesize and metabolize nutrients, produce blood proteins and regulate bile. Engineering a vascular system is key to successful implantation and often something organoids are missing, says Ebrahimkhani.

The organoids might be used to test new drugs, model diseases and eventually reduce the need for transplant organs. "With tissue by design, you can change the design to fit different applications," he says. —Samantha Paige Rosen



TOM ALIANY/UNIVERSITY OF PITTSBURGH

## Overheard

### Catherine Chappell Says Treat Hepatitis C in Pregnancy

Recruiting pregnant women for a drug trial is no small task given the potential risks to the mother and fetus. But **Catherine Chappell** was convinced pregnancy was an ideal time to treat women with active hepatitis C infections. Chappell, assistant professor of obstetrics, gynecology and reproductive sciences, ran a phase 1 clinical trial with nine pregnant volunteers who were positive for the virus. The women were given the antiviral drug cocktail ledipasvir/sofosbuvir starting in their second trimester. All were cured of the virus and gave birth to healthy, hepatitis-free babies. The results were published in a September 2020 issue of *The Lancet Microbe*.

#### What inspired you to do this study?

I had worked in the HIV clinic for four years during my fellowship. We started treating people living with HIV [who were also positive for] hepatitis C with these really fantastic medications. We see about 200 pregnant women a year at UPMC Magee-Womens Hospital who have active hepatitis C infection, and so I thought: “Why aren’t we using this [drug] in pregnancy?” We know if we treat moms for HIV during pregnancy, we can also prevent perinatal transmission of HIV. I thought this might also work for hepatitis C, because you could cure women for hepatitis and prevent perinatal transmission all with a single course of these medications.

#### Why is pregnancy an ideal time to screen and treat women for hepatitis C?

A lot of women don’t come in for routine [gynecological] care, especially women who may have a history of opioid use disorder or injection drug use. Pregnancy is a time when women are uniquely engaged in care, arguably much more than during any other time in their reproductive life. So it is a perfect window of opportunity for hepatitis C screening and hopefully, in the future, treatment as well.

#### What’s next?

We are currently doing a phase 1 study of sofosbuvir/velpatasvir (which is effective for all six genotypes of hepatitis C virus, whereas ledipasvir/sofosbuvir only works for four of them). Meanwhile, we are planning a large multicenter study of 100 pregnant women where we are going to further evaluate the safety and efficacy of sofosbuvir/velpatasvir during pregnancy. Pitt will be the primary site, and [we are] coordinating with six others around the country and one in Canada. —Christina Frank

## PENNELL TO CHAIR NEUROLOGY

On July 1, **Page Pennell**, an MD, will step in as chair of the Department of Neurology. Pennell is currently a professor of neurology at Harvard University and vice chair for academic affairs in Brigham and Women’s Hospital’s Department of Neurology. Her research has focused on maternal and fetal outcomes of women with epilepsy, antiseizure medication use during pregnancy and the effects of neuroactive steroids on seizure provocation.



Pennell serves as the principal investigator on the nationwide Maternal Outcomes and Neurodevelopmental Effects of Antiepileptic Drugs study, which evaluates the long-term effects of in utero and infant antiepileptic drug exposure.

At Pitt Med, she will work to further the mission of the neurology department, which is to accelerate the understanding of and treatments for many neurological disorders and conditions.

## Faculty Snapshots

**E**arlier this year, several Pitt Med docs were elected into the American Society for Clinical Investigation. The new members include Walid Gellad, an MD and MPH who is associate professor of medicine and health policy, Jacqueline Ho, an MD, MSc associate professor of pediatrics, Philana Ling Lin, an MD, MSc associate professor of pediatrics, Heath D. Skinner, an MD, PhD associate professor of radiation oncology, and Matthew Steinhauser, an MD associate professor of medicine.

—Sarah Stager



Gellad



Ho



Lin



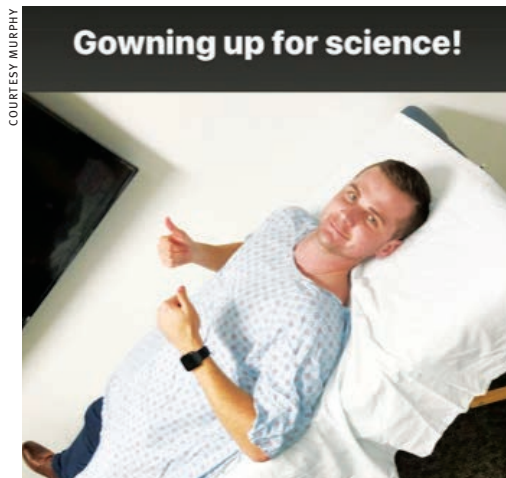
Steinhauser



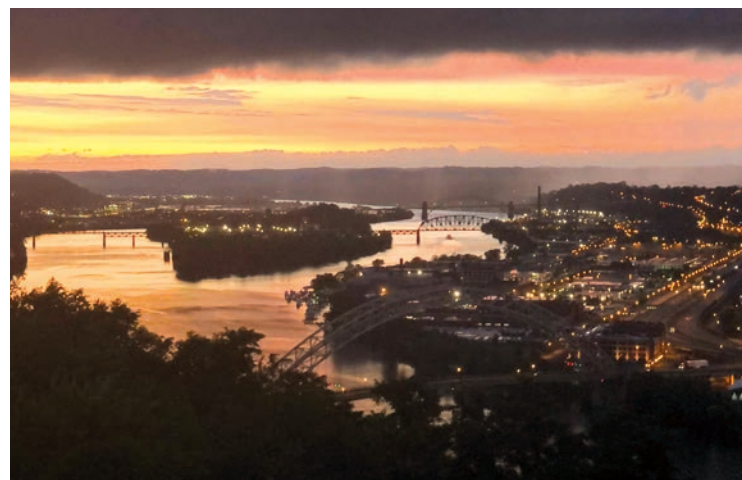
Skinner



Pittsburgh native Joseph Murphy likes to show off Pitt and the region. Check out his Instagram campus tour and more: @pittmed\_students.



COURTESY MURPHY



## No Average Joe

Joe Murphy's Pitt Med experience has been defined by connection and community. A Pittsburgh native and member of the Class of 2022, Murphy uses his role as a student ambassador to create mentor relationships between upper and lower classmates, as well as current first-year students and med school applicants. Murphy, 27, majored in chemistry at the University of Virginia, but his desire to interact with patients led him to pursue medicine. To that end, he is part of Pitt Med's Longitudinal Alliance Program (LAP), which matches med students with patients who have chronic health issues. Throughout their four years of study, students learn from the patients and vice versa. Murphy follows a patient with muscular dystrophy, who helped him recognize obstacles patients often face in navigating the health care system. When Murphy's classmate Sean Dooley, a fellow third-year, asked students to grow mustaches to raise money for charity, Murphy raised \$375 for the Little Hercules Foundation for Duchenne Muscular Dystrophy in honor of his LAP partner patient.

Murphy's research focuses on finding a drug treatment for nonalcoholic fatty liver disease, but he hasn't ruled out any residency track. "In your third year, you're really seeing what it's like to be a physician in whatever field you're rotating through," he says. "You have to embrace the attitude that your mind can always be changed, and you can always find something that you're passionate about." —CF

## What Protects Memory with Age?

When embarking on a 14-year study exploring aging, memory impairment and amyloid plaques, **Beth Snitz**, associate professor of neurology at Pitt Med, took the opposite approach to most researchers in this area: She asked not what factors predict disease, but what seems to protect older adults from it. Collaborating with Pitt Med colleagues in six different departments, Snitz followed 100 volunteers from their early 80s to their mid-90s—the "oldest-old" as this group is often categorized.

The study, published in *Neurology*, examined why some of the "oldest-old" never develop amyloid plaques of Alzheimer's disease when the majority (66%) do, and why some maintain cognitive resilience even with plaques. By pairing thinking and memory tests with PET scans, Snitz discovered that participants who initially performed well on tests were not as likely to develop cognitive problems despite having amyloid plaques. Participants with APOE e2, an uncommon gene variant linked to a decreased risk of Alzheimer's disease, were six times less likely to develop amyloid plaques. There aren't many studies of this group, but "they're the best examples of resilience around," Snitz says. Understanding their resilience "may well help identify ways to prevent dementia." —SPR

## FOOTNOTE

They're good. But don't just take it from us! The National Cancer Institute (NCI) has rated the UPMC Hillman Cancer Center "exceptional"—its highest possible rating. The Hillman is one of 51 cancer centers in the country to achieve this designation. The NCI has also provided the Hillman with its largest grant to date—\$30 million, which will go toward bettering cancer prevention, diagnosis and treatment.



Marjery Cooney, David Johnson and Mark Miko have helped keep Pitt people safe during the pandemic.

## SCOUR AND SANITIZE

Marjery Cooney squatted on the floor of Alan Magee Scaife Hall to paste a sticker that showed two people outlined in blue, with an arrow pushing them apart. “Observe a minimum 6 feet from person to person at all times,” it read. She used a scraper to smooth out the air bubbles, then moved to the next one. It was March 2020.

“Just to do stuff like that, knowing that the world was changing, was eerie,” says Cooney, a full-time member of the Scaife Hall cleaning crew since 2004.

As the world changed, so did the cleaners’ routines. The crew has been putting in overtime for more than a year now to ensure the safety of everyone who enters the building. Crew members disinfect railings, elevator buttons, bathroom areas and other high-touch points throughout the day with a new product that kills the virus within 5 seconds. And the staff now includes someone devoted to watching over hand-sanitizers.

They had fewer and fewer tenants, says Jamie Giovengo, “but we did more and more disinfecting to make sure everyone stayed safe.” Giovengo

directs the cleaning crew that covers Scaife Hall and Biomedical Science Towers East, West and South.

“You never thought you could clean enough or sanitize enough,” says Cooney.

Mark Miko, a member of the cleaning crew since 1988, says they try to create a comfortable environment by being visible. The custodians want to “give people as much reassurance as we can that things they use are being cleaned on a regular basis,” he adds.

Giovengo says she is proud of how her team adjusted under the uncertain circumstances; and the crew likewise says they’re grateful to their management for keeping them safe and addressing concerns like time off for childcare or sick leave.

“They were always, always there for our concerns, time out, time off,” Miko says. “They couldn’t have been any better.”

—Sarah Stager

—Photo by Tom Altany/University of Pittsburgh

# Disparity Dashboard



The Primary Care Equity Dashboard (which looks nothing like this) will give VA hospitals a bird's-eye view of their quality of care. It will also suggest strategies for addressing health disparities.

## TOOL KEEPS TABS ON CARE INEQUITIES IN REAL TIME BY ELAINE VITONE

**F**or some time, Leslie Hausmann (PhD '05) and her colleagues have had questions about patient care at the VA.

They wondered, how many patients are current on their flu vaccines? And their cancer screenings? How many of those diagnosed with hypertension are getting their blood pressure under control? How many of those with diabetes are keeping their hemoglobin in check?

In short, they wanted to pinpoint, whose care was falling short?

And, are there patterns? Does where patients live make a difference? What about gender, race and socioeconomic status?

So Hausmann and others at the Center for Health Equity Research and Promotion (CHERP), high on the hill in Oakland's Pittsburgh VA Medical Center-University Drive, started toying with the idea of a health disparities "dashboard."

By harnessing electronic medical records, they thought, perhaps they could get a bird's-eye view of standard benchmarks of quality care at their facility.

Hausmann, a Pitt associate professor of medicine, studies health disparities and their contributing factors, particularly bias and discrimination. (PLOS One, by the way, recently published her study of patient experiences with perceived discrimination.)

When she discusses her work with clinicians, they express interest and concern. "But they just don't feel like they have the tools to support changes in practice to address [disparities]," or even identify what disparities are affecting their patients in the first place, she says.

The dashboard project started humbly enough, with some clunky yet painstakingly coded spreadsheets Hausmann generated in partnership with VA leaders across the state. That project led to a massive, one-year effort

focused on hypertension across nine VA centers. The results were encouraging: small but significant declines in both the total number of Black veterans with severe hypertension and in Black/white hypertension disparities.

As Hausmann shared the good news with colleagues, she started getting calls requesting her how-to's. It was soon clear that someone should make this national, she says.

"And I decided, 'Well, if nobody else is going to do it, I'm going to do it.'"

With support from the VA Innovators Network, Hausmann led the development of a prototype using the national VA corporate data warehouse. With that in hand, she secured funds for a five-year endeavor to streamline the tool to be fully inte-

### It was soon clear that someone should make this national.

grated into the primary-care workflow of VA facilities nationwide. She's now in year three of the project, which is funded by the Veterans Health Administration's Office of Health Equity and Office of Research and Development.

The dashboard, dubbed the Primary Care Equity Dashboard, allows a facility to see where they stand in quality measures and also compare themselves to other VAs across the country. "Then it allows them to do an equity deep-dive into each of those measures," Hausmann says, to understand which demographic groups need attention and then identify exactly which patients they should reach out to.

From there, dashboard users can access resources to figure out what concrete steps to take next. For example, a tab within the dashboard contains a vast library of quality-improvement tools and resources, carefully culled from the medical literature and organi-

zations aimed at addressing disparities. "We've compiled more than 200 disparities interventions for specific diseases—some focusing on patients, some focusing on providers," she says.

Quality improvement efforts often hit a wall when it comes to assessing impact, she says. The common refrain is, "We never know if what we're doing makes a difference. It's too hard to collect data ourselves—we're too busy." So the team built, right into the dashboard, a tracking mechanism allowing clinicians to watch their progress over time.

As a test drive for the dashboard, VA Pittsburgh Healthcare System is tackling racial disparities related to how well patients with cardiovascular disease are keeping up with their statin medications. The dashboard

revealed that in late 2020, white patients at the University Drive facility were 3% above the VA's national average, while Black patients were 18% below.

With funding from the Veterans Health Foundation, a team is using the dashboard to study the effectiveness of two approaches to addressing the issue: a pharmacist-led educational session and a telephone reminder for medication refills. Results are expected in early 2022.

As the team puts the dashboard to work on a national scale, Hausmann hopes it will better equip providers to dismantle some of the systems that contribute to disparities—and to make that work a priority.

"Because right now, people learn about quality improvement in general, but that's often not done through the health equity lens," says Hausmann. "This tool will shine a very bright light on the health equity component to make that shift." ■

Sterile Vision mentor  
MaCalus Hogan demos  
the new technology.



# PROBLEM SOLVERS

STUDENTS BUILD SOLUTIONS  
FOR THE REAL WORLD

BY ADAM REGER

Last year, Stephen Canton, Clinical Scientist Training Program trainee and fourth-year med student, and Dukens LaBaze, a UPMC orthopaedic surgery resident, took second place at the 2020 Randall Family Big Idea Competition, which awards \$100,000 to student inventors. Their prize-winning entry: Sterile Vision, a device that uses machine learning to keep track of surgical equipment in the operating room.

Standing among the winners at the ceremony, Canton was struck by how many of his fellow Pitt Med students were there with him. The competition draws entries from across the University. The first- and fourth-place teams also included Pitt Med students Noah Pyles (Class of 2022), James O'Brien (Class of 2022) and Jonathan Cohen (an MSTP student), who developed Polycarbin to reduce medical waste, as well as Eva Roy (Class of 2022) and Anjana Murali (Class of 2023), who built a platform called Patient Experience Navigator.

Canton recalls his reaction: "That's huge, right?"

Though impressed by his fellow med students, Canton was hardly surprised.

As a first-year med student with an undergraduate degree in bioengineering, he had worked closely with John Maier, director of research and development for family medicine, to establish the Bioengineering, Biotechnology and Innovation (BBI) concentration.

BBI taps into a deep well of medical student talent that Canton observed. Drawing on

resources from across Pitt, the concentration supports students working in such areas as bioengineering, biomedical informatics and tissue engineering, offering everything from mentoring to longitudinal research support. About 20 first- and second-year students are actively engaged in the concentration.

"The people attracted to this like to look at problems and find solutions," he says.

But the know-how students might apply to solve a clinical problem is quite different from what's needed to transform an idea into a device or procedure that can actually have an impact on patients' lives.

Through faculty mentoring and a recommended course, Idea to Impact, students learn about the commercial channels their ideas will have to travel to reach the marketplace.

The O2 Cube, a solar-powered device that fills oxygen cylinders, is a perfect example of an innovation that is poised to make a difference in the real world.

Its inventor, James Newton, will complete his MD as well as his MS in bioengineering from Pitt this spring. After learning of the desperate need for oxygen in low-resource areas, he and his partners designed the O2 Cube to furnish hospitals with inexpensive oxygen. Through events like the Blast Furnace pitch competition offered by Pitt's Innovation Institute, they secured funding that allowed them to test an early version of the O2 Cube in Malawi, where lack of oxygen can exacerbate health problems like pediatric pneumonia.

"We learned a lot from that experience,"

Newton says. "We came back and pivoted on the design, and we've been hacking away at prototyping this solar-powered system."

The students were able to use the Swanson School of Engineering prototyping facilities for their pilot device. And Pitt's Innovation Institute and sciVelo are available to help guide their inventions toward the marketplace.

BBI's emergence is part of a broader shift toward recognizing innovation as important academic work, Maier notes. Pitt Med faculty can now include patents and company formations in their promotion applications, alongside journal publications and grants. And the professional background of Anantha Shekhar, the John and Gertrude Petersen Dean of the School of Medicine and senior vice chancellor for the health sciences, who joined the University in June 2020, includes founding several biotech companies.

"The dean appreciates how this type of work fits into a model of developing new knowledge and bringing it to bear on people," Maier says.

Both Canton and Newton will continue their entrepreneurial journeys as they pursue careers in medicine. Newton formed a company, Lean Med, in 2018, and has secured patents for inventions used in sinus operations.

And Sterile Vision was recently accepted to AlphaLab Health, a six-month accelerator program that provides up to \$100,000 of support for innovators.

"I'm riding the wave," Canton says. "I just love this stuff." ■





Kiani (shown here) and Ebrahimkhani (lower right) have devised a new way to prevent the immune response from destroying gene-therapy viruses.

# SAFE DELIVERY

GENE-EDITING APPROACH KEEPS CRISPR KEEN

BY ERIN HARE

Maybe you've heard about CRISPR-Cas9, that powerful method of editing genomes that uses an RNA-guided enzyme. Well, there's a little problem with it.

Gene therapy generally relies on viruses to deliver genes into a cell. In the case of CRISPR-based gene therapies, molecular scissors can then snip out a defective gene, add in a missing sequence or enact a temporary change in its expression. But the body's immune response to the virus can thwart the whole endeavor.

To overcome that obstacle, researchers at the University of Pittsburgh created a system that uses CRISPR in a different way. Their system briefly suppresses genes that are related to antibody production, specifically antibodies to the adeno-associated virus (AAV), which is often used as a delivery vehicle in CRISPR.

Results published in the September 2020 *Nature Cell Biology* show that the technique allows the virus to dispatch its cargo unimpeded.

"Many clinical trials fail because of the immune response against AAV gene therapy," says study cosenior author Samira Kiani, associate professor of pathology at Pitt and member of the Pittsburgh Liver Research Center (PLRC) and McGowan

Institute for Regenerative Medicine. "And then you can't readminister the shot because people have developed immunity."

So Kiani and her longtime collaborator Mo Ebrahimkhani, associate professor of pathology at Pitt and a member of PLRC and the McGowan Institute, set out to modify gene expression related to the body's immune response to AAV. But this gene is important for normal immune function, so the researchers didn't want to shut it down forever, just tamp it down momentarily.

Because CRISPR is such a convenient system for editing the genome, the pair figured they would put it to use for altering the master switches that orchestrate genes involved in immune response.

"We're hitting two birds with one stone," says Ebrahimkhani. "You can use CRISPR to do your gene therapy, and you can also use CRISPR to control the immune response."

When they treated mice with their CRISPR-controlled immune suppression system and then exposed them to AAV again, the animals didn't make more antibodies against the virus. These animals were more receptive to subsequent AAV-delivered gene therapy

compared to controls.

Beyond gene therapy, the study also shows that CRISPR-based immune suppression can prevent or treat sepsis in mice, highlighting the potential for this tool to be broadly useful for a range of inflammatory conditions, including cytokine storm and acute respiratory distress syndromes, both of which can crop up with COVID-19, though more studies are needed to engineer safety features.

"The main goal of this study was to develop CRISPR-based tools for inflammatory conditions," says study lead author Farzaneh Moghadam, a PhD student in Kiani's lab. "But when we looked at bone marrow samples, we saw that the group treated with our tool showed a lower immune response to AAV compared to the control group. That was very interesting, so we started exploring how this tool contributes to antibody formation against AAV and could potentially address safety and efficacy concerns with gene therapy trials."

Kiani has cofounded SafeGen Therapeutics with the goal of bringing this technology to the clinic. ■





# WHAT A FINISH!

THE CLASS OF 2021 GRAPPLED  
WITH THE UNEXPECTED

BY GAVIN JENKINS



**S**now flurries had fallen overnight but hadn't stuck to the ground. It was Monday, March 15, 2020—four days after the World Health Organization had declared COVID-19 a pandemic. Eve Bowers walked around UPMC Presbyterian in the cold, searching for an open entrance. As the Pitt Med student pulled one locked door after another on that gray morning, she wondered if she would be sent home when she finally reached the otolaryngology department, where she was scheduled to report for an acting internship.

Rounding the corner on Lothrop Street, Bowers noticed a group of security guards standing in front of the emergency department entrance. They wore face masks (an unfamiliar sight at the time). As Bowers passed the group and entered the hospital, she hoped to be sent home.

From what she had heard, the medical school was going to close. She thought it would be about two weeks, and then everything would go back to normal.

A Sewickley native who had graduated from the University of Pennsylvania in 2016, Bowers wanted to leave the city and its lingering winter weather for a place where she'd feel warm and safe from COVID-19.

At the otolaryngology department, a resident granted Bowers her wish and told her to leave. For a moment, Bowers felt like a kid learning about a snow day. "I thought: 'Two-week vacation!' But I also felt stressed because it was a pandemic." At her apartment later, Bowers was overwhelmed by conflicting emotions. The pandemic was "insane and somewhat thrilling," yet the uncertainty frustrated her. "It almost felt like the end of the world," Bowers said.

She packed some clothes and food and drove to North Carolina to stay with her sister. When she returned to Pittsburgh three months later, she was itching to get back inside a hospital, this time as a fourth-year medical student.

## NOT A TIME FOR SENIORITIS

During the fourth year of medical school, students study for the Step 2 CK (clinical knowledge) exam, prepare residency applications and complete their away rotations, which are essentially monthlong interviews at institutions across the country. It's hardly a breeze. However, it's also a time when students tend to have more control over their academic schedule, and many make the most of travel opportunities, including rotations abroad.

Stephen Canton, a Clinical Scientist Training Program (CSTP) student, compares it to senior year of high school. A feeling sets in that's "similar to senioritis," said Canton, 29. Most students are advised to take advantage of the flexibility during their fourth year to catch their breath, he adds, because "they know how strenuous residency can be."

But, of course, nothing transpired as it was supposed to this past year. Travel plans and research projects were canceled. Students hurried to fill their schedules with rotations and electives they needed to graduate. This spring, the graduates enter a profession that's on the front lines of a pandemic.

As Vice Dean Ann Thompson put it:

"They'll be telling people stories about this when they're 90."

In spring 2020, when Pitt Med students were away during the extended spring break, administrators held daily meetings to figure out how they could maintain academic progression for students and safety for everyone at the same time, according to Jason Rosenstock, associate dean for medical education.

Each step was uncharted, so Rosenstock and others at Pitt Med spoke each week to their counterparts at Harvard, Yale and other medical schools about how to move forward. They also attended a series of Association of American Medical Colleges webinars on providing clinical instruction remotely.

Pitt Med's administration essentially restructured its curriculum on the fly—what would normally be years of work, they accomplished in a matter of days. When students returned in May, Pitt Med replaced live patient interactions with simulations and added a telemedicine training program. The school also expanded the number of courses that would qualify for an acting internship. "This gave them scheduling flexibility and made it easier for them to graduate," Rosenstock said.

When the pandemic began, the current third-year students (Class of 2022) were about to start clinical rotations and take their Step 1 exams. Both got pushed back by several months.

Frustration was palpable among all the classes. To keep students informed, Rosenstock coordinated with leaders from each year to keep everyone in the loop and updated students nearly every day through email. "He has done an amazing job," Canton said of Rosenstock. "He really let us know that he was hearing our concerns."

## WILL I BE READY FOR RESIDENCY?

Rosenstock said he received two questions more than any others from fourth-year students:

One: Will I be ready for residency?

The answer—yes. In May, fourth-years go through Pitt Med's annual residency boot camp, where they practice situations they'll face as physicians, as well as sharpen nontechnical skills like time management. This year, Pitt Med has added supplemental training on



Stephen Canton (left, shown pre-pandemic) is a Clinical Scientist Training Program student and an entrepreneur.

COVID-19 to its regular boot camp curriculum. On their rotations, students had not been allowed to treat patients who tested positive for the virus.

The other popular question:  
How will I match?

So, there was good and bad news. The good news: Because away rotations were canceled to prevent further spread of COVID-19, every medical student in the country was in the same boat. The bad news: Without away rotations, students couldn't showcase their skills and win over residency program decision-makers. In the past, away rotations have helped students who had high scores on the first of the national boards, also known as Step 1, but low scores elsewhere.

"Do well on a rotation elsewhere, and they'll likely say, 'Let's take them,'" Thompson said.

A lot was riding on virtual interviews.

## SHOWING UP

When the pandemic began, and the fate of their academic future was uncertain, the Class of 2021, and the students from other years, stepped up to battle the spread of the novel coronavirus. Some students served as case investigators and spoke with patients who had been diagnosed with COVID-19 about their symptoms. Others worked as contact tracers.

Along with other Pitt Med students, fourth-years raised money for charity, delivered medication to older residents and provided childcare support for clinicians.

They also, with their classmates and mentors, stood up for social justice in the wake of George Floyd's death.

When Rafa Ifthikhar and other social medicine fellows heard about the "White Coats for Black Lives" protest, they got the word out to other students over social media. It was almost noon on June 5—a warm, cloudy day—as Pitt Med students from all classes gathered outside Alan Magee Scaife Hall. That was the first time many of them had seen one another in person



Several members from the Class of 2021 participated in the “White Coats for Black Lives” protest on June 5 along with classmates and mentors.



Jessica Z.L. An and Kirkland An changed their wedding plans because of COVID-19. (Courtesy @laurachengphoto)



Brady and Anna Marburger with their daughter, Charlotte.

since mid-March. A fourth-year student and aspiring ob/gyn, Ifthikhar noticed that the group gathering on Terrace Street had a “weird reunion” vibe.

More students arrived than she’d anticipated. The mood became more somber as the group walked down the hill toward the lawn in front of UPMC Presbyterian. Facing Fifth Avenue, the students merged with clinicians wearing white coats and face masks. People held signs that read, “Racism is a public health crisis” and “Black Lives Matter.”

The crowd knelt for 8 minutes and 46 seconds—the amount of time Minneapolis police officer Derek Chauvin pressed his knee into Floyd’s neck until he died on May 25.

“All you could hear were the cars going by,” said Ifthikhar, 26. “It was a good event, but if substantive change doesn’t come out of it, then it was just really performative.”

Throughout the summer, University administrators—including Anantha Shekhar, an MD/PhD, and John and Gertrude Petersen Dean of the School of Medicine and senior vice chancellor for the health sciences—met with Black students, faculty and staff to talk about police brutality and systemic anti-Black racism in society. Administrators also invited students of Asian descent to participate in video conference support sessions to combat the rise in racism and violence toward members of their communities.

Canton, who earned a bachelor’s degree in bio-engineering from Pitt, spoke to administrators as part of a panel on racism last summer. Afterward, Canton met one-on-one with Shekhar, who had started his new role on June 1, 2020.

“In our first meeting, I was immediately moved by how down-to-earth and warm he was for a person in his position. Many of the concerns and questions that I presented to him, I have already seen be put into action,” Canton says.

Pitt students from throughout the University

continue to be a catalyst for Pitt’s antiracism and equity efforts.

## LIGHTS, CAMERA, ZOOM

Jessica Z.L. An sat at a table in the “all-purpose room.” Typical for one-bedroom apartments in East Liberty, it combines a kitchen, living room and dining room. Some Pitt Med students took advantage of conference rooms and offices at Alan Magee Scaife Hall for residency interviews. An chose to interview from home.

With so much at stake for residency, An created a setting that could rival anything a virtual panel guest on CNN would use.

An’s husband, Kirkland An, who works for Pitt’s Office of Communications and Marketing as an editorial production specialist, bought her a laptop stand and a ring light. As she answered questions from internal medicine and pediatrics physicians, An looked into her computer’s camera, which rested at eye level. The light shined onto her face and the white wall behind her.

The virtual residency interviews might last up to eight hours, with a student being transferred from one virtual breakout room after another to be questioned by physicians.

There was a five-second delay when An was transferred to another breakout room. As the next room loaded, she stood for the first time in an hour. The 24-year-old sipped from a glass of water, and then sat again before another physician appeared on her computer screen.

“The interviews were rapid paced,” An said later. “And since it was on Zoom, you didn’t always get a break.”

When there isn’t a pandemic raging, fourth-year med students fund their own away rotations and residency interviews. They spend a small fortune on airfare, lodging and food.

Students found other opportunities to make lemonade from lemons, too.

Friendly and outgoing, An had been looking forward to meeting fellow medical students as well as residents and attending physicians on the interview trail. Instead, An debriefed her husband in between interviews.

“I would turn off the ring light and go into the other room to talk with him,” An said. “Sometimes, we’d walk around the block.”

Kirkland An took notes of their debriefing sessions; his notes helped An finalize her rank list of where she’d like to match.

There is not a cap on how many residency programs to which a med student can apply. Yet the cost of applying and traveling can limit options. This year, virtual interviews gave med students the opportunity to apply to more residency programs than usual.

Thompson said she heard that one program in the country received 800 applications for fewer than 20 residency spots.

“I’ve heard about students applying to every single program in the country,” Thompson said.

She added that it was a challenge to persuade people that applying to 50 programs was unnecessary; Pitt Med students typically land a spot in one of their top three choices. “If they’ve done well here, they’re going to be viewed as first rate,” she said. “Our reputation serves them well.”

Canton said he followed Pitt Med’s recommendation himself. However, the Wilksburg native understands why some of his classmates applied to as many programs as they could. Especially those vying for more competitive specialties, like ophthalmology, dermatology, plastic surgery and neurosurgery.

“At some institutions, there are three slots for plastic surgery and 15 for pediatrics, which is not an indication of the importance of the

specialties, just simply a result of supply and demand,” he said.

Brady Marburger found a silver lining too.

In July, Marburger’s wife, Anna, gave birth to Charlotte. If the away rotations hadn’t been canceled, the 27-year-old, Harmony, Pennsylvania, native probably would have gone on a few monthlong trips.

“It was really nice to have an interview from 8 a.m. to noon, and then be able to spend the rest of the day with Charlotte,” he says.

## PANDEMIC HITS HOME

The residency interview process was painful for some. One Pitt Med student, we’ll call her Emily, was diagnosed with COVID-19 in late November—less than two weeks before her first interview.

Emily suffered from shortness of breath and gastrointestinal symptoms. She was never hospitalized, but her neurologist thinks she had COVID encephalopathy—an inflammation of the brain that can cause confusion and excessive sleepiness—and should have been admitted.

Emily was diagnosed with a memory deficit because of COVID-19. She mostly recovered from the virus in early December, but her memory problems persist.

“So, I did all of my interviews with difficulty finding words,” Emily said. “It was really challenging.”

In mid-December, a week after testing negative for COVID-19, Emily sat in front of her laptop, wearing dress pants and a dark blazer. It was one of the only times she had fixed up her hair and applied makeup since the pandemic began. Like An, she’d created a professional set-up for herself.

As the residency interview began, she spoke to three physicians at a time. They asked questions like, “How do you handle stress?” and proposed hypothetical scenarios involving patients. She had to think on her feet, and she was still tired from the coronavirus.

“I don’t think I realized how bad my memory and speaking were until I got into the interview cycle,” she recalled.

“I was forgetting questions that I was being asked, and I would just kind of stare blankly at the screen.”

Emily applied for one of the more difficult fields to enter. Her longest session consisted of 15 interviews, 15 minutes each. When it was

over, she was exhausted, and her cheeks hurt from smiling—she was so close to residency.

## ROLLING WITH THE PUNCHES

Victoria Humphrey (Class of 2021) stood at the back of a line to enter UPMC Shadyside. It was just after dawn on a warm July 2020 morning, and Humphrey waited to get her temperature taken before beginning an acting internship (what many still call a “sub-I”) in medicine. Though Pitt Med students returned in May 2020, this was her first time in a clinical setting since the pandemic started.

Everyone in line wore a mask, and, as Humphrey learned in the days ahead, recognizing new coworkers by half of their faces can be a challenge. After months of learning virtually from her native Florida, Humphrey was excited to be back in person.

“I didn’t know what to expect,” she said. “I knew I needed to go with the flow.”

She and her classmates exercised this mentality in their personal lives, as well.

An and her husband, Kirkland, were supposed to get married in July 2020. However, they moved the date up to May 2020, so An could self-quarantine in time to return to her acting internship. Only their immediate families and the pastor attended, standing 6 feet apart and wearing masks.

Pitt granted the couple access to Zoom, and 184 computer screens—some with multiple household members—tuned in for the ceremony. The virtual event allowed the Eastern Pennsylvania natives to invite people who would not have otherwise been able to attend, including some of An’s relatives in China.

Held at a Philadelphia church, the wedding was filmed using multiple cameras so the audience could see An’s face as her father walked her down the aisle. An’s brother, a broadcast journalism major at the University of Missouri, switched angles throughout the wedding.

“It was definitely a different experience but still really great,” An said. “We had what was most important.”

In November, Canton remotely defended his thesis for a master’s in clinical research.

Canton, who had received a master’s in kinesiology from Louisiana State University before entering Pitt Med, was able to invite his mother, twin brother, friends and old profes-

sors to watch his remote defense of two papers. At the end, he included his Sterile Vision pitch.

Canton is the CEO of Sterile Vision, a startup that’s developed a computer-vision and machine-learning platform to streamline operating room workflow and hospital-supply chain processes. (Read more about the startup on p. 14.)

As Canton waited for his committee to return, he talked with his friends and family about Sterile Vision’s potential. When the committee members returned, they passed Canton without requesting revisions.

“I felt really good,” said Canton.

Sterile Vision has been accepted into a local incubator and has found investors.

Canton notes that he has to balance his energy between residency and entrepreneurship. He says residency is a priority at this time because it is “five years to really get it right and set the foundation for the rest of my surgical career.”

Speaking of balancing acts—are Marburger and his wife, a teacher, ready to juggle parenthood with residency?

“The last year prepared us for what it can be like and that we can get through it,” he said.

“It’s not going to get easier, but I think we’ll get better at handling it.”

—Sarah Stager contributed to this report.

## EPILOGUE

On March 19, members of the Class of 2021 learned the setting for the next chapter of their careers.

Humphrey matched in dermatology with Massachusetts General Hospital/Harvard University. Bowers, who is Humphrey’s cousin, matched in otolaryngology at Jackson Health/University of Miami Health System.

An and her husband are headed to Texas; she matched in internal medicine/pediatrics at Baylor College of Medicine and Texas Children’s Hospital in Houston.

Ifthikhar matched in obstetrics and gynecology at the University of California San Diego/Jacobs Medical Center.

Canton and Marburger—both of whom are Pittsburgh-area natives—get to remain close to home. Canton matched in orthopaedic surgery with UPMC Presbyterian and Marburger matched in pediatrics at Children’s Hospital of Pittsburgh of UPMC.

For the complete match list, see page 34. ■

# Pulled Away from the Lab

PHD STUDENTS ANGST, BUT ALSO WRITE,  
TEACH AND HIKE | BY CRISTINA ROUVALIS

Pam Brigleb was on a roll. She was spending long days in the lab, studying how a particular virus, known as reovirus, could trigger celiac disease. The results looked promising. The 25-year-old PhD student at the School of Medicine was tingling with excitement about the breakthroughs, which she hoped could one day lead to a celiac therapy.

Then another virus entered the picture—the novel coronavirus—and the world, including her lab, was forced to shut down. The weekend before the March 16 closing date, Brigleb worked day and night to get in as many trials as she could.

For Brigleb, the pandemic has been a frustrating interruption in her work in the lab run by Terence Dermody, the Vira I. Heinz Distinguished Professor and chair of pediatrics. But the time off motivated her to do something else she has always wanted to do—teach a class. A trained immunologist in a lab filled with virologists, she started a remote Friday class and dubbed it “Immunology with Pam.”

“It was a good opportunity to get teaching experience,” says Brigleb, who wrote an article about it for *Nature*. The fourth-year grad student hopes the pandemic won’t delay her plans to graduate in 2022.

Christopher Harim Lee, 30, is on track to present his dissertation by December 2021. Lee and Brigleb both do research with reoviruses, which sometimes cause mild respiratory or gastrointestinal symptoms in humans but often are asymptomatic. (Scientists like to employ them as model viruses to study how similar viruses can cause disease.)

When the lab reopened on a staggered schedule in June, the shortened hours allowed him to concentrate on his writing. “Sometimes I go down the wormhole of lab research. This lets me look at the big picture.”

Even so, he and other grad students miss the camaraderie of the lab.

Throughout the pandemic, Dermody has organized activities to keep his graduate students connected: Regular Zoom calls. In-person hikes on Mount Washington with hikers staggered 10 feet apart. A short-lived book club.

“I don’t like to use the words ‘social distancing,’” says Dermody, physician-in-chief and scientific director of Children’s Hospital of Pittsburgh of UPMC. “That is inhumane. Solitary confinement is cruel and unusual punishment. We were physically distanced.”

His students took turns presenting on provocative scientific papers. They also took on writing “sprints.” A researcher would be given a deadline to write a section of their thesis, and two “sprinters” would provide

feedback. “It was write, review, revise—and repeat,” Dermody says.

John Horn, associate dean for graduate studies, says the pandemic has been hard on students, most of whom are in their 20s, an age when socialization is important. “It’s very stressful for them. We know that because we’ve surveyed them. Some of them have coped well. Some of them probably not so well.” (School of Medicine students have access to Pitt counselors and other mental health resources: [www.medstudentaffairs.pitt.edu/contact-us/mental-health-team](http://www.medstudentaffairs.pitt.edu/contact-us/mental-health-team).)

Some first-year students said the lab-free days left them feeling isolated after moving to a new city. It also left them unsure of the progress they were making. Some mentioned becoming overwhelmed with uncertainty.

For second-year student Bellina Mushala, the pandemic meant forgoing her third rotation in a lab in the molecular pharmacology program. Instead, she coauthored a literature review article through a series of virtual one-on-one sessions with Iain Scott, PhD assistant professor of medicine. She liked the experience so much that she decided to join his lab.

Even so, the 22-year-old worried about the lost bench time—she wasn’t able to return to the lab until August. “It was a real self battle,” she says. Scott reassured her that a PhD was a marathon, not a sprint.

The death of George Floyd and other injustices brought to light last year, including the disproportionate number of underrepresented minorities dying from COVID-19, made 2020 all the more difficult for Mushala, who is a person of color.

As citizens took to the streets for justice, Mushala and other students confronted administrators about equity issues at Pitt Med. She was heartened by the way they listened to student concerns. The graduate program office brought on Priscilla Morales as assistant director for admissions and diversity. The Biomedical Graduate Student Association now has a diversity and inclusion committee.

Even before the pandemic, the School of Medicine wanted to ramp up career planning for late-stage PhD students who were so engrossed in finishing their dissertation that they didn’t have time to think of what came next. Pitt Med now offers virtual career workshops, which allow those approaching the finish line to explore career goals and options.

The biggest hardship was on people who had just graduated and were looking for jobs, Dermody says: “The market for science jobs basically dried up.” But he reassures students who are preparing their dissertations that they can hone their skills until the market turns. “I have told them many, many times, ‘When resources are constrained, the best place to be is in training. It’s going to get better.’” ■

# PANNING FOR ANTIBODIES

THE TRAVAILS BEFORE THE TRIALS  
OF A PROMISING TREATMENT  
BY SHARON TREGASKIS



Wei Li is able to identify promising antibodies after generating hundreds of billions of possible options.



**B**efore John Mellors and Dimiter Dimitrov, founding director of Pitt's Center for Antibody Therapeutics, launched their UPMC-backed Abound Bio, they surveyed the clinical and business landscape. "I initially thought we would target infectious diseases," says Mellors, who is chief of Pitt's Division of Infectious Diseases and director of UPMC's HIV/AIDS Program. "But Dr. Dimitrov and I decided there was greater unmet medical need in cancer."

This was, perhaps obviously, in the era B.C.—before COVID-19. October 2019, to be exact.

In January 2020, Dimitrov, a University of Pittsburgh professor of medicine, and his lab were in the midst of several pediatric cancer projects. His group had also advanced to clinical trials an antibody that neutralizes Hendra and Nipah infections (respiratory viruses circulating in Australian fruit bats that have crossed into humans).

Suddenly his circles were abuzz with news of a pneumonia outbreak in China. "My collaborators are at the Wuhan Institute of Virology, where the virus was sequenced," he says.

When Chinese scientists released the genome of SARS-CoV-2 in mid-January, Dimitrov told Mellors he wanted to redirect his research team to the novel coronavirus.

They could find an antibody to stop it in record time—if his boss was willing to sign off.

This wasn't Dimitrov's first tango with a coronavirus. In 2003 he had zeroed in on how SARS-CoV infects people, then found an antibody to block it. He'd done the same with MERS-CoV. Now his team at Pitt was ready to tackle COVID-19.

"Mitko's great," says Mellors of Dimitrov. "He always asks me what I think." Their conversation about the novel coronavirus, however, was short. This is an emergency, said Mellors. Go right ahead. Full force. UPMC Enterprises pitched in to cover the costs.

Why was Dimitrov—and colleagues who knew of his team's work—so convinced he could stop the novel coronavirus?

Mellors recruited Dimitrov from the National Cancer Institute (NCI) in 2017. The time was ripe to exploit advances in antibody engineering to give the immune system the upper hand against a wide range of chronic maladies like HIV, cancer and rheumatoid arthritis. In his 27 years at NCI, Dimitrov had developed and refined methods to build vast libraries of engineered human antibodies, then identify the best among them to tweak immune function as needed for a condition.

A little immunology background: The adaptive immune system learns by exposure to antigens, the surface molecules that distinguish friend from foe—a beneficial gut bacterium gets a pass; *E. coli* gets the boot.

Viruses, bacteria and the like mutate fast, and the adaptive immune system has to be ready for anything. So our blood churns out a diverse array of antibodies. Dimitrov focuses on the most common, a class of y-shaped proteins known as immunoglobulin G (IgG). Each form (or "isotype") of IgG has a unique binding site at its tips.

When one of these binds to an antigen (like a lock and key), the combination serves as a homing beacon for the immune system's search-and-destroy department.

Not every key fits every lock with equal precision. Antibodies vary, too, in the rate and strength of their binding action.

The human body takes a more-is-more approach, with a weighty ring of keys on hand for whatever may come. Some antibodies may



Dimitrov



Mellors

bind only partially to a given antigen, others not at all, but with enough forms in the mix, they collectively get the job done. The goal for therapeutic antibody applications, by contrast, is to find a single form—a monoclonal antibody—uniquely suited to the task at hand.

If you're going to count on just one protein to derail a fast-mutating virus like HIV—or SARS-CoV-2—you need one strong enough to bind to its target, but not so specific that a new variant will escape its grasp, explains Wei Li, a Pitt assistant professor of medicine and assistant director of the Center for Antibody Therapeutics.

Dimitrov and Li start with what amounts to a replica of the adaptive immune system in their laboratories. They turn human B cells into tiny factories, cranking out trillions of IgG antibodies, each with a distinctive binding pattern.

The resulting library approximates a vast universe of antibody possibility, explains Li.

Known as "naïve," some of these antibodies may have existed in the original patients, but many of them are new because of the random pairing of the two major components of the antibody: its heavy and light chains. Yet they're made from fully human components, so there's no risk of a future patient having a cross-species reaction. (Early recombinant antibodies contained mouse proteins that triggered allergic reactions in humans.)

Because some of the antibody components generated by human DNA tend to aggregate quickly in the lab environment, Dimitrov and Li do a good bit of behind-the-scenes biochemical engineering. While some investigators prefer mouse proteins because they're less finicky, the Center for Antibody Therapeutics team has developed scaffolds and other tools to stabilize the gene products in their libraries.

For his team, finding the right monoclonal antibody for a given job is akin to, as Dimitrov likes to say, panning for gold. They apply a technique known as phage display, which garnered the 2018 Nobel Prize in Chemistry for George P. Smith and Sir Gregory P. Winter. His team modifies a bacteriophage (which is, oddly, another virus) to express a particular antibody on its surface.

Then the researchers make a library of hundreds of billions of antibodies expressed on the surfaces of different phage particles. They mix the library with the antigen, in this case part of the SARS-CoV-2 spike protein. Antibodies that bind to the antigen become like a weight. “So we can pull down the particles that

### **The business case for Dimitrov’s monoclonal antibodies dried up when SARS and MERS case counts fell. Arguably, however, the public health case persists.**

are heavier,” says Dimitrov. “That’s how we separate them from the other billions of not-important antibodies for a particular purpose.”

The first round of panning might yield hundreds, or even thousands, of antibodies of interest. Subsequent rounds narrow the field. Says Dimitrov: “Typically, after three or four rounds of panning, which takes about a week, we identify the strongest binders.”

In their quest to thwart SARS-CoV-2 infection, the Center for Antibody Therapeutics had one additional advantage beyond the array of libraries, search strategies and tools already on hand. In 2003, SARS was spreading around the world. Dimitrov managed to characterize the molecules on its spike protein that the virus uses to infect a human cell, by way of the human ACE-2 receptor. The SARS-CoV-2 genome revealed that it was using a very similar approach to initiate COVID-19.

While he was still at the NCI, Dimitrov had built a phage to express the SARS glycoprotein and identified an antibody that stopped it from binding to the ACE-2 receptor, like capping a hypodermic needle to prevent an accidental stick.

Given the similarity between SARS and

SARS-CoV-2, additional modifications to the tools were fairly straightforward. By early February 2020, the team at Pitt had two candidates—dubbed Ab1 and Ab8.

Soon after, they showed that each was effective against the novel coronavirus in a petri dish.

Publication of the requisite findings in animal models, however, would take months. Wild-type mice aren’t susceptible to infection by SARS—or SARS-CoV-2—because they lack the ACE-2 receptor. Humanized mice and hamsters had been widely available in 2007 when Dimitrov tested his SARS antibody, but by early 2020, few remained. In early 2020, research facilities scrambled to

breed their remaining animals, then waited months for them to mature.

The peer-reviewed papers on Ab1 and Ab8 appeared in *Cell*, *PNAS* and *Vaccine* in the fall of 2020. The technology to produce Ab1 and Ab8 had already been patented, so Pitt promptly licensed it to Abound Bio, raising much-needed funds to fuel future research. Dimitrov and Mellors hope one day the breakthroughs will help patients. The journey from drug discovery to U.S. Food and Drug Administration (FDA)–approved treatment can be arduous, however, and licensing is only the first step.

As the world marked the one-year anniversary of the pandemic’s start, Dimitrov was eagerly awaiting data on the feasibility of pharmaceutical-grade manufacturing for Ab1 and Ab8, the first step toward clinical trials. While the FDA had granted emergency use authorization to Eli Lilly and Regeneron for their antibody cocktails, Dimitrov held out hope for Ab1 or Ab8 to demonstrate comparative advantages in their formulation, efficacy or delivery.

(Ab8, for example, is so small it might be delivered by inhalation. By contrast, the currently authorized treatments require an hour-

long intravenous infusion.)

Dimitrov believes that the wait for appropriate animal models to verify Ab1 and Ab8 cost lives as the pandemic spun out of control in the United States.

“I was very emotional. I continue to be emotional. We were the first to have antibodies because our method is the fastest, but we will be the last to put them in humans.”

Although the monoclonal antibodies Dimitrov identified to stop SARS and MERS were licensed years ago, neither has been formulated for clinical trials. The business case for development dried up when case counts fell. Arguably, however, the public health case persists. Pandemics don’t send hold-the-date notices.

Dimitrov champions the cause every few years—most recently, in 2017 when he coauthored a call to action in *Frontiers of Medicine* with collaborators in China. “Outbreaks of emerging infectious diseases pose serious challenges to global public health,” they wrote.

In their view, monoclonal antibodies are a viable tool for halting outbreaks, protecting front-line workers and saving lives. Antibodies have both prophylactic and treatment potential. To realize their potential, however, governmental, academic and industry players would have to collaborate to refine technologies and subsidize costs.

The Center for Antibody Therapeutics has largely resumed its cancer-related monoclonal antibody projects with some exciting prospects—including molecular targets in liver cancer and ways to improve existing cancer immunotherapies. With researchers at Tsinghua University, they figured out how to control tumors and prevent “T-cell exhaustion” so the body can better fight cancer. Abound Bio and China’s Yufan Biotechnologies are moving toward clinical testing.

As a boy in communist Bulgaria, Dimitrov devoured the biographies of pioneering immunologists Louis Pasteur, Robert Koch and Paul Ehrlich, the German originator of the “magic bullet” theory that undergirds contemporary targeted therapeutics.

“Since 8 years old,” says Dimitrov, “my dream was to become a scientist and save people, like they had.” ■



# *Be Well*

**MANY CLINICIANS STRUGGLE  
WITH THEIR MENTAL HEALTH**

**BY CARA MASSET**

**ILLUSTRATIONS BY MICHAEL HIRSHON**

**I**t was still dark when the vascular surgeon awoke to bicycle for an hour and then prep a quick breakfast for the kids. On the way into UPMC Presbyterian, he dropped his teenage daughter off at her babysitting job. By 7:15 a.m., he was already in the OR, head bent over the table, beginning the first of the day's 11 operations.

Some surgeries were scheduled outpatients. Others were emergencies that required triaging cases. One patient was at risk of hemorrhaging with a life-threatening aneurysm. Breaks were unpredictable and a luxury when they came.



During his return commute around 6 p.m., Rabih Chaer, a professor of surgery at the University of Pittsburgh, logged onto a conference call with a research committee. At home, he put a chicken pot pie from Costco into the oven for his three teenage children. They tossed up a salad. It was a simple meal. Still, eating dinner together was a blessing, especially in the year 2020.

A decade ago, Chaer's work days were just as busy, but often less pleasant. Chaer tended to be easily irritated. An OR delay was intolerable. He was short with his colleagues. Distant from his family. As a junior faculty member working long hours to prove himself in his career, he says in retrospect, he expected perfectly executed plans from everyone around him so that his time was never wasted.

Chaer was burned out and going through a divorce when he did a routine procedure on a marathon runner and saved the man's legs.

The patient, Sam Madow (not his real name), was the organizer of an annual race in Indiana, Pennsylvania, that raised funds for veterans. At a follow-up appointment, Madow invited Chaer to run.

"Me?" Chaer thought. The idea was almost laughable. He was overweight. Hadn't exercised in years.

"C'mon, Doc," Madow said. "I'll run with you."

Chaer ran a relay segment at Madow's race.

A couple of years later, he and Madow ran the Pittsburgh half-marathon together.

Chaer kept at it. He became an Ironman, competing in triathlons and even a 220-mile race across Haiti. He's now in better mental and physical shape than he's been in years.

"[Sam] thinks he may have owed me because I saved his legs," Chaer says. "But I owe him big time."

**A** 2009 study on career satisfaction asked vascular surgeons who are parents whether they would recommend their job to their children. More than half said no.

In the past decade, studies in the *Journal of the American Medical Association*, *New England Journal of Medicine*, *Nursing* and elsewhere have confirmed what many knew anecdotally: Workers in hospitals and clinics around the country experience alarming rates of burnout and depression. All generations are experiencing this: trainees, leaders with decades of experience and students, as well.

In 2018, Chaer delivered a presidential address on burnout to the Eastern Vascular

Society. He relayed data from recent literature: The prevalence of burnout for health care professionals was higher than the general population; depression or depressive symptoms among medical students was 27%; 39% of residents were experiencing burnout and 48% of them were at elevated risk of depression.

As director of Pitt Med's vascular residency program, Chaer found the results of one study to be particularly concerning: Although residents correctly estimated how many of their peers were experiencing burnout, faculty incorrectly guessed a much lower rate. He pointed out that consequences of burnout can include medical errors, reduced professionalism, reduced patient satisfaction, staff turnover, depression, suicidal ideation and car crashes.

"We have a professional obligation to act," he told the audience.

Chaer shared his personal story of how running with Madow helped him move beyond burnout. It's not like everything turned to gold under winged running shoes, but his lifestyle change has been transformative. He can sleep through the night. His mind is calmer. He's more attentive to his kids. He's more efficient at work.

Chaer knew he wasn't alone in his struggle to balance his life. He wanted to help colleagues. Last year, with a grant from the UPMC Physician THRIVE program, he started his first research project related to physician wellness. He's interested in simple solutions to the stress that cardiologists, as well as vascular and cardiac surgeons, deal with.

"This group of physicians essentially deals with stressful situations on a daily basis because of the acuity of the medical problems their patients can have. We're dealing with life and death situations."

He's interested in helping with physical stressors, too: "We are sometimes wearing a lead apron to protect against radiation exposure because we work with X rays. That can put a bit of stress on the neck and the physician's spine. Physicians are also oftentimes wearing magnifying loupes, and your neck is bent for several hours at a time," Chaer says.

Throughout the yearlong study, participants will complete questionnaires and provide hair samples to be tested for levels of stress-induced cortisol. Chaer and his team had planned to launch the study in . . . 2020. Yeah. It launched later than expected, in part because the team added a parallel study to address even more critical needs. "We decided to do a

similar intervention targeted toward providers taking care of patients who have COVID-19, because one can only imagine the amount of stress they are under," Chaer says.

**"M**anaging the emotional experience of working in the ICU is part of the job," says Ian Barbash, Pitt assistant professor of medicine in the Division of Pulmonary, Allergy and Critical Care Medicine, who treats COVID-19 patients. It's a challenging part of the work in normal times—all the more so in the pandemic. "The scale, the volume and the acuity of the patients is something that is not familiar to most, even experienced clinicians," he says.

Many COVID-19 patients are more alert than other patients typically entering the ICU, in part because COVID-19 evolves in a way that other diseases like pneumonia do not, Barbash explains. It means the care team gets to know many patients, making it even harder to watch some of them decline.

Staff get to know family members, but often only virtually. Ed Zettl, a nurse in the first dedicated COVID unit at UPMC Mercy, said that when he does rounds at the beginning of each shift, he asks patients about their families or talks virtually with family members because, inevitably, others are also sick or in quarantine. He educates everyone as best as he can about staying safe and gives referrals to the social work team.

Zettl has been a nurse for 12 years.

"I love what I do," he says. In some ways, life has been more challenging outside work without his usual extracurriculars—hitting the gym, heading to the ballpark for Pirates games.

Barbash says that before the pandemic, he was able to maintain a reasonable separation between work and home life. Then, the whole family was home on lockdown. It was hardest for his wife, who suddenly had to work from home while taking on most of the care for their three children. Barbash was not only working some shifts in the ICU at UPMC Presbyterian, but also working from his basement with two computer monitors and a headset to help build the new UPMC TeleICU program that gives virtual support to providers on the front lines.

Barbash is the medical director of the TeleICU. He has put in long hours getting the system up and running, but the work has been meaningful, he says. The program is designed to help bedside providers at hospitals where there isn't an ICU doctor available at night.

Barbash is on a team that rotates the night

# “Physicians are expected to be self-driven.” That’s something that’s self-driven. We wanted to help physicians know

shifts for TeleICU, so that has made his schedule more manageable.

Sadness and grief are feelings Barbash has experienced at work before, he says, but now those feelings are combined with anger at the scale of suffering in a pandemic that was potentially avoidable. He bristles at being called a hero; his says his work before the pandemic and in the future is equally important to the patients he serves.

Connecting with colleagues, even remotely, is important for his well-being, he says.

“Feeling like a part of a large group of people—all of whom are committed to an organizational mission to take care of this large population of critically ill patients—that feeling of connectedness does, to some extent, help to mitigate some of the other [negative] emotions,” he says.

Sharing feelings, Barbash adds, helps clinicians validate one another’s experiences: *I, too, cried on the way home in the car. Or: Thank goodness, I got my vaccine today!*

Zetl points out that there was a lot of public attention for frontline workers in spring 2020. The constant acknowledgment in the form of pizzas and fruit platters has diminished as the pandemic has gone on, so his team has come up with other ways to keep spirits up. One of the most uplifting routines ICU staff added is a Covid Champion celebration for patients as they are discharged. With a congratulatory poster, horn and a bell, staff whoop up some fun. The patients love it, he says.

The self-care folder that appeared at the nurses’ station in the oncology division in 2017 didn’t get a lot of use. The hope was that the folder filled with resources—like free passes for tai chi classes and phone numbers for mental health professionals—would help oncology nurses reduce their risk for compassion fatigue. (Symptoms can include nausea, headaches, insomnia, depression and anxiety.)

Nurses participating in focus groups said they didn’t have much time to look through the folder at work and would have felt guilty taking time away from patient care. At home, they preferred to cherish time with loved ones and follow self-care routines they’d already established. They appreciated the thoughtfulness behind putting together the folder and the resources for providers in crisis, but these gestures didn’t relieve their particular work stressors.

“They said: ‘I’m not minimizing that you put resources into giving us passes to go to yoga or tai chi, but boy, if I would have had an extra nursing assistant to help me . . . I could feel better about the work I do for my patients,’” says Judith Zedreck, Pitt professor of nursing, who researches issues related to nursing retention; she copublished a study on the self-care folder in *Nursing* last year.

Nurses told her: “What I need from my leadership is acknowledgment of the work I do, and the tools to do my job.”

They expressed a number of ideas for improvement: By all means, hire new staff with signing bonuses, but continue to acknowledge the work of loyal staff; establish a more consistent schedule so that staff aren’t flip-flopping between day shifts and night shifts; and have a leadership presence on night and weekend shifts, not only during business hours.

“A lot of what we can do goes back to those basic principles of leadership,” says Zedreck, coordinator of Pitt’s Health Systems Executive Leadership program for doctoral nursing students. She says the same goes in a pandemic. She held a discussion in July 2020 with current doctoral students and alumni from her executive leadership program who are serving in management roles around the country; they talked about upheaval amid COVID-19 challenges. Their conversation ranged from how PPE distorts interactions with patients to the importance of “consistent communication, even if the message may be different daily.”

A few years ago, Sansea Jacobson, an attending psychiatrist at UPMC Western Psychiatric Hospital, had an idea: We “knew that residents were not immune to stress and burnout, especially those covering the overnight medical call” in the free-standing psychiatric hospital with more than 200 beds. So, she and her colleagues thought they’d offer a workshop with guided sessions on mindfulness and at-work yoga.

“They didn’t want it,” says Jacobson, Pitt associate professor of psychiatry and associate program director in the Office of Residency Training. It was another well-intentioned idea that wasn’t really going to meet anyone’s needs.

“Our initial push to help made us take a step back,” Jacobson says.

So they conducted an assessment that led to a number of actions: Faculty set up simulation training for residents to practice running codes specific to their setting at Western Psychiatric. A physician extender was hired for overnight physicals so residents could focus on patients with urgent needs. A new position was created for a chief resident of well-being (whose role, among other charges, includes regauging the email firehose by compiling announcements into one weekly email).

Jacobson points out that these changes are at the systems level.

The responsibility for well-being, she says, should not be pinned on individual clinicians. Helping to build personal resilience amid the demands of being a clinician is important, but it can’t be the only solution offered by institutions.

For instance, Jacobson and colleagues are exploring systematic ways to reduce stress over the use (some say “bane”) of electronic medical record (EMR) systems. EMR is often partially blamed for the concerns raised in the literature on provider well-being.

“I don’t think I’ve ever read an article [on clinician wellness] that does not focus on [EMR systems],” said Loren Roth, Distinguished

*ected to be perfect.  
n, but it's also culturally expected.  
ow that it is OK to seek help.”*

Professor Emeritus of Psychiatry, when he interviewed Jacobson for his Psychiatry Advances podcast in October 2020. “Physicians experience the feeling of being cut off from their patients—not exactly what they thought they were bargaining for.”

On the podcast, Jacobson described a project that pairs millennial residents with senior faculty to help them “become more efficient and effective so they can spend more time doing work that is meaningful to them.”

Jacobson also told Roth about a curriculum she and her departmental colleagues are developing to help address systemic racism in graduate medical education.

“There really can’t be well-being” without anti-racism solutions, Jacobson adds.

Jacobson has a reputation as a witty host for UPMC’s Physician Connection Series—she’s an Oprah of sorts, interviewing physician leaders on stage at an evening soiree. The psychiatrist asks them about their lives, including how they built their careers and how they’ve handled missteps and challenges over the years. When she interviewed UPMC Magee-Womens Hospital President Richard Beigi at the 2019 event while they sat in comfy sofa chairs, she noted that there were many wellness champions in the audience.

“A dirty little secret is the word ‘wellness’ makes me cringe,” she said to laughs.

“I find it quite polarizing, and I think a lot of times it’s interpreted in a way that makes

## POSITIVE CULTURE

As Pitt Med students make their way, they can turn to a number of school programs and resources if they’re struggling:

- Pitt Med’s Student Health Advocacy Resource Program (SHARP) has served as a model for other academic institutions since it was created in the 1990s. In monthly meetings, class representatives and faculty advisors discuss anonymous concerns from classmates. Lauren Auster, a fourth-year SHARP representative, says discussions range from imposter syndrome to equity in medicine to financial instability to grief over patient deaths. Students and faculty not only brainstorm resources and action plans for concerned individuals, but they also put together programming on topics like cognitive behavioral therapy techniques for stressful situations.

- In the ’80s, Pitt Med was one of the first medical schools to hire an in-house counselor for students; several years later, a psychiatrist was added. The counseling staff has since expanded, including the recent hire of a dedicated counselor for PhD students.

- Advisory “houses” assign incoming students to a faculty member and a group of students from every class. This way, first-years already know a second-year who can give advice, and the third-years can, in turn, send advice down the line.

- In 2020, Evelyn Reis, professor of pediatrics, was appointed to the newly established role of associate dean for the learning environment, to support a culture rooted in human dignity for students, faculty and patients.

Beyond these initiatives, Alda Maria Gonzaga, the new associate dean for student affairs, says it’s important for faculty to talk to students about what activities they’re doing to refresh themselves so they can come back to their studies renewed. “The bigger overarching concern is this reality that medicine is expansive, and one could spend all their time trying to learn it,” says Gonzaga.

“That should be a lifelong goal, rather than a short-term goal.” —CM

## HOW CLINICIANS CAN GET HELP

Resident and Fellow Assistance Program (LifeSolutions): 412-647-3669

Physicians for Physicians: 412-647-3669

GME Professionalism Concern Line: 1-844-463-4362 (GME-4DOC)

UPMC Threat Assessment and Response Team: 412-647-4969

Local 24/7 resolve Crisis Services: 1-888-796-8226 (7-YOU-CAN)

National Suicide Prevention Lifeline: 1-800-273-TALK (8225)

National Crisis Text Line: Text HELP to 741-741





physicians feel uneasy—a blaming-the-victim type of issue.” She credited UPMC for recognizing that well-being needs to be addressed at the organizational level.

Jacobson has not only contributed to change within the psychiatry department, which now uses assessments every other year to address well-being needs as they evolve. She has established a framework for all trainee programs across Pitt and UPMC as cochair of the Graduate Medical Education WELL (Well-Being, Education, Learning and Living) committee.

Calls for action from around the country to improve physician well-being led to new national requirements for graduate medical programs by the Accreditation Council for Graduate Medical Education (ACGME). The requirements went into effect in July 2019, mandating that attendings, residents and fellows need be able to recognize symptoms—and know how to seek care for themselves or colleagues—in six areas: burnout, depression, fatigue, substance use, risk for suicide and risk for violence.

At Pitt, Jacobson’s committee launched the online WELL Toolkit ([gmewellness.upmc.com](http://gmewellness.upmc.com)) with resources on those six topics gathered from more than 80 clinician educators and experts across the country. Jacobson emphasizes that it was assembled “by physicians for physicians,” with evidence-based content.

The assessment tools and educational modules aren’t designed for individuals per se, but for unit chiefs, program directors and other leaders to use at group sessions. ACGME plans to use it as a national model.

“My favorite part of it, really, is the introduction section where we try to help physicians overcome the stigma related to help-seeking,” Jacobson says. “Physicians are expected to be perfect. That’s self-driven, but it’s also cultur-

ally expected. We wanted to help physicians know that it is OK to be human. It’s OK to seek help.”

“Stop the stigma” is a plea from physician alumni around the country who have themselves struggled with burnout and depression. Several spoke anonymously for this story, describing the creeping toll of long hours and the feeling that corporate-minded employers only pretend to care about them. Some are haunted by tragic patient deaths or their own personal traumas like sexual violence. Still, they are committed to their patients. For years they operated as if everything was perfect—until they reached out for help because they couldn’t function in the face of a parent’s death, divorce, cancer diagnosis or other triggering event on top of their work.

Jacobson says getting help is not only a matter of confronting “maladaptive perfectionism,” but also offering answers to practical questions that can overwhelm someone who is struggling to get through their days: Will getting help jeopardize their medical license? Can they afford to pay student loans if they take time off? Who will need to know?


One physician we spoke with feared that speaking publicly could lead to trouble with licensing boards. He recalled being scared when he applied for his medical license because he had to supply documentation from a therapist about a mental health crisis he had been treated for decades prior.

“You work so hard to obtain a professional credential,” he says, adding that it was terrifying that a committee could unnecessarily take away everything he’d worked for. He received his license, but he felt the process was an invasion of privacy, not to mention legally fraught. Many medical state licensing questions violate the Americans with Disabilities Act because they ask about mental health struggles beyond current impairment. Only seven states do not ask mental health questions for licensure, as of 2018. Pennsylvania is one of them.

The physicians welcomed the new national requirements. One alumnus says that based on stories from older colleagues about working around the clock, he doesn’t think he would have made it through residency if national requirements hadn’t limited residents to 80-hour workweeks before he went through training.

Physicians should be better role models when it comes to mental health, he adds, and hopes that the new requirements will help reduce stigma. Physicians are typically first adopters when it comes to healthy living, he said. He doesn’t know any colleagues who smoke. Many exercise regularly and avoid red meat. But those same physicians may hesitate to seek counseling, despite the fact that physicians have higher risks for depression and suicide.

Jacobson’s academic expertise is suicide prevention. She emphasizes that suicide, while relatively rare, is a risk that physicians need to be aware of. One study found that male physi-



Hospitals are starting to recognize that mental health among clinicians is not just a matter of personal resiliency.

## NEW STANDARDS FOR STUDENTS

Studies show that students enter medical school with higher levels of well-being than their age-group peers, but then those stats flip in medical school. Learner well-being was the lead topic of the 2020 Association of American Medical Colleges (AAMC) conference. Med students and school administrators nationwide want systems-level changes to prevent and address burnout, notes Joan Harvey, recently retired associate dean of student affairs at Pitt Med.

One national action item that has been checked off: The Step 1 medical licensing exam will soon be evaluated in a pass/fail format, rather than graded, to reduce pressure. Other topics highlighted by the AAMC conference: addressing racism and adding more flexibility to the academic calendar and residency start dates.

# “When it’s you, you might not see it.”

icians had a risk 1.4 times higher than men do generally and female physicians had a risk 2.2 times higher than women do in the general population.

The primary risk factor for suicide is an underlying mental health condition, usually untreated depression. Jacobson says clinicians need to be reminded that depression is treatable. And there are treatments that work. (If you’re having harmful thoughts, call the National Suicide Prevention Lifeline at 1-800-273-8255 or text the Crisis Text Line at 741741. See the resource box on page 29.)

Those who get help are almost always glad they did and wish they had done so sooner. Jacobson says there is evidence that, even among doctors who are required to receive treatment (say, for a substance use disorder), the majority are satisfied with their treatment and are practicing five years later.

Often, the first call for help is the hardest. One unit chief recalled diligently writing mental health hotlines on meeting agendas for her staff for years. She never expected that she would need to call the hotline herself. Then one day she did.

Jacobson understands. “When it’s you, you might not see it,” she says.

Several years ago, Jacobson’s marriage dissolved, and she was figuring out how to be a single parent and maintain her career. She thought she could explain away her struggles because of the circumstances. *Of course, I should feel sad*, she thought.

Finally, her own mother pointed out to her that getting therapy would be beneficial. Her first thought was that she didn’t have time. (In one study referenced in the WELL Toolkit, 92% of physicians said time was a reason why they weren’t seeking mental health care.)

Then she realized her mother was right. The signs were there: Poor sleep. Mind-wandering. Less joy. Feeling muted and subdued, which was unfamiliar to her. It seems so obvious in retrospect that she needed care. She sees patients all day who experience this, but, “I didn’t see it in myself,” she admits.

She is grateful that she sought help. Years later, she’s still a single parent with a busy academic and clinical schedule, but she feels like herself again. She’s more efficient. And she’s a role model for mentees and colleagues.

**I**n the late ’70s, Joseph Maroon, today a renowned neurosurgeon, found himself pumping gas at his family’s truck stop in West Virginia. He was 41 years old. His father died and his wife left him in the same month, and he was trying to keep the business afloat.

“One day I was doing brain surgery at Pitt, and the next week I was flipping hamburgers and filling up 18-wheelers at a truck stop,” Maroon told the Tribune-Review. “I just had no idea how to get out.”

He eventually returned to his career as a neurosurgeon. The Pitt clinical professor and Heindl Scholar in Neuroscience has been speaking publicly for decades about his battle with depression. (He too is an Ironman competitor.) In 2017, he published the book “Square One: A Simple Guide to a Balanced Life” to share what he’s learned.

Jacobson’s WELL committee cochair is Vu Nguyen, associate professor in the Department of Plastic Surgery. He directs the department’s residency program; recruiting is a concern for Nguyen because surgeons aren’t known to have the best work-life balance, and

younger physicians are more attuned to not letting work take over their lives. “Surgery will lose out to attracting the future,” he says, if he and his peers don’t take action.

Nguyen says he is inspired by Maroon, who won the 2020 UPMC Clinician of Courage Award; that award is given to a UPMC physician and leader in the community who has overcome adversity.

When mentors like Maroon or Jacobson or Chaer acknowledge that they had challenges and sought help, it’s a powerful affirmation for many colleagues and mentees. The WELL Toolkit cites two studies indicating that “more than 90% of medical students agreed that if they knew doctors further along in their careers who struggled with mental health issues, got treatment and are now doing well, they would be more likely to access care if they needed it.”

In his presidential address, Chaer reminded his audience that clinicians are “uniquely privileged to make a difference, just by showing up to work.”

And when they do report to work, institutions need to make sure that it’s a place where people can find meaning and contribute to a higher purpose, says Jacobson. Everyone should be able to uphold their oaths to heal minds and bodies, she adds, including their own. ■

## SIT?

Practicing mindfulness meditation sounds lovely, but many go-getters like high-achieving medical students struggle to slow down.

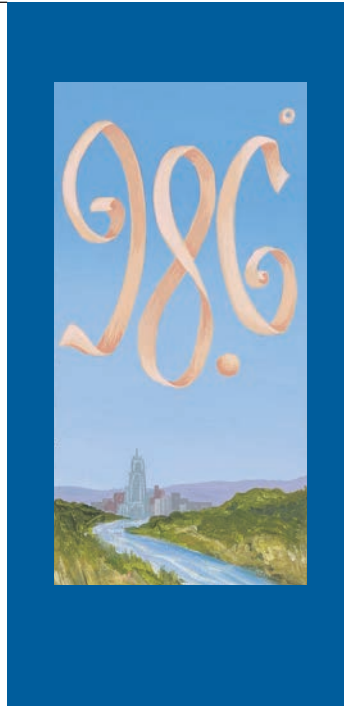
“The thought of sitting still is just a very high barrier to entry,” says Catherine Pressimone, a med student who serves as a co-organizer of the Empowerment Series for Pitt Med’s Wellness Committee.

So Pressimone is setting up art therapy sessions to help her peers (and herself) learn mindfulness techniques that involve keeping their hands busy and their minds present. “If you focus on what’s in front of you, and only what’s in front of you . . . you don’t even realize you’re relaxing,” she says. “And then you’re like, ‘Oh! I feel great now!’”

Pressimone has coordinated sessions on mindfulness in collage art and creative writing and hopes to arrange future classes with community artists.

“Mindfulness is a practice, as in something you do routinely,” she says. “But then practicing also means it’s something that you get better at.” —CM

*People and programs  
that keep the school  
healthy and vibrant*



## SANCTUARY

SOLACE FOR STUDENTS

**R**aymond Thornton (MD '98) mesmerized his classmates when he played the piano, whether it was at a basement piano bar in Oakland, the class talent show or his home in Highland Park. Friends say it was apparent he wasn't the average medical student who'd taken childhood piano lessons, but a professional in their midst. Thornton finished a doctorate in piano performance from Juilliard while a first-year student at Pitt Med.

"He was truly extraordinary," says Athena Beldecos (MD '98), once a violinist, who played chamber music with Thornton for fun during their Pitt Med days. She called him a "Mozartologist" for his expertise about the composer.

"We enjoyed each other's sense of humor," she says, a sentiment shared by classmates and colleagues throughout his career. "He was meticulous in his word and dress, with his pressed shirts and bowtie. And then he could let these comments slide under his breath that were just riotous."

Thornton grew up in Point Pleasant, West Virginia. After Juilliard and Pitt, he completed his residency and a fellowship in interventional radiology at UC San Francisco. He served as an associate attending interventional radiologist at the Memorial Sloan Kettering Cancer Center in New York. He was the founding director of the center's intervention-

al radiology fellowship program and directed their interventional oncology fellowship. Thornton also held appointments at the University of Utah and Cape Cod Hospital. He died in October.

Beldecos remembers Thornton as a cultivator of beauty, who tended to dahlias and roses in his garden, and even wrote diagnostic reports in a beautiful manner. Gardening and meditation gave

him solace when he struggled with depression, she says.

She's leading their Class of 1998 in honoring his life through tributes, including an April performance featuring the Brentano String Quartet through the Pittsburgh Chamber Society Digital Concert Series. Plans are under way to create a memorial on campus with aesthetics that are healing and calming. —*Cara Masset*



Thornton

For more information: [amr276@pitt.edu](mailto:amr276@pitt.edu)

## BOOSTER SHOTS

**A** \$1 million grant from the **Tull Family Foundation** launched the new **Alba Tull Center for Neuro Imaging and Therapeutics**, dedicated to designing and expanding imaging technologies. In this multidisciplinary meetup of neuroscience, therapeutics and imaging, the center aims to develop new anti-aging treatments, train physician-scientists in the uses of imaging technologies and find new ways that augmented reality can help guide surgeons' hands. Joseph Maroon, clinical professor of neurological surgery, played a key role in securing the gift.

Center projects will include high-definition fiber tracking (an imaging technique pioneered at Pitt) and radiomics (a single, noninvasive scan integrating multiple patient records to predict responses to therapies and support precision-medicine approaches to care).

**The Clear Thoughts Foundation** has created the CTF Consortium supporting the work and collaboration of Pitt labs run by **Robert Friedlander**, Walter E. Dandy Professor and chair of neurological surgery, **Oscar Lopez**, professor of neurology, psychiatry and clinical and translational sciences who directs Pitt's Alzheimer's Disease Research Center, and **Amantha Thathiah**, assistant professor of neurobiology and member of the Pittsburgh Institute for Neurodegenerative Diseases.

Despite COVID-19 interruptions, the investigators have continued their work focused on understanding dementia. Notably, in spring 2020, a team led by Friedlander showed that, in mice, melatonin, which the body produces less of as we age, helps regulate inflammation that leads to neurodegeneration in a number of diseases. That study was supported by CTF as well as the National Institutes of Health and the **Pittsburgh Foundation Walter L. Copeland Fund**. And Lopez's team reported primary results from a multisite trial suggesting that replacement of blood plasma with albumin can slow cognitive and functional decline in patients with Alzheimer's disease.

To learn more, join the CTF Connect Virtual Panel Discussion (details at [cleartoughtsfoundation.org](http://cleartoughtsfoundation.org)). —*Elaine Vitone and Erica Lloyd*

To make a gift to the school, contact Jen Gabler, **412-802-8317**, [jag188@pitt.edu](mailto:jag188@pitt.edu), [giveto.pitt.edu](http://giveto.pitt.edu)

# MATCH RESULTS

## CLASS OF 2021

University affiliations were listed for medical center programs.

### ANESTHESIOLOGY

Blanco, Javier  
University of Vermont Medical Center  
Fuller, Zachary  
UPMC/University of Pittsburgh, Pa.  
Javaid, Amal  
New York-Presbyterian/Weill Cornell Medical Center  
Kim, Song  
UPMC/University of Pittsburgh, Pa.  
Minorini, Rebecca  
UPMC/University of Pittsburgh, Pa.  
Ramirez, Wesley  
UPMC/University of Pittsburgh, Pa.  
Rathnam, Chandramouli  
Vanderbilt University Medical Center, Tenn.  
Stavros, Alexander  
Hospital of the University of Pennsylvania

### DERMATOLOGY

Humphrey, Victoria  
Massachusetts General Hospital/Harvard University  
Liu, Rebecca  
UPMC/University of Pittsburgh, Pa.

### EMERGENCY MEDICINE

Alarcon, Daniela  
UCLA Medical Center  
Clark, Alexander  
Vanderbilt University Medical Center, Tenn.  
Duell, Jessica  
WellSpan Health York Hospital/Drexel University, Pa.  
Duffy, Kevin  
UPMC/University of Pittsburgh, Pa.  
Kaplan, Lauren  
New York-Presbyterian Hospital/Cornell and Columbia Universities  
Olson, Karen  
Maine Medical Center/Tufts University  
Walton, Alexandra  
Alameda Health System Highland Hospital/  
University of California, San Francisco

### FAMILY MEDICINE

Cuddeback, Maris  
University of Florida Health Shands Hospital  
Fenn, Mikaela  
University of Illinois  
McClain, Kara  
Cambridge Health Alliance Cambridge Hospital/  
Harvard University, Mass.  
Morillo-Hernandez, Carlos  
Ventura County Medical Center/University of California, Los Angeles  
Narayanan, Arthi  
Swedish Medical Center/University of Washington  
Ogunmola, Ayodele  
Northwest Community Health Center/Baylor College of Medicine, Texas  
Windler, Carolyn  
Tacoma Family Medicine/University of Washington

### INTERNAL MEDICINE

Ahsan, Maaz  
NYU Langone Medical Center, Bellevue Hospital/  
New York University (Research Track)

Alexandre, Wheytnie  
NYU Langone Medical Center, Bellevue Hospital/  
New York University  
Amodei, Kate  
UPMC/University of Pittsburgh, Pa.  
(Women's Health Track)  
Arcieri, Michael  
Yale New Haven Hospital/Yale University, Conn.  
Churilla, Bryce  
Johns Hopkins Bayview Medical Center, Md.  
Dinh, Vu  
UPMC/University of Pittsburgh, Pa.  
Gobao, Valerie  
UPMC/University of Pittsburgh, Pa.  
Gordon, Beth  
NYU Langone Medical Center, Bellevue Hospital/  
New York University  
Iamrl, Fahdem  
NYU Langone Medical Center, Bellevue Hospital/  
New York University  
Jobe, Kendra  
University of Virginia Medical Center  
Kosinski, Emily  
Hospital of the University of Pennsylvania  
Lee, Jacqueline  
Cedars-Sinai Medical Center/University of California,  
Los Angeles  
Leech, John  
UPMC/University of Pittsburgh, Pa.  
Liu, Ying  
NYU Langone Medical Center, Bellevue Hospital/  
New York University  
Orr, Katherine  
Yale New Haven Hospital/Yale University, Conn.  
(Primary Care Track)  
Paul, Nicole  
Johns Hopkins Hospital, Md.  
Singh, Ajit  
Pennsylvania Hospital/University of Pennsylvania  
Visina, Jacqueline  
Vanderbilt University Medical Center, Tenn.  
Weill, Sydney  
UPMC/University of Pittsburgh, Pa.  
(Women's Health Track)  
Zhang, Grace  
UCSF Medical Center/University of California  
San Francisco  
Zimo, Jessica  
McGaw Medical Center of Northwestern  
University, Ill.  
Zuchelkowski, Benjamin  
UPMC/University of Pittsburgh, Pa.

### INTERNAL MEDICINE/ PEDIATRICS

An, Jessica  
Texas Medical Center/Baylor College of Medicine  
Hawkins, Christina  
WVU Health System/West Virginia University  
Pantalone, Julia  
UPMC/University of Pittsburgh, Pa.

### NEUROLOGICAL SURGERY

Jorge, Ahmed  
Ohio State University Medical Center  
Perez, Jennifer  
The Mayo Clinic, Minn.

Schulien, Anthony  
UPMC/University of Pittsburgh, Pa.  
Sudhakar, Vivek  
Emory University, Ga.

### NEUROLOGY

Malavia, Tulsi  
McGaw Medical Center of Northwestern University, Ill.  
Morrison, Andrew  
Hospital of the University of Pennsylvania  
Otte, Charlton  
McGaw Medical Center of Northwestern University, Ill.  
Safonova, Aleksandra  
Johns Hopkins Hospital, Md.  
Zusman, Benjamin  
Brigham and Women's Hospital/  
Harvard University, Mass.

### OBSTETRICS AND GYNECOLOGY

Baron, Marissa  
University at Buffalo, N.Y.  
Edber, Simon  
Kaiser Permanente San Francisco Medical Center/  
UC San Francisco  
Flanigan, Margaret  
UPMC/University of Pittsburgh, Pa.  
Ifthikhar, Rafa  
UC San Diego Medical Center/University of California, San Diego  
Judge-Golden, Colleen  
Duke University Medical Center, N.C.  
Kumar, Aarti  
NYU Langone Medical Center, Bellevue Hospital/  
New York University  
Leone, Anna  
University North Carolina Hospitals  
Madde, Ankitha  
University of Wisconsin Hospital and Clinics  
O'Connor-Terry, Carly  
UPMC/University of Pittsburgh, Pa.  
Panko, Audrey  
McGaw Medical Center of Northwestern University, Ill.  
Pickus, Benjamin  
University of Wisconsin Hospital and Clinics  
Raymond, Megan  
Thomas Jefferson University Hospital, Pa.  
Sederdahl, Bethany  
Christiana Care Health System, Del./Thomas Jefferson University

### OBSTETRICS AND GYNECOLOGY— PRELIMINARY

Levine, Melanie  
Temple University Hospital, Pa.

### OPHTHALMOLOGY

Campos, Patricia  
UPMC/University of Pittsburgh, Pa.  
Nkrumah, Gideon  
UPMC/University of Pittsburgh, Pa.

### ORTHOPAEDIC SURGERY

Canton, Stephen  
UPMC, University of Pittsburgh, Pa.  
Paras, Tyler  
UC San Diego Medical Center/  
University of California, San Diego



**LEFT:** Newly matched (and matching!) twin brothers Travis (with longer hair) and Bryce Churilla are headed to Northwestern University and Johns Hopkins, respectively. **RIGHT:** Students celebrate and show off their matches, written on the backs of their shirts. Photos: John Altdorfer (left) Tom Altany/University of Pittsburgh (right).

## OTOLARYNGOLOGY

Belsky, Michael  
Stanford University Programs, Calif.  
Bowers, Eve  
University of Miami Health System/  
Jackson Health, Fla.  
Oberlies, Nicholas  
UPMC/University of Pittsburgh, Pa.

## PATHOLOGY

Jerome, Jacob  
UPMC/University of Pittsburgh, Pa.  
Willis, John  
Duke University Medical Center, N.C.

## PEDIATRICS/PSYCH/ CHILD PSYCHIATRY

Keller, Evan  
UPMC/University of Pittsburgh, Pa.

## PEDIATRICS

Castillo dela Cruz, Patricia  
University of Washington Affiliated Hospitals, Wash.  
(Research Track)  
Churilla, Travis  
Lurie Children's Hospital of Chicago/McGaw Medical  
Center of Northwestern University, Ill.  
Corey, Catherine  
UPMC/University of Pittsburgh, Pa. (Research Track)  
Davis, Camille  
Children's Hospital Los Angeles/University of  
Southern California  
Gheri, Alexis  
Walter Reed National Military Medical Center, Md.  
Heck, Carly  
UPMC Children's Hospital of Pittsburgh/University of  
Pittsburgh, Pa.  
Hill, Amber  
C.S. Mott Children's Hospital/University of Michigan  
Jordahl, Alexa  
UH Rainbow Babies & Children's Hospital/Case  
Western University, Ohio  
Lanyi, Maria  
UPMC Children's Hospital of Pittsburgh/University of  
Pittsburgh, Pa.  
Marburger, Brady  
UPMC Children's Hospital of Pittsburgh/University of  
Pittsburgh, Pa.  
Martin, Katherine  
Lurie Children's Hospital of Chicago/McGaw Medical  
Center of Northwestern University, Ill.  
Okoniewski, William

Lehigh Valley Hospital, Pa./University of South Florida  
Ribar, Ellen  
Children's Hospital Colorado/University of Colorado  
Serody, Katelin  
UPMC Children's Hospital of Pittsburgh/University of  
Pittsburgh, Pa.  
Shah, Sapna  
Montefiore Medical Center/University Hospital for  
Albert Einstein College of Medicine, N.Y.  
Waltz, Gail  
UPMC Children's Hospital of Pittsburgh/University of  
Pittsburgh, Pa.  
Weber, Margaret  
University of Minnesota Medical Center  
Zurawel, Ashley  
Lurie Children's Hospital of Chicago/McGaw Medical  
Center of Northwestern University, Ill.

## PHYSICAL MEDICINE AND REHABILITATION

Brown, Roshawn  
UPMC/University of Pittsburgh, Pa.  
Chiang, Michael  
Harvard Spaulding Rehabilitation Hospital,  
Harvard University, Mass.

## PLASTIC SURGERY (INTEGRATED)

Tompkins-Rhoades, Casey  
UCSF Medical Center/University of California,  
San Francisco

## PSYCHIATRY

Altmann, Helene  
UPMC/University of Pittsburgh, Pa.  
Auster, Lauren  
UCSF Medical Center/University of California,  
San Francisco, Calif.  
Collins, Elliot  
University of Washington Affiliated Hospitals, Wash.  
(Research Track)  
Ferguson, Kortni  
Stanford University Programs, Calif.  
Kim, Paul  
UPMC/University of Pittsburgh, Pa.  
Long, Kevin  
Zucker Hillside Hospital/Zucker School of Medicine at  
Hofstra/Northwell, N.Y.  
Marengo, Laura  
Massachusetts General Hospital/Harvard University  
Newmark, Jordyn  
Carolinas Medical Center/Wake Forest University, N.C.  
Oh, Cristine  
Stanford University Programs, Calif.  
Post, Jordon  
University of Illinois Hospital

## PSYCHIATRY/CHILD PSYCHIATRY

Oyefusi, Vivianne  
UT Southwestern Medical Center/  
University of Texas Southwestern

## RADIATION ONCOLOGY

Wingrove, Peter  
University of Virginia Health System

## RADIOLOGY-DIAGNOSTIC

Snyder, Matthew  
UPMC/University of Pittsburgh, Pa.

## SURGERY-GENERAL

Ayoade, Oluwaseun  
Yale New Haven Hospital, Conn.  
Cai, Jinman  
Virginia Tech Carilion Clinic  
Fuentes, Kathleen  
Lahey Clinic/Tufts University, Mass.  
Furman, Leah  
UPMC/University of Pittsburgh, Pa.  
Herman, Paul  
University of Washington Affiliated Hospitals, Wash.  
(Research Track)  
Kern, Caelie  
UPMC/University of Pittsburgh, Pa.  
Koesarie, Kathleen  
Conemaugh Memorial Medical Center, Pa.

## SURGERY-PRELIMINARY

Henderson, Andrew  
Duke University Medical Center, N.C.  
O'Neil, Scott  
University of Washington Affiliated Hospitals  
Wilson, Arianne  
University of Chicago Medical Center, Ill.

## CARDIOTHORACIC SURGERY

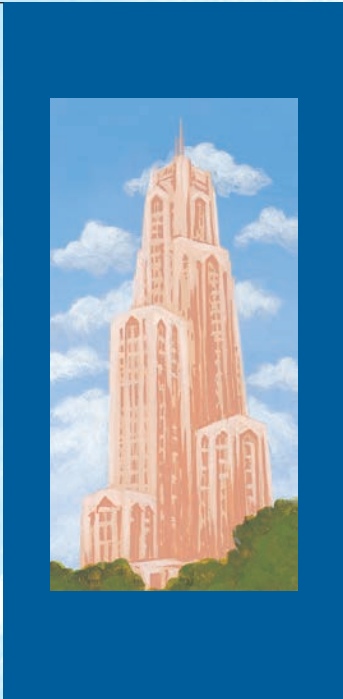
Brown, James  
UPMC/University of Pittsburgh, Pa.

## THORACIC SURGERY

Humar, Rishab  
Cedars-Sinai Medical Center, University of California,  
Los Angeles

## UROLOGY

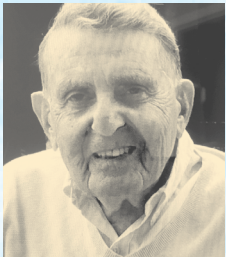
Hudson, Chandler  
Southern Illinois Healthcare



## CLASS NOTES

### '50s

Pediatrician **Bernie Putter** (MD '59) saw salt-like spots on the patient's cheek, confirming what a younger physician suspected but hadn't witnessed before—measles. "You see it once, you'll never forget," says Putter of the telltale Koplik spots. Putter was practicing in Port St. Lucie, Florida, in 2015 when he helped diagnose the state's first locally acquired measles case in some time. By working in Florida after practicing on Long Island for 36 years, Putter says he was following advice from his late mentor Paul Caplan (see obituary, Fall 2020), who told Putter over one of their supper breaks in the St. Margaret cafeteria to practice medicine where he wanted to live.



Putter



Teris

connects hospital systems, nursing homes, social service agencies and higher education systems to "improve the health and well-being of community members," Teris says. In March 2020, he helped establish CCN's COVID-19 Telehealth Assistance Program,

### '70s

**Wayne Teris** (MD '79) is chief medical officer of Care Compass Network (CCN), a nonprofit organization in Binghamton, New York. Originally funded by New York Medicaid, CCN

allowing social care organizations, behavioral health providers, substance-use disorder providers and private primary care practices in the network to deliver care safely during the pandemic. "Most of our partners," says Teris, "indicated that this program was critical to their survival during lockdown."

### '90s

**Antonio Hardan** (Psychiatry Fellow '96) is professor of psychiatry and behavioral sciences at Stanford University, where he also directs the Autism and Developmental Disabilities Clinic and the Division of Child and Adolescent Psychiatry. Hardan's autism research uses neuroimaging and biologic markers to assess "who benefits most from a specific intervention," he says. He's also researching the efficacy of parental intervention: "There are not enough resources out there to deliver treatment," Hardan notes. So "one approach we've been examining is training parents to help their children learn new skills," allowing them to deliver crucial interventions at home when professionals may not be available.



Hardan

### '00s

**Kamal Khanna** (PhD '04) is associate professor of microbiology at New York University. His research focuses on understanding how the immune system, via a close study of macrophages, responds to respiratory infections; that research focus narrowed last spring. "Once the pandemic hit," Khanna says, "half my lab switched to studying SARS-CoV-2."



Khanna

Just prior to the pandemic, Khanna says, his lab discovered a macrophage responsible for "rewinding things back down" in response to infection-related inflammation. These findings were featured in the March 2020 issue of *Science Immunology*.

When **Natalie Gentile** (MD '14) and **Kirsten Lin** (MD '06, Family Medicine Resident '09)—both independent-practice physicians in the Pittsburgh area unaffiliated with a large health system—first learned how the COVID-19 vaccine



Gentile

would be distributed, they recognized immediately the disparate access that their fellow unaffiliated providers would face. "We had a need and recognized that need in others," Gentile says, "so we created the opportunity for us all to get taken care of." After registering with Pennsylvania's Department of Health as a provider and smoothing some bumps in the road—like delayed shipments and logistical hurdles—their clinic has vaccinated more than 1,000 frontline workers. It's largely staffed by volunteers, including Pitt Med students.

**Robert Tomko** (PhD '08) is assistant professor of biomedical sciences at Florida State University, where he

received the University Teaching Award in 2019. Tomko's lab currently researches the 26S proteasome: "a protein recycling center inside our cells," he says, "that breaks down damaged, defective or otherwise unneeded proteins into building blocks that can be used to make new proteins." Tomko aims to "reverse engineer" the proteasome in order to understand its functional mechanisms more intimately.

"These advances," he says, "will help us to discover new and interesting chemicals that could potentially be developed into drugs" for proteasome-dysfunction-linked cancers and neurodegenerative disorders.



Lin



Tomko

## '10s

“Teaching can be chaotic in a clinical setting,” says **Michael Cosimini** (MD '11), assistant professor of clinical pediatrics at Keck School of Medicine of USC. To keep students and trainees engaged, he created Empiric, a 15-minute card game. It teaches evidence-informed prescribing practices for antibiotics, incentivizing conservative use of the drugs to discourage fueling the growing threat of antimicrobial resistance. Cosimini has also published on podcast-



Cosimini



Vella



Quesnelle

ing in medical education and is a frequent contributor to the pediatric CME podcast Peds RAP. In fact, after reading about allergist **Dave Stukus**' (MD '02) work in Pitt Med, Cosimini interviewed him for a two-part segment, “Allergy Myths.”

**Laura Vella** (MD, PhD '10) is assistant professor of pediatrics at the University of Pennsylvania and an attending physician in the Division of Infectious Diseases at Children's Hospital of Philadelphia. The COVID-19 pandemic's onset has “added an entire new component to my work,” she says, both as a researcher and a clinician. Her primary research area focuses on the immune response to infections and vaccinations. In July 2020, Vella's research on pediatric COVID-19 cases presenting with multi-system inflammatory syndrome was published in *Science Immunology*, confirming that critical illness after SARS-CoV-2 infection is associated with marked activation of the immune system.

**Kelly Quesnelle** (PhD '12, Postdoc '14) is associate professor of biomedical sciences at Western Michigan University's Homer Stryker MD School of Medicine. There, she codirects the hematology and oncology course and serves as the pharmacology discipline director for the medical curriculum. She received the International Association of Medical Science Educators' Early Career Award for Excellence in Teaching and Innovation in 2019. Her recent research considers responsible social media use in the classroom: “[These] platforms,” she says, “are a wonderful way to be accessible to students and faculty peers—always very important, but especially in the midst of a pandemic.”

—Cara Masset, Rachel Mennies, Elaine Vitone

## SPOTLIGHT

### STUART KAPLAN: RELIEF AND RENEWAL

**G**etting a tattoo is typically a choice. Perhaps it's a memory of someone's best day or a reminder of strength after their worst. For victims of sex trafficking, tattoos—a form of branding by their pimps—are scars of abuse.

**Stuart Kaplan** (Res '84) strives to give victims a physically clean slate by removing their brandings. For three decades, Kaplan, a clinical assistant professor of medicine and dermatology at the UCLA Geffen School of Medicine, has volunteered with Children of the Night, a nonprofit that helps sexually exploited children. According to the National Center for Missing and Exploited Children, the average age of child sex-trafficking victims is 15. “These girls have the emotional scars,” Kaplan says, “and then they have physical manifestations of these scars.”

Kaplan sees up to four Children of the Night patients per week. Each tattoo can take up to 10 treatments to remove, depending on the color, amount of ink and whether the tattoo was done professionally. The protocol is to use a laser to gradually break the ink particles into smaller pieces until they can be absorbed by the body's white blood cells.

Even receiving the initial numbing injection can be traumatic for victims who were branded. “It's almost reliving the experience they had before,” Kaplan explains. He has removed pimps' names from places as intimate as patients' genitalia and the insides of their lips. Sometimes patients cry, not always from physical pain, but out of emotional relief.

Kaplan, who has a private practice in Beverly Hills and is founder and CEO of KAPLAN MD Skincare, was drawn to dermatology to help people feel better about themselves. “The skin is the window to the rest of the body,” he says. Kaplan has diagnosed brain tumors, thyroid conditions and metabolic problems, all by observing patients' skin. Of his work with Children of the Night, he says: “I will remove the tattoo no matter how difficult it is. I want to show these girls that there are good people out there, because they have not seen the best side of humanity.” —Samantha Paige Rosen



COURTESY KAPLAN MD, INC.



Kaplan helps teens who've been exploited.





## DEBORAH GENTILE: HELPS KIDS LIVING DOWNWIND

BY SHARON TREGASKIS

**D**eborah Gentile (MD '94) was an associate professor of pediatrics at Drexel University in 2010 when she signed on as a clinician at a series of “asthma camps” for families living in medically underserved Pittsburgh neighborhoods. The events combined screening and patient education with hands-on sports drills led by professional and college athletes.

Gentile was skeptical when school nurses at the camps told her that, in their schools, nearly half of the students—five times the national average—used rescue inhalers. Then the pediatric allergist and her colleagues started crunching numbers. Some 20% to 30% of camp participants had an asthma diagnosis or met the screening criteria. Yet fewer than 50% of the children who needed care had the prescriptions or the know-how to prevent asthma attacks.

A chronic inflammatory condition, asthma makes the lungs hypersensitive, triggering severe airway inflammation, coughing, even suffocation in response to irritants like respiratory infection

or secondhand smoke. Over the long haul, uncontrolled asthma impedes sleep, school attendance and extracurricular participation.

With the right meds, however, families can keep symptoms in check. “There are so many things we can do to help children with asthma live healthy, productive lives,” says Gentile, who has spent the past decade analyzing asthma rates among Pittsburgh-area kids living downwind from power, steel and coke-production plants.

Asthma is a “disease of disparities,” says Gentile. Neither the risks of developing asthma nor access to the screening and treatment that control it accrue proportionally. Air quality is worse in poorer neighborhoods, and poverty exacerbates exposure’s effect: The hours-long commute via public transit to an affordable provider can put treatment beyond reach, and because of Pennsylvania’s low reimbursement rates, few private allergists accept public insurance.

Gentile was funded by the Heinz Endowments in 2012 to run elementary school-based asthma clinics. Fifteen schools hosted the free screening events; the vast majority were near major Mon Valley polluters. In November 2020, the *Journal of Asthma* published Gentile’s latest analysis of data from those screening clinics, on the role of outdoor air pollution on asthma prevalence and control. Of the 1,202 children Gentile and her colleagues screened, 22.5% had asthma. Black children fared worst: 26.8% had asthma.

While the investigators statistically accounted for factors like race, socioeconomic status and exposure to secondhand tobacco smoke, they were unable to achieve the gold standard of experimental study design—inclusion of a control group. They simply couldn’t find an elementary school distant from the smokestacks at which students matched the participants’ racial and socioeconomic demographics. “It’s an environmental justice issue,” says Gentile. “The kids who live nearest to these sites are poor and African American. Their families lack the means to move away.”

Clairton’s residents live in the shadow of North America’s largest coke facility. After a plant fire there in December 2018, Gentile documented a rise in asthma diagnoses and exacerbation of symptoms among adults. She subsequently testified before the Pennsylvania Senate to advocate for stricter emissions controls. In 2019, she received the Michelle Madoff Award of Environmental Excellence from Pittsburgh’s Group Against Smog and Pollution. That same year, she established the nonprofit Community Partners in Asthma Care to formalize her ongoing efforts.

The nonprofit’s first venture—a dedicated asthma clinic, headed by Gentile—features a partnership with a federally qualified health center (FQHC) in Clairton. “We did the math,” says Gentile, who hopes to prove that when delivered through an FQHC, high-quality asthma care can be accessible for patients and affordable for providers. “This model could generate revenue for the community health center so we could train an asthma navigator, bring in health educators.” At the clinic ribbon cutting in November 2020, Gentile wielded the outsized ceremonial scissors. ■

COURTESY GENTILE



Asthma is a “disease of disparities,” says Deborah Gentile. (No relation to Natalie Gentile, page 36.) “But [Deborah] has volunteered for us doing vaccines!” says Natalie.

**ALBERT G. LIDDELL III**  
MD '63, RES '64, '65, '68  
NOV. 18, 2020

**JOSEPH W. BARDZIL**  
MD '64  
JAN. 17, 2021

**GEORGE H. BENZ JR.**  
MD '67  
DEC. 24, 2020

**ROBERT L. KINCHELOE JR.**  
MD '67  
FEB. 25, 2021

**HOWARD S. STURIM**  
RES '67  
MAR. 12, 2021

**LEO P. KWELLER**  
MD '69  
DEC. 13, 2020

**STEVEN WILLIAM THEIS**  
MD '69, FEL '74  
JAN. 8, 2021

**'70s**  
**AUGUSTO N. DELERME-  
MARTINEZ**  
RES '70, '73  
DEC. 23, 2020

**NONITA T. LIM UY**  
FEL '71  
DEC. 4, 2020

**SAMUEL J. WINT**  
MD '71  
JAN. 26, 2021

**OMAR I. BHUTTA**  
RES '74  
MAR. 8, 2021

**DAVID WESTLEY LINCOLN II**  
PHD '79  
MAR. 27, 2021

**'80s**  
**MICHAEL J. GREGOREK**  
MD '81  
DEC. 17, 2020

**CRAIG B. QUIGLEY**  
MD '81  
MAR. 25, 2021

**'90s**  
**PAUL D. FREESWICK**  
RES '97  
MAY 5, 2020

**SUSAN Y. ISHIYAMA**  
RES '99, '00  
JAN. 23, 2021

**'00s**  
**EZMIN GEORGE**  
MD '06  
FEB. 25, 2021



Emery Greene Mullen celebrates her second birthday in February. (Photo courtesy Mullen family.)

## UNHINDERED

Watching 2-year-old Emery Greene Mullen toddle about with her sister, you would never guess that doctors were once unsure whether she would be able to walk.

In the womb, Emery was diagnosed with the most severe form of spina bifida. Part of her spinal cord formed outside of the spinal column and was protruding through the skin on her back. In the worst cases, the condition can cause difficulty walking, loss of control of the bowel and bladder, as well as hydrocephalus, where fluid builds up in the brain and must be drained with a shunt.

Allee Mullen, Emery's mother, was 21 weeks pregnant when she learned of her baby's condition. As a nurse in the pediatric ICU at UPMC Children's Hospital of Pittsburgh, she understood the implications immediately.

"It was very devastating," she says. "We spent days with doctors."

Allee Mullen and her husband, Kevin Mullen, talked extensively with the surgeons who would later become their daughter's namesakes: Stephen Emery, professor of obstetrics, gynecology and reproductive sciences, who directs the Center for Innovative Fetal Intervention at UPMC Magee-Womens Hospital, as well as Stephanie Greene, associate professor of neurological surgery and director of perinatal neurosurgery at Children's.

The Mullens decided that Allee should undergo surgery to repair Emery's spinal cord before she was born. It would be the first time the UPMC team attempted the in utero procedure.

Though this is a somewhat new approach, a study published Feb. 8, 2021, in *JAMA Pediatrics* affirms that fetal surgery is likely to improve outcomes for children with spina bifida well into their first decade; these children are more likely to walk and perform self-care tasks independently than are children who had postnatal repairs. Pitt's Amy Houtrow, professor and vice chair of physical medicine and rehabilitation, as well as division chief of pediatric rehabilitation medicine at Children's, was the study's lead author.

Emery is doing just fine. Though she has some problems with her bowel and bladder, as well as slightly irregular motor functions, she gets around like most playful 2-year-olds. "She has surpassed all the expectations that everybody—all the doctors and everybody—had for her. And it's so fun to watch," Allee Mullen says. —Sarah Stager

# CALENDAR

FOR ALUMNI & FRIENDS

Unless otherwise noted, for information:  
 Michael Downs at 412-648-9059  
 or [mld139@pitt.edu](mailto:mld139@pitt.edu)

**SENIOR AWARDS CEREMONY**  
 MAY 20, 3 P.M.  
 Soldiers & Sailors Memorial Hall  
 & Museum

**SCOPE AND SCALPEL**  
 MAY 21, 7:30 P.M.  
 MAY 23, 3 P.M.  
 August Wilson Center  
 For information:  
[engage.pitt.edu/project/25510](http://engage.pitt.edu/project/25510)

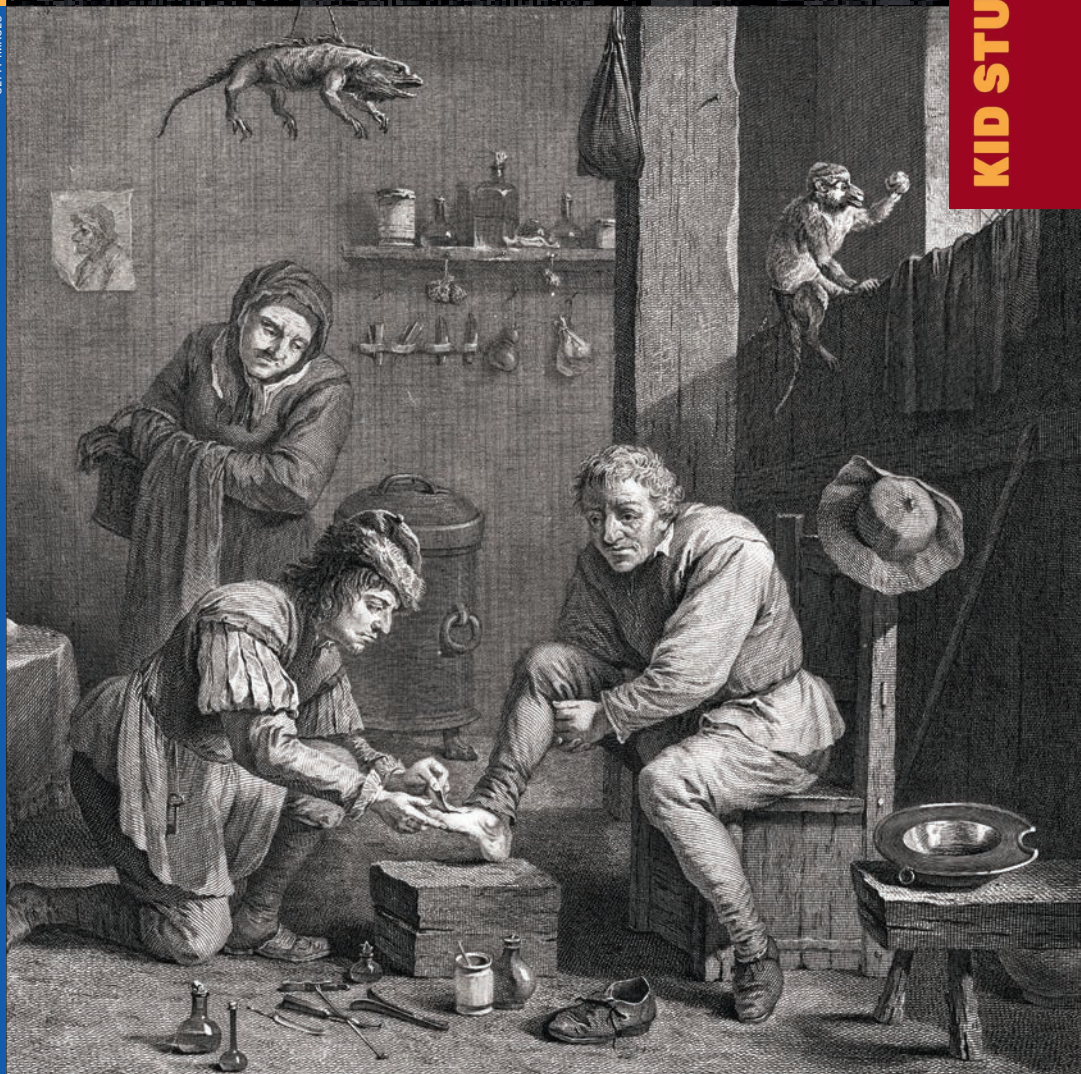
**SCHOOL OF MEDICINE  
 COMMENCEMENT**  
 MAY 24, 11 A.M.  
 Petersen Events Center

**WHITE COAT CEREMONY**  
 AUGUST 8, 10:30 A.M.  
 Carnegie Music Hall

**HOST A STUDENT!  
 FALL-WINTER**  
 Help Our Students Travel (HOST) is  
 MAA's new program to support fourth-  
 year Pitt Med students through inter-  
 views for residency. We'll match stu-  
 dents with interested alumni based on  
 location, institution and program. The  
 program will help determine the safest  
 ways to connect during the pandemic.  
 To register: <http://pi.tt/HOST>

To find out what else is happening at  
 the medical school, visit [health.pitt.edu](http://health.pitt.edu)  
 and [maa.pitt.edu](http://maa.pitt.edu)

GETTY IMAGES



Honk if you love leeches! Let's hear it for medicinal parasites!

## FOR REAL! TWEEN SCIENCE



**Warning: This story is not for the squeamish.**

Say you lose a finger. And let's assume you've elevated your injured hand and compressed the blood flow. If a digit or other body part is dangling or detached, your body kicks into damage control and floods the wound with blood clots—the semisolid stuff of scabs—which will further limit blood flow; in time, they'll harden up and fill in while you heal.

Trouble is, all that clotting works against the doc who's stitching you back together. Because pretty soon, your hand has already cut its losses, so to speak, and said "peace out" to that finger. With all that clotting hindering blood flow, the re-stitched digit can die.

Drugs can stop the clotting, but those have side effects. So what's a doc to do? Send in the parasitic worms!

Leeches have been used by healers dating at least as far back as ancient Egypt, 2,500 years ago. Today, the parasites at the UPMC Presbyterian inpatient unit (a European species known as *Hirudo medicinalis*) are all too happy to latch onto reattached body parts, skin grafts and transplanted tissue. (They're also helpful for people with circulation problems caused by diabetes.) Once there, leeches hold onto the patient's skin using sucker-tipped faces and sucker-tipped tails.

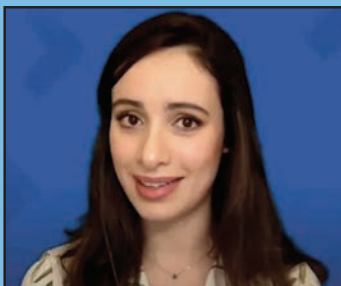
And then? Chow time, to the tune of five times their body weight (15 milliliters, or about a tablespoon, of blood).

Each leech has three jaws that leave a tiny Y-shaped wound—but no scar. Leeches secrete more than 50 different proteins: Some are numbing, some help widen blood vessels and some quash clotting. Altogether, this super saliva works better than a lot of drugs. In fact, leeches are so effective at this job that they're approved by the Food and Drug Administration as a medical device.

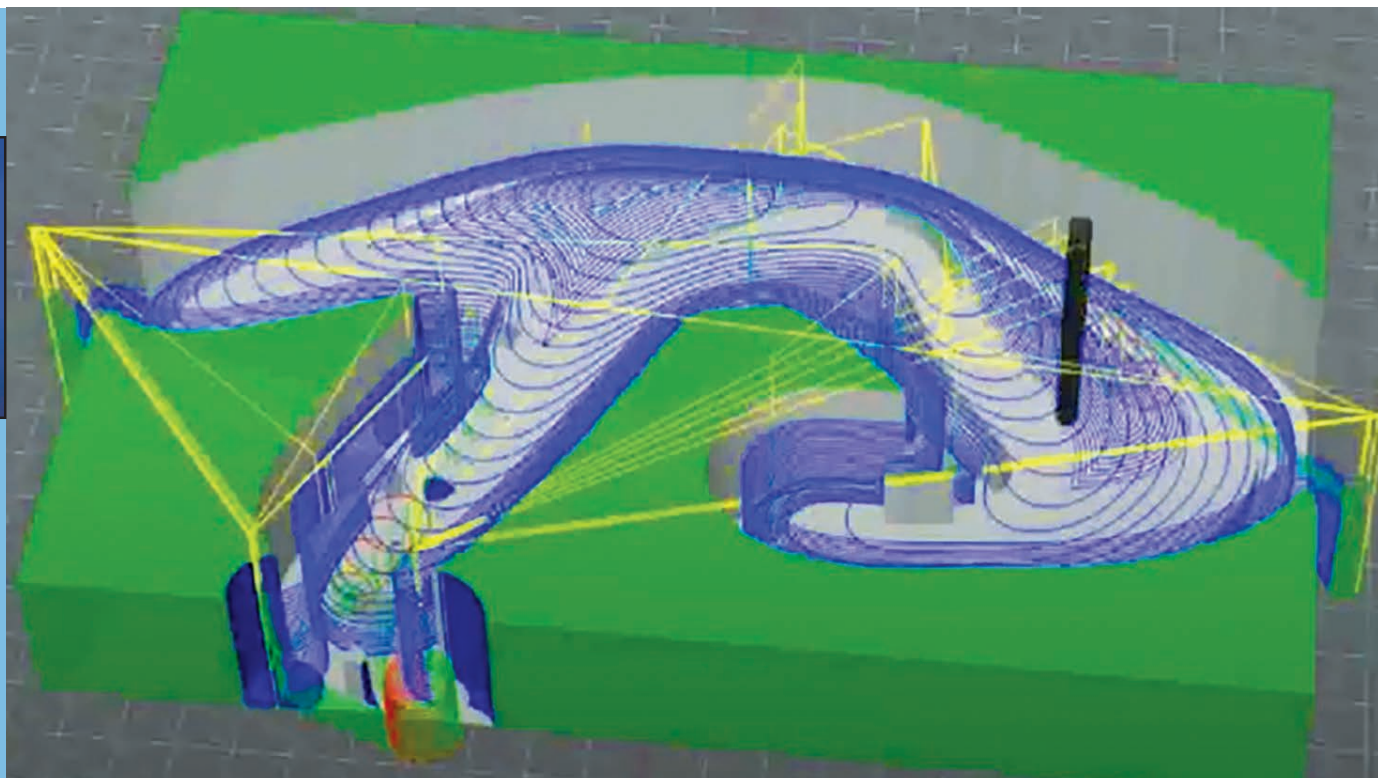
Not bad for a blood-sucking fiend. —Elaine Vitone

Thanks to Pitt's Alfred L'Altirelli (PharmD '06), administrative director of pharmacy at UPMC Presbyterian and adjunct professor of pharmacy at Pitt, for helping us latch onto this topic.

IMAGES, RIGHT: REPLICA CAD/UNIVERSITY OF  
PITTSBURGH, THE LAMANS: AMEE OBIDZINSKI/  
UNIVERSITY OF PITTSBURGH



The Lamans' planned gift will benefit Pitt Innovation Challenge (PInCh) projects like REPLICA (shown here), a custom-made cartilage ear implant, which won a \$100,000 award last fall. REPLICA is the brainchild of plastic surgeon Liliana Camison (above), who is part of a team of Pitt and Carnegie Mellon University researchers.



# Seed. Succeed.

David Laman (MD '70), a retired pulmonologist, remains something of a student of the sciences. He reads medical literature for kicks, just for the love of watching emerging biomedical approaches to addressing disease take shape.

"There's so much exciting biotechnology out there that occurs at the very basic level," he says. As an example, he points to Jennifer Doudna, the Berkeley biochemist who pioneered CRISPR gene editing and received the 2020 Nobel Prize in Chemistry.

"There are going to be multiple other uses for CRISPR technology, including treating sickle cell disease, thalassemia and who knows what else that wasn't on her original project grant."

Sadly, it can be tough for bench researchers—particularly up-and-comers—to get funding, he says. That realization inspired him and his wife, Verna Laman, to establish a planned gift supporting pulmonary and critical care medicine as well as the PInCh program (short for Pitt Innovation Challenge).

"I think it's a really slick idea" says David Laman of PInCh, which Pitt's Clinical and Translational Science Institute designed to generate solutions to challenging health problems. Through seed funds, PInCh helps bold new ideas—and the innovators behind them—get a fighting chance.

The Lamans wanted to build something enduring for the benefit of young scientists, "and be helpful for the future," he says.

"I think that someplace out there, there will be another Doudna."



David and Verna Laman

To make a gift, contact Jen Gabler: 412-802-8317, jag188@pitt.edu, Giveto.pitt.edu