Throughout this city — on the hill where the School of Medicine sits and in neighborhoods to our east and west — the biomedical landscape is transforming.

A new wing for the medical school, enviable biomedical research and manufacturing hubs, modern patient-centered hospitals — projects years in the making are now taking shape. They are key to a larger effort that’s more meaningful than brick and mortar or shining towers of glass. This is our time to build something extraordinary.

The structures rising across our campus and city will be integrated into, and integral to, a medical school that is becoming all the more interprofessional, proactive, entrepreneurial and in tune with what matters most. A school whose faculty, staff and students learn from the people and communities they serve as much as they do from benchwork or clinical rounds. And who know that they may need to step outside of convention and their own comfort zones to solve what seem to be intractable problems.

There are plenty of such problems in American health care: "inequitable," "out of reach," "unaffordable"… these are the modifiers commonly used for the ills we are tackling together. As I read about recent accomplishments of Pitt Med people in these pages, other words come to mind. Words like "ingenious," "indomitable" and "inspiring." I’m very proud of what Pitt Med people are accomplishing.

Yes, here in Pittsburgh, we are building buildings; at the same time, we’re building understanding, relationships, solutions, momentum, the future. And, of course, we aren’t doing this alone—but only through the generosity and support of people and organizations that share our vision. I hope you’ll join us as we build an even more promising tomorrow.

Anantha Shekhar, MD, PhD
Senior Vice Chancellor for the Health Sciences
John and Gertrude Petersen Dean, School of Medicine
ed student Shruthi Venkatesh (Class of ‘28) knew that, sometimes, people with multiple sclerosis had to buy expensive wheelchairs, stair lifts and other assistive devices to get around in their day-to-day lives. But it wasn’t until she talked to people in support groups that she realized how daunting and frustrating the process can be.

In 2021, as part of a new program where med students can elect to spend the summer after their first year learning from people in the community about a specific aspect of their health, Venkatesh got an earful. She spoke with members of the Pittsburgh MS Empowerment Support Group and the local chapter of the National MS Society.

“Each insurance company is different in terms of approved assistive devices, and many do not offer coverage at all,” they told her. Grants from national nonprofit organizations also can be difficult to access, they added.

Venkatesh was one of two winners of the Jeannette South-Paul Award for Social Determinants of Health Enrichment in 2021. The community interviews paired nicely with Venkatesh’s Dean’s Summer Research Project. For that, she studied the “exposome” in MS — that is, how the totality of environmental and other exposures over a lifetime can influence the health of someone with MS.

One woman from the support group told Venkatesh that she was able to purchase an expensive joystick-operated wheelchair and home modifications. But because her disability forced her to quit her job, she was worried she wouldn’t be able to afford future out-of-pocket costs as her condition deteriorated. “It was an eye-opening experience,” says Venkatesh, who is getting a dual MD/PhD degree in neuroscience.

Venkatesh also saw racial disparities. Many Black members of the support group told her they were denied workplace accommodations that employers often granted white workers.

Her summer research project has made Venkatesh even more interested in researching neurodegenerative diseases such as MS and Alzheimer’s. When she becomes a doctor, she says, she will be more sensitive to the day-to-day struggles of those living with chronic illnesses.

Danielle Gruen (Class of ’24) also won a 2021 Jeannette South-Paul Award. Gruen, who has a PhD in biogeochemistry from MIT and Woods Hole Oceanographic Institution, came to Pitt for her MD. She also came to explore how different people recover from trauma and prehospital care.

“When she becomes a doctor, Venkatesh says, she will be more sensitive to the day-to-day struggles of those living with chronic illnesses.”

“IT’S REALLY IMPORTANT TO AMPLIFY” VENKATESH SAYS, WHO IS INTERESTED IN PRACTICING EMERGENCY MEDICINE.

Jeannette South-Paul Award winners

Shruthi Venkatesh

SDoH and Community Mentor: Members of the Empowerment Support Group and Pennsylvania Keystone Chapter of the National MS Society

Dean’s Summer Research Project Mentor: Zongqi Xia, MD, PhD

“When she becomes a doctor, Venkatesh says, she will be more sensitive to the day-to-day struggles of those living with chronic illnesses.”

Danielle Gruen

SDoH Mentor and Community Advisor: Noble A-W Maseru, PhD, MPH and Philip Halten, MA

Dean’s Summer Research Project Mentor: Jason Sperry, MD, MPH and Francis Guyette, MD, MPH

“When she becomes a doctor, Venkatesh says, she will be more sensitive to the day-to-day struggles of those living with chronic illnesses.”
Molecular cartography

At least cells in the human body can divide and multiply to replace old cells and repair damaged tissue, but in response to certain stresses, cells can lose their ability to proliferate.

The rare cells that lose this ability are called senescent. They accumulate with age and probably contribute to cancer and age-related disorders, such as chronic lung disease, cardiovascular disease and dementia by pumping out signals that damage neighboring tissues.

The molecular landscape of senescence has remained relatively uncharted. To address this knowledge gap, the National Institutes of Health established the Cellular Senescence Network (SenNet). The program will award $125 million to 16 teams to form the new SenNet Consortium — two of the projects are led by Pitt researchers, who will receive a combined $31 million throughout five years.

Just as Google Maps provides detailed information about every locale it stores, SenNet will provide data and analysis about the process of senescence for cells, tissues and organs down to the molecular scale. The information will be available for any scientist to access.

Toren Finkel, an MD, PhD, Distinguished Professor of Cardiology and director of the Aging Institute at Pitt and UPMC, is leading the TriState SenNet Tissue Mapping Center, one of the two projects led by Pitt. It will contribute to the atlas by developing maps of senescence in heart and lung cells. The researchers will map gene expression and protein composition in senescent cells from human tissue slices and lab-grown mini organs and then characterize biomarkers of senescence. Finkel will collaborate with Melanie Königshoff, an MD, PhD, and Oliver Eickelberg, an MD, professors of medicine at Pitt.

“We don’t know if cellular senescence is one thing or many things,” says Finkel. “An analogy is cancer: Lung cancer, pancreatic cancer and lymphomas are all very different, even though we call them all cancer.”

In another discovery that advances scientists’ knowledge about aging cells, the Aging Institute’s Toren Finkel and Jay Xiaojun Tan, a PhD assistant professor of cell biology, identified the sequence of steps that cells take to fix leaks in their lysosomes. They call it the PITT Pathway.

Pathway found

Sensing is readily apparent in plants. The accumulation of senescent cells in humans leads to age-related disorders and cancer.

PROBLEMATIC PUMPS

New hope for a dangerous childhood heart condition

For the roughly 1,000 babies born in the United States each year with hypoplastic left heart syndrome (HLHS), the outlook is sobering: about a third don’t survive to see their first birthdays. Born without a working left ventricle — the heart chamber responsible for pumping oxygenated blood to the rest of the body — many of these children struggle even after surgery that allows the right ventricle to take over the function.

And yet, others with the condition grow up to lead relatively normal lives. New research from the lab of Cecilia Lo, the F. Sargent Cheever Professor who chairs developmental biology, points to a culprit behind the drastically different outcomes: an energy shortage in cells.

Just as the heart pumps blood, healthy heart cells pulse vigorously. But extensive damage to mitochondria — which provide energy to the cell — leads to languid pumping that could be fatal to a baby. Lo, a PhD, and her team found defective mitochondria in the cells of patients with both mild and severe HLHS, but the damage was more significant in the latter group.

For doctors at UPMC Children’s Hospital of Pittsburgh, which already has some of the best HLHS outcomes in the country, the findings will help identify the highest-risk patients and move them to the top of heart transplant waiting lists. What’s more, the researchers identified two drugs already on the market as potential treatments.

Jacqueline Kreutzer, an MD, who is the Peter and Ada Rossin Professor in Pediatric Cardiology at Pitt and codirector of the UPMC Children’s Heart Institute, says, “Dr. Lo’s groundbreaking research is critical to improving HLHS patients’ quality of life and shift traditional care approaches to a new level.”
**HIDDEN IN PLAIN SIGHT**

Clinicians and researchers are learning from Western Pennsylvania Amish and Mennonites, and saving lives.

When doctors learned that 15-year-old Sarah (not her real name) had a mitochondrial genetic disorder, the diagnosis was more than a first step in alleviating her seizures, strokes and vision trouble. For Pitt researchers, it was also a chance to reach a community that’s usually isolated from the medical world.

Sarah is Amish—one of Northwestern Pennsylvania’s roughly 13,000 Plain people (the collective term for Amish and Mennonite communities), who eschew modern technology and largely avoid conventional health care. Centuries of living apart from the larger population has limited their genetic diversity, and the medical consequences have long remained understudied in this corner of the commonwealth.

A team from UPMC Children’s Hospital of Pittsburgh that included Cate Walsh Vockley, a genetic counselor at the hospital, and Lina Ghaloul Gonzalez, an MD assistant professor of pediatrics in the Division of Genetic and Genomic Medicine, knew that Sarah’s diagnosis meant her family was at risk, too. Their outreach led to transformative care for others found to have the same mitochondrial DNA mutation as Sarah. The researchers have since developed programs to provide further genetic services for the community, including a clinic in Mercer County. Walsh Vockley and Ghaloul Gonzalez travel there once a month to offer families services closer to their homes.

Their work not only expands care for Plain communities but also increases overall understanding about genetic conditions. Says Ghaloul Gonzalez: “What we’re learning from the Plain community doesn’t just go back to that community.”

**THE RESEARCHERS HAVE SINCE DEVELOPED PROGRAMS TO PROVIDE FURTHER GENETIC SERVICES FOR THE COMMUNITY, INCLUDING A CLINIC IN MERCER COUNTY.**

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**A FRESH START**

This alliance launches careers and moves research forward.

In the midst of the recent labor shortage, organizers of clinical research have struggled to hire research assistants—positions critical to keeping important studies running. Pitt is bridging that gap by supporting a free workforce development program that is jumpstarting meaningful careers in the process.

The STRickland Research Training (START) program—part of the Bidwell Training Center’s medical assistant training program—provides students the experience and education necessary to support clinical research at the University of Pittsburgh and across the country. It will also diversify Pitt’s research workforce.

“The whole world is short-staffed right now,” says Laurel Yasko, an MPH, RN and operations executive director of Pitt’s Clinical and Translational Science Institute (CTSI). “That includes the research staff we need to complete scientific discoveries.”

CTSI director Steven Reis, an MD, and Yasko formed START in 2020 with Bill Strickland, former CEO of Manchester Bidwell Corporation and member of Pitt’s Board of Trustees (who won a MacArthur Fellowship, aka a “genius” award, in 1996). The program’s students—who are often seeking their second or third careers—are also invited to participate in a four-week externship, where they shadow researchers in a clinical setting. By fast-tracking the schooling and experience needed to become a clinical research assistant, START removes barriers that often prevent people from landing these positions.

“Partnering with Pitt’s CTSI,” says Strickland, “means that people who come our way to find meaningful careers now have a wider horizon of possibilities before them.” Adds Reis: “It will also enhance science at Pitt by bringing diverse perspectives and lived experiences to our work.”

“This program is providing Bidwell trainees with a new career path that can change their professional lives.”

—STEVEN REIS
At this stage, Avista is funded primarily by UPMC Enterprises—this innovation arm of the health system plans to invest $1 billion in life sciences start-ups by 2024. Pitt and UPMC’s collaborative commercialization efforts extend back to the 1990s, says surgeon Timothy Billiar, associate senior vice chancellor for clinical academics at Pitt and executive vice president of UPMC who has chaired Pitt’s Department of Surgery for 24 years. In the early days, the focus was on digital products. About five years ago, Pitt and UPMC created a more formal structure for also commercializing biological technologies. Several of the resulting companies have already made significant progress and have partnerships with, or been acquired by, pharmaceutical companies.

Avista is now partnering with Roche, notes Rob Lin, a PhD who is CEO of Avista, as well as a VP at UPMC Enterprises.

Moving breakthroughs and developments into the clinic so they can benefit patients is a top priority for Dean Anantha Shekhar, an MD, PhD, whose own discoveries for psychiatric disorders have been spun off into start-ups. He recently brought Evan Facher, a PhD and MBA who Pitt’s vice chancellor for innovation and entrepreneurship, onto his leadership team as associate dean for commercial translation in the School of Medicine. Among other responsibilities, Facher will help discern which med school innovations are truly ripe for commercialization. (In fiscal year 2022 alone, Pitt Med researchers filed 251 patent applications and launched 10 start-ups.)

Facher’s team welcomes new companies like Avista into a dynamic business environment through LifeX, an organization founded by Pitt that helps early stage life sciences companies in the region become a laboratory for disrupting existing biomanufacturing processes, which tend to be painfully slow and inefficient.

Pittsburgh’s progress and ambition is exciting for clinicians like Sahel who are eager to respond with “yes” when patients ask: Do you have any treatments to help me?

BUILD: SYNERGY
IDEA TO IMPACT.

PARTNERSHIPS CRUCIAL TO CURES
Fertile ground for life sciences start-ups

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A century ago, Pittsburgh’s East End became the site of one of the nation’s first Model T Ford assembly plants, lifting materials from rail tracks below to fabricate cars from the top floor down.

Today, that same building, situated between Baum Boulevard, Morewood Avenue and Centre Avenue, has been transformed and expanded by the University of Pittsburgh for another kind of construction — creating what are often patient-specific treatments to combat cancer and other diseases.

 Appropriately named The Assembly, the eight-story, $330 million structure is filling with researchers focused on four primary disciplines: immunology, cancer biology, women’s cancers and computational biology.

The former automobile and clothing factory sits just a block away from the flagship UPMC Hillman Cancer Center and expands the center’s research space by 50%, says Robert Ferris, an MD, PhD, and Hillman director as well as the Hillman Professor of Oncology. “It’s very fortuitous to find a place right nearby in such a crowded neighborhood,” he says.

The building is filled with references to its automotive history, from vintage photos in the elevators to a 4 1/2-story atrium known as the crane shed, occupying the space where cranes used to lift raw materials off train cars and deposit them on platforms that fed into the different floors.

As impressive as the building is, the real magic of The Assembly is its plan to foster serendipity by creating spaces where researchers from different disciplines can meet to share coffee, food and ideas.

“At the end of the day, the reason why this building is going to be successful is what always makes science successful: people,” says Greg Delgoffe, PhD director of the Tumor Microenvironment Center, whose labs have moved to The Assembly. “The whole point of this beautiful, historic place is that it brings together a number of really important sets of researchers.”

“What was the problem the Ford assembly building had to tackle? You needed to be able to concentrate your efforts and create something that could roll off the floor and be used.” In the same way, Delgoffe says, The Assembly will probe the raw materials of cancer to develop treatments that can be driven off the lot.

Next generation treatments

A Pitt/Hillman offshoot called Novasenta has finished a $40 million Series A financing round with the help of UPMC Enterprises, the health system’s commercial and innovation arm. Novasenta comprehensively maps the tumor microenvironment with proprietary computational platforms to uncover new druggable targets for a range of cancers.

Tumor Microenvironment Center director Greg Delgoffe, Hillman director Robert Ferris and interim immunology chair Darío Vignali cofounded the firm in 2018. Novasenta is one of several startups focused on cancer care to come out of Pitt. And now, as Assembly labs get into gear, expect to see more such promising ventures.

Complex patterns

With tens of thousands of molecular factors at play just in the human genome, how can scientists make sense of the genetic landscape of cancer and the immune system?

Harinder Singh, whose experimental and computational biology group is housed in The Assembly, says researchers are increasingly using machine learning approaches to find molecular patterns underlying certain cancers or autoimmune diseases — patterns that are too complex for any human to see. But the computational tools can’t reveal disease mechanisms or how to target them.

That’s where the creative work comes in.

The professor of immunology and director of the Center for Systems Immunology says, “Machine learning is very good at predicting features” of biological processes but “not able to interpret those features. For that, we still need human intelligence to come up with these causal explanations, which we can then experimentally test.”

Recharged

Many of the newest cancer treatments rely on the immune system rather than the blunter instruments of chemotherapy and radiation. One impressive example in recent years has been CAR T cell therapy, which has worked well against blood cancers like leukemia. But the therapy hasn't had much success in solid malignancies like liver and colorectal cancer. The microenvironment inside those tumors has very little oxygen and few nutrients, because those substances are consumed so quickly by the proliferating cancer cells. That impoverished landscape hinders the activity of the T cells, Delgoffe says, and they can become exhausted and lose their potency. His lab is exploring ways to restore vitality to T cells so they can work just as well inside those tumors as they do in the bloodstream.
I

n the United States, up to 20% of patients have major complica-
tions after a procedure, says Aman Mahajan, an MD, PhD, MBA who chairs the Department of Anesthesiology and
Perioperative Medicine. In fact, mortality after surgery is one
of the leading causes of death worldwide.

“Surgery can be incredibly difficult on a patient’s body.
In some cases, it can have the same toll as running a marathon,”
says Mahajan, the Peter and Eva Safar Professor at Pitt.

A 2018 cohort of 24 high-risk orthopaedic patients referred
to UPMC’s Center for Perioperative Care (CPC) lost 32 pounds
on average and had better outcomes.
Following about 10,000 patients enrolled in optimal care path-
yways for surgery across four UPMC hospitals throughout two
years, Stephen A. Esper, an MD and MBA, and Jennifer Holder-
Murray, an MD, reported a 30% increase in survival after several
types of procedures (Annals of Surgery, November 2020). Esper, an
assistant professor of anesthesiology and perioperative medicine,
directs the CPC. Holder-Murray is an associate professor
of surgery and surgical director of the CPC.

UPMC Health plan now requires patients referred for certain operations to participate in the department’s optimization programs, and a venture studio out of
New York is digitizing and commercializing Pitt’s
approach. Other elite medical centers are looking
to this new platform and coaching program, called Pip Care, to meet this critical need, says Mahajan.

“A patient pathway to recovery through shared decision-making

A PATIENT’S BODY. IN SOME CASES, IT CAN HAVE
THE SAME TOLL AS RUNNING A MARATHON.”
—AMAN MAHAJAN

HOW DOES A TEAM CARE FOR
THE PATIENT IN FRONT OF THEM?

The Pitt-developed Pal.M app enables providers to search millions of national
electronic health records for real-time guidance on diagnoses and treatments.

“I
n the literature, you will see things like ‘Race didn't
have any impact,’” says Margaret Rosenzweig, Pitt
Distinguished Service Professor of Nursing who, with
School of Medicine collaborators, studies disparities in
breast cancer outcomes. “You look back at the inclusion
criteria, and they are taking patients who don't have a
lot of comorbidities, who are pretty healthy. And, if the majority
population? Is that what you're trying to extrapolate? Probably
not. There’s always a tension between the rigor of needing
to do the science correctly versus doing the science in a
way that is meaningful and accessible.”

John Maier, assistant pro-

fessor of family medicine, concurs: “You often have a
guideline that’s built around
a great study that was done
at one or more institutions
that was well-controlled. For a study like that, they only let in people with that. So, in this
specific group, we know that if you give them this medicine, the outcomes will be good. And that’s great. But the odds — that the
patient who is sitting in front of us is exactly like those patients —
are really low.”

Clinical trial participants often don’t reflect the wide popula-
tion that will be using the treatments, and it’s hard to know which
treatments will help each unique patient. In Pitt’s Department of
Family Medicine, a project is under way to take on this challenge.

With support from the American Board of Family Medicine
Foundation and in collaboration with Pitt’s Clinical and Transla-
tional Science Institute (CTSI), the department will sponsor a pilot
study of the Pitt-developed Patients Like Mine (Pal.M) app, which
enables providers to search millions of national electronic health
records for real-time guidance on diagnoses and treatments. They’re
able to tap quickly into information about people with similar over-
lapping health issues and backgrounds as the patient who just walked
into the exam room.

THE LONGER-TERM GOAL:
REQUIRE ALL STUDENTS TO
LEARN ABOUT ARTIFICIAL
INTELLIGENCE TOOLS.

AI: IT’S FOR EVERY DOC

Just as they learn the intricacies
of the Krebs cycle, new genera-
tions of Pitt Med docs will learn about AI and machine learning.

In response to a call from
Dean Anantha Shekhar and
in collaboration with Shyam
Visweswaran, MD, PhD asso-
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informatics, John Maier, an MD,
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medicine, introduced the entire
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The school’s longer-term goal:
Require all students to learn about these tools in enough
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Maier’s introduction for the
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AAFs fellows
Three Pitt faculty members with appointments in the School of Medicine have been named to the most recent class of American Association for the Advancement of Science (AAAS) fellows, a distinctive honor within the scientific community—and a historic one as well, dating to 1874. (Kay Brummond, PhD professor of chemistry, was also honored with a fellow designation.)

When Sarah Gaffen, a PhD, first opened her laboratory in 1999, the number of peer-reviewed research papers about it—17—a family of enzymes and a number of substances secreted by our immune cells—could be counted on one hand. Now academic publications involving it—17 to 17—number in the tens of thousands, and the AAFS has recognized Gaffen for her lab’s 20-plus years of work on L−17 in fungal immunity and autoimmunity. Gaffen is the Gerald P. Rodnan Professor in the Department of Medicine.

Steven H. Little, a PhD, is internationally recognized for his research in pharmacuetics and biomimetic drug delivery systems. As a Distinguished Professor, the William Kepler Whitla Endowed Chair and chief of chemical and petroleum engineering in the Swanson School of Engineering, as well as a faculty member in the bioengineering, immunology, ophthalmology and pharmaceutical sciences departments, he has developed numerous new drug formulations, including a controlled drug release that mimics the body’s own mechanisms of healing and resolving inflammation. Little’s research shows potential for treating glaucoma and gum disease and for avoiding organ rejection after transplantation.

Jerry Vockley, an MD, PhD, came to UPMC Children’s Hospital of Pittsburgh in 2004 to lead the Division of Medical Genetics, now the Division of Genetics and Genomic Medicine. He is a professor of pediatrics and the Cleveland Family Professor in Pediatric Research at the School of Medicine and a professor of human genetics at the School of Public Health. Vockley directs an active research program on inherited disorders of energy and protein metabolism, focused on both understanding the genetic causes of these disorders and developing new treatments for them. His research has earned him awards from both the National Institutes of Health and the American Society of Human Genetics; he is also recognized for his role in galactosemia research. Vockley is a fellow of the American Society for Clinical Investigation (ASCI), founded in 1908, and is one of the most esteemed honor societies of physician-scientists. Membership recognizes a researcher’s significant contributions, at a relatively young age, to the understanding of human disease.

Vockley, associate professor of psychiatry and of cell biology, focuses on improving our understanding of the mechanisms associated with disorders such as addiction, schizophrenia and Parkinson’s disease.

Sperrey, professor of surgery and of critical care medicine, focuses on prehospital trauma care and sex-based outcome differences following injury or surgery.

A quick look at our flourishing community of scholars.

2022/2023 STATISTICS

FACULTY

2,442 regular faculty members (as of November 2021)
1,778 volunteer faculty members
79 current members of the Academy of Master Educators

TRAI N EES

620 postdoctoral associates and fellows (as of September 2021)
1,497 residents and 453 fellows (as of August 2022)

The Class of 2023 was the 50th med student class to complete the four-year longitudinal research project experience.

2022 PITT MED GRADUATES

87 MS, 52 PhD, 10 MD/PhD (MSTP) and 156 MD students

371 registered PhD students (including those in the Medical Scientist Training Program) and 148 MS students

346 manuscripts published (85 submitted, 85 in press)
397 presentations (at national and international conferences, 200 of regional or local meetings)
146 local research awards

610 registered MD students (including 334 women and 276 men; 231 are from Pennsylvania)

High-impact research.

The COVID-19 Medical Response Office

A new addition to the slate, this award was created to recognize the extraordinary service performed by the CMRO. At the time of the award, the office was led by John Williams, then-CMRO director, and Henry L. Hillman Professor of Pediatric Immunology, and Else Martin, associate director and assistant professor of medicine. The CMRO kept Pitt campuses informed and promoted a sense of community through exceptionally challenging times.

2022 Chancellor’s Awardees

DISTINGUISHED RESEARCH AWARDS

David Brent, MD Distinguished Professor of Psychiatry
Anne-Roxandra Carvunis, PhD associate professor of computational and systems biology

DISTINGUISHED TEACHING AWARDS

Peter Drain, PhD associate professor of cell biology

SPECIAL CHANCELLOR’S DISTINGUISHED SERVICE AWARD

The COVID-19 Medical Response Office

A renewal of support for a five-year multicenter effort to identify the molecular and genetic mechanisms that cause amyotrophic lateral sclerosis and a related disorder called fronto-temporal lobar degeneration.

Jinho D. Das, assistant professor of immunology, was given a $2.4 million New Innovator Award by the National Institute of Allergy and Infectious Diseases to create three-dimensional maps of protein interactions to study how genetic variation affects the mechanism by which infectious pathogens interact with their hosts.

Yi-Nan Gong, Dwi Utami, staff scientist, and Andrew Collins, assistant professor of computational and systems biology, received a five-year award totaling $2.7 million from the National Institute of General Medical Sciences to target disorders called fronto-temporal lobar degeneration.

And, assistant professor of developmental biology, will develop heart “organoids” that mimic anatomical features to model congenital heart defects, which occur in 1%-2% of all live births.

Head-to-head comparison

The accumulation of tau protein—tangle-like protein fibers clogging the brain’s nerve cells—is an important marker of disease severity. But scientists wrestle with the technical limitations of detecting small amounts of tau proteins. Some tools that help identify tau tangles are more sensitive than others and can flag early Alzheimer’s disease and which for patients with symptomatic Alzheimer’s.

To suss this out, Pitt researchers led by Tharick Pascoal, assistant professor of psychiatry, were awarded more than $41 million over five years from the National Institutes of Health.

To measure the amount of tau protein and detect its location in the brain, researchers use slightly radioactive compounds called tau tracers, which bind to tau in the brain and make it visible on a PET scanner. By comparing two frequently used tracers, the researchers hope to get a clearer picture of the differences and similarities between the two and describe which is more appropriate for patients with subclinical Alzheimer’s disease and which for patients with symptomatic Alzheimer’s.

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Toward vaccine confidence

Can we inspire vaccine confidence in high-risk rural communities?

Katherine Williams, an MD, MPH, is working with an interdisciplinary team across Pitt and UPMC Horizon/Shenango Valley and the Mercer County Health Equity team to address low rural vaccination rates in Pennsylvania. Williams, research instructor in family medicine, was one of five inaugural Social Justice Fellows announced in February 2022. “I am honored to have the opportunity to add to the diligent work and strong foundation laid by the multidisciplinary Mercer County Health Equity team over the past year,” says Williams. As part of the fellowship, she worked to enhance vaccine messaging and motivation using principles developed by the Department of Family Medicine as well as human-centered design techniques. The team is devoted to understanding the personal experiences of community members and health workers in the Mercer County area as they develop messaging and motivation strategies. Together, they are addressing the disparities of COVID-19 vaccination rates that are generally lower, and COVID-19 death rates that are consequently higher, in rural areas by empowering residents to advocate for COVID-19 vaccine administration. The Social Justice Fellowship spans all six health sciences schools.

Antibiotics v. ear tubes

Alejandro Hoberman, an MD, executive vice chair of pediatrics, received the 2022 Top 10 Clinical Research Achievement Award from the Clinical Research Forum, a nonprofit association of clinical research experts and thought leaders from the nation’s leading academic health centers. Hoberman, the Jack L. Paradise Professor of Pediatric Research, is the first person to receive this award from the Forum on two separate occasions. Most recently, the award recognizes Hoberman and his research team for a May 2021 paper in the New England Journal of Medicine. Their paper reported that, compared to the use of episodic oral antibiotics, they found no advantage to surgically placing ear tubes in a young child’s ears to reduce the rate of recurrent ear infections over a two-year study period.

NCI continuing support for specialized programs at Hillman

The UPMC Hillman Cancer Center is the host for several Specialized Programs of Research Excellence (SPORES) that have received additional rounds of funding from the National Cancer Institute. Among them, the Skin Cancer SPORE received a five-year grant in 2021 for nearly $11 million, and the Head and Neck Cancer SPORE received a five-year, roughly $13 million grant, says Robert Ferris, an MD, PhD, who serves as the Hillman Cancer Center director and Pitt’s associate vice chancellor for cancer research.

New chairs named

MaCalus V. Hogan is now the David Silver Professor and chair of the Department of Orthopaedic Surgery at Pitt. At Pitt and UPMC, Hogan will build on the department’s tradition of groundbreaking research as well as its identity as a destination for clinical training that has produced leaders in orthopedics throughout the world. He is a prominent foot and ankle expert and consultant to a number of collegiate teams, as well as the Pittsburgh Ballet Theatre.

An MD and an MBA, he most recently served as professor of orthopaedic surgery at Pitt, with secondary appointments in bioengineering, clinical and translational science, and business, and as residency director and vice chair of education for orthopaedic surgery at UPMC, chief of its Division of Foot and Ankle Surgery and medical director of outcomes with the UPMC Wolff Center for quality, safety and innovation.

Health D. Skinner, an MD, PhD, is professor and chair, Department of Radiation Oncology. Skinner is working to advance UPMC Hillman Cancer Center’s radiation oncology services nationally and enhancing access to care. In service to these goals, he is fully committed to a department that represents the community it serves by increasing diversity at all levels. Board-certified in radiation oncology, Skinner completed a combined MD/PhD program at West Virginia University and a combined internship and residency in radiation oncology at the University of Texas MD Anderson Cancer Center. He has most recently served as an associate professor of radiation oncology at Pitt and as an investigator at UPMC Hillman Cancer Center. Skinner specializes in the study and treatment of head, neck and lung cancers. As a physician-scientist, he maintains an active translational research laboratory focused on identifying novel, clinically targetable biomarkers of resistance to radiation.

José P. Zavala, an MD, MPH, has been appointed the Eugene N. Myers Professor and chair, Department of Otolaryngology. Zavala comes to Pitt from Washington University in St. Louis, where he served as chief of the Division of Head and Neck Surgical Oncology, the Joseph Kimbrough Professor of Head and Neck Surgery and director of the head and neck surgical oncology and Microvascular fellowship program.

At the School of Medicine and UPMC, Zavala focuses on further elevating the Department of Otolaryngology’s status as one of the premier research and clinical otolaryngology programs in the country by making continued investments in clinical and translational research, defining new paradigms in clinical care and enhancing the department’s already excellent educational and training programs.

BY THE NUMBERS
The School of Medicine remains a top recipient of federal research funds. Total National Institutes of Health funding to the School of Medicine in fiscal year 2021 was more than $470 million.1

2021 NIH Funding Rankings for Pitt Med Departments:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Department Name</th>
<th>NIH Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Physical Medicine</td>
<td>$251 million</td>
</tr>
<tr>
<td>2nd</td>
<td>Dermatology</td>
<td>$214 million</td>
</tr>
<tr>
<td>3rd</td>
<td>Neurological Surgery</td>
<td>$149 million</td>
</tr>
<tr>
<td>4th</td>
<td>Pathology</td>
<td>$109 million</td>
</tr>
<tr>
<td>5th</td>
<td>Surgery</td>
<td>$74 million</td>
</tr>
</tbody>
</table>

INVENTIVE
Getting promising discoveries into the clinic and into the homes of patients requires commercialization. In fiscal year 2022, research at the School of Medicine resulted in:

<table>
<thead>
<tr>
<th>Invention</th>
<th>Publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>214 invention disclosures</td>
<td>149 patents</td>
</tr>
</tbody>
</table>

WHERE ARE THEY NOW?

The UK’s Clarivate Institute for Scientific Information has determined that 20 researchers with appointments in the School of Medicine are among the most highly cited researchers in the world.

© Pitt tells

PATENT COOPERATION TREATY APPLICATIONS FILED | 58
U.S. PATENTS ISSUED | 67
INVENTION DISCLOSURES | 251
U.S. PATENT APPLICATIONS FILED | 149
REPORTS | 10
LEAPS FORWARD

Yetsa Tuakli-Wosornu’s holistic approach to injury and life

As a long jumper for the Ghana National Team and 2016 Olympic hopeful, Yetsa A. Tuakli-Wosornu knows about high-level competition. As a physician with an MD from Harvard and an MPH from Johns Hopkins, she knows musculoskeletal medicine and wellness. Adding her athletic and wellness expertise to a sports-focused city like Pittsburgh was a perfect match.

Tuakli-Wosornu’s recruitment from Yale School of Public Health to Pitt was supported by the University’s Race and Social Determinants of Equity, Health and Well-Being Cluster Hire Initiative. The Pitt associate professor of physical medicine and rehabilitation specializes in interventional spine and sports medicine treatments, incorporating “holistic mind-body development” and therapies. Her practice at UPMC serves a wide range of clients. In Pittsburgh, she’s found other opportunities to channel her uncommon skill set. Here, she quickly connected with Ryan Shazier, the retired Steelers linebacker who started the Ryan Shazier Fund.

“From the first time we met,” Tuakli-Wosornu says, “Ryan was the role model and mentor I needed.” Ryan Shazier’s Spinal Cord Injury Foundation (now Ryan Shazier Fund) provided Tuakli-Wosornu the opportunity to make her passion for musculoskeletal medicine and wellness a reality.

In the Pittsburgh region, nationally and around the world. And across a range of fields, they are sparking change through 3D Sports Rx PGH, a program unlike any other.

3D Sports Rx PGH is a program that combines athletic and wellness expertise to a sports-focused city like Pittsburgh. The program is designed to help people with spinal injuries.

“We want to scale Ryan’s recovery model — the two pillars of sports and family — for other spinally injured patients.”

In Brantley, Tuakli-Wosornu found another essential part of 3D Sports Rx PGH. He is president of SHAPE, a fitness facility focused on coach-led programming.

Now, with the support of family, people recovering from spinal injuries through 3D Sports will benefit from SHAPE’s expertise. 3D Sports Rx PGH is in its pilot phase and has begun enrolling participants.

From their own experiences in competition, Tuakli-Wosornu, Shazier and Brantley understand that dead lifts and shuttle sprints only get you so far. That’s why mental training is the vital third component of 3D Sports Rx PGH. “Where your mind goes, the body usually follows — but not the other way around,” says Tuakli-Wosornu.

“When working with my patients, I’m always bringing them to mental balance and wellness, not only in those moments I’m also challenging them in their day-to-day life to train their mental skills so that they can better respond to some of the stressors from their injury or just regular life.”

Tuakli-Wosornu is also the founding director of Sports Equity Lab, an independent research lab with the dual goals of eliminating inequities in sports while also using sports to eliminate inequities in society. It’s yet another way Tuakli-Wosornu believes people can break down barriers and accomplish the unexpected.

“WHERE YOUR MIND GOES, THE BODY USUALLY FOLLOWS — BUT NOT THE OTHER WAY AROUND.”
—YETSU TUAKLI-WOSORNU

“MID-CAREER FACULTY OFTEN HAVE LITTLE TIME TO FOCUS ON THEIR OWN CAREER GROWTH.”
—ESA DAVIS

A LEADERSHIP PATH

Faculty from underrepresented minorities (URM) make up a very small percentage of the senior academic faculty in biomedical sciences in the United States, but a new Pitt-led program aims to change that. Mid-career URM faculty members will have an opportunity to refocus their career development with the help of a new program called TRANSFORM.

Created specifically for faculty at the associate professor level, the program is designed to help promote these faculty into leadership positions at a pivotal time in their careers—and when attrition of URM faculty is most likely.

“The idea is to fill a void,” says Esa Davis, an MD, MPH, who is the program director of the National Institute of General Medical Sciences–funded TRANSFORM. “There are a lot of programs for early stage investigators and for senior faculty, but there’s not much in between.”

Mid-career faculty often have little time to focus on their own career growth, says Davis, who’s also an associate professor of medicine. They’re mentoring, teaching, serving on different committees and pursuing their own work, and their own career development gets stuck as a result.

Davis’ coprincipal investigator is Pitt’s Audrey Murrell, a PhD professor of business administration, psychology and public and international affairs. Pitt is one of the TRANSFORM program’s five sponsoring sites.

“Award of excellence in science and technology” — Anantha Shekhar

From top: Allmar, Delgoffe, Neal, Ding

 Ascending stars

Pitt health sciences has recognized especially notable work of junior faculty for several years with its Senior Vice Chancellor’s Research Seminars. Now, to honor highly productive and creative mid-career faculty, the health sciences has created the Ascending Stars program. The inaugural awards went to four associate professors, each of whom received $25,000 in research support and delivered a lecture highlighting their work.

The winners were Susanne Ahmed, MD, PhD, associate professor of psychiatry; Greg Delgoffe, PhD director of the Tumor Microenvironment Center; and Matthew Neal, an MD and the Roberta G. Simmons-Associated Professor of Surgery—all in the School of Medicine. Ying Ding, PhD associate professor of biostatistics, in the School of Public Health was also recognized.

“This award is just one small but tangible way in which we can recognize the excellence of faculty members whose career trajectories continue to offer great promise and to encourage them to continue their upward momentum, while also serving as role models and mentors to their junior colleagues,” says Dean Anantha Shekhar.

“Mid-career faculty often have little time to focus on their own career growth,” says Davis, who’s also an associate professor of medicine. They’re mentoring, teaching, serving on different committees and pursuing their own work, and their own career development gets stuck as a result.

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DIGGING DEEPER TO FIND ANSWERS.

"THE VAGINA HAS TREMENDOUS REGENERATIVE POTENTIAL. IF WE CAN BIOFABRICATE KIDNEYS AND LIVERS, WE MOST CERTAINLY CAN MAKE VAGINAS."

—PAMELA MOALLI

Pamela Moalli, University of Pittsburgh professor of obstetrics, gynecology and reproductive sciences, leads a team that won the $1 million Magee Prize in November 2021. The prize, awarded to an international team, was created to promote knowledge and enhance the health and wellness of women and infants worldwide; it’s sponsored by the Richard King Mellon Foundation.

Although many women and girls struggle with vaginal wellness—“It’s just not talked about openly,” notes Kyle Orwig, Pitt professor of obstetrics, gynecology and reproductive sciences who is a project co-investigator.

Orwig, a PhD, and Moalli, an MD, PhD, are both members of the Magee-Womens Research Institute. Caroline Gargett, a PhD from Monash University in Australia, has joined them in their studies of vaginal stem cell populations as a possible basis for regenerative medicine solutions. Krystyna Rytel, an undergraduate at Pitt, was also on the team.

The group will use the prize funds to develop new biomaterials for repairing tissue loss in women with compromised vaginal structure and function. They are hopeful that developing a better understanding of vaginal stem cells and their “niches” will be key. If successful, the work could have sizeable therapeutic potential, helping women and girls with congenital defects, repairing damage from cancer treatment, restoring loss of function from aging and perhaps contributing to gender-affirming procedures.

“The vagina has tremendous regenerative potential,” says Moalli, explaining that even severe childbirth injuries can often heal with little, if any, scarring. “If we can biofabricate kidneys and livers, we most certainly can make vaginas.”

“It’s really hard to sit across from these people who are hurting and say, ‘We don’t have any options for you.’”

As difficult as they were to accept, the VOICE results completely changed our approach,” says Hillier. “They compelled us to do things differently and understand the communities we were working with much better.”

—SHARON HILLIER

HIV PREVENTION: ASK THE EXPERTS—THE PATIENTS

Protection from HIV and a reckoning

To build a vagina from stem cells, scientists need to better understand cellular composition and function.

The Microbicide Trials Network (MTN), which conducted 43 HIV prevention studies involving more than 18,000 participants on four continents, wrapped up in 2021 after 15 years of funding from the National Institute of Allergy and Infectious Diseases (NIAID). Microbicides are vaginal and rectal products designed to help prevent the sexual transmission of HIV.

This huge effort, led by Sharon Hillier, a PhD and vice chair of obstetrics, gynecology and reproductive sciences at Pitt, contributed to regulatory approval of the first biomedical HIV prevention method developed specifically for women—a slow-release dapivirine vaginal ring that the user inserts monthly.

The ring, which reduces the risk of acquiring HIV by about half, was recommended by WHO in 2021 and is now approved for use in several African countries, based in part on data from eight MTN studies.

The ring is a crowning achievement for the MTN. Its legacy also includes the international network’s first flagship trial, called VOICE—for very different reasons.

VOICE had a noble goal: Offer women methods for HIV prevention—a daily pill or a daily gel—that they could control, unlike, say, a condom. But when the results of VOICE came out in 2013, researchers were stunned. None of the products the study tested were found to be effective. Most of VOICE’s participants had not used the products every day as directed, despite indicating otherwise throughout the four-year study.

As it turned out, they weren’t interested in products they had to fuss with every day. Why didn’t they speak up sooner? They didn’t want to disappoint the researchers.

The VOICE results made it clear that daily methods were not going to work for women like those who took part in the study, which was conducted in three African countries.

Other options were needed, so researchers set their sights on the promise of a vaginal ring to be inserted monthly that MTN’s second flagship study, ASPIRE, had already begun evaluating.

In ASPIRE and other studies moving forward, researchers began monitoring product use during the study so that any problems could be addressed in real time; they also looked to better understand the lives and social contexts of study participants and the factors that might be influencing decisions about whether or not to use a product.

VOICE was also a wake-up call for the entire field, notes Diane Rausch, a PhD and director of the Office on AIDS at the National Institute of Mental Health (NIMH). After VOICE, data that came from MTN about acceptability, usability, attitudes and behaviors related to products for HIV prevention made a huge difference in the field, she notes. NIMH and NIAID cofunded the MTN, as did the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

“Despite what we were to accept, the VOICE results completely changed our approach,” says Hillier. “They compelled us to do things differently and understand the communities we were working with much better.”

Hillier now leads MATRIX, a five-year $125 million cooperative agreement funded in 2021 by the U.S. Agency for International Development focused on early research and development of HIV prevention products for women.

“The study organizers will consider what women want in an HIV prevention product before the first clinical trial is even conducted and integrate end-user feedback all along the way,” says Hillier.
What if a drug could help the liver regenerate and eliminate the need for many transplants?

Paul Monga, professor of pathology and medicine and Pittsburgh Liver Research Center director, has found a new drug that has shown success in mice, in regenerating and repairing the liver after severe injury or partial surgical removal.

Working with proteins known to play an important role in liver function and regeneration, Monga and his team were able to identify which ones control regeneration, where they are found in the liver and which are responsible for the divide-and-conquer strategy liver cells have that determines the functions they perform in the liver’s three sections or “zones.”

The drug, an antibody called FL6.13, shares similar functions with the proteins Monga and his team focused on, including activating liver regeneration. The antibody also was tested on mice with liver damage from toxic overdoses of Tylenol. The result? Enhanced repair of liver tissue.

“My team and I believe that improving the liver’s ability to repair itself could help circumvent the need for transplantation,” Monga said in an article he wrote for The Conversation. “Further study of drugs that promote liver regeneration may help curb the burden of liver disease worldwide.”

You might say that Eric Lagasse is in the body-building business; he helps bodies build miniature livers.

For more than a decade, Lagasse has been researching the regeneration of organ tissue. The associate professor of pathology and member of the McGowan Institute for Regenerative Medicine explores cell-based therapies. Through this research with his team, he discovered that liver cells, when introduced into the lymph node, will grow miniature livers and restore the original organ’s functions. In effect, the lymph nodes become bioreactors. “This novel approach opens the possibility of extending the lives of people suffering from end-stage organ failure, bridging them to a potential transplant or even eliminating their need for an organ transplant,” he says. Now Lagasse is off and running with his startup, LyGenesis. The firm has raised more than $18 million and received FDA clearance to begin a phase 2a trial of its bioreactor therapy for patients with end-stage liver disease.
The Kathy and Jim Ronald Legacy Fund
James L. Bennett and Linda R. Bennett

Eric Abercrombie and Melissa Abercrombie
Paul N. Afrooz, MD
Hesham Mohamed Ahmed Amr, MD, and Iman Abdulrahim
Nancy L. Aitken
Suzanne B. Alexander
William Crawford Alexander and Gayle Martin
Nicholas J. Alldrich
Ebrahim Aljaffer and Noucha A. M. T. Aljaffer
Andrew Alex and Michelle Alex
Richard Louis Altman, MD
Andrew Aloe and Michelle Aloe
James Aronson, MD, and Joan G. Ammer, MD
Geoffrey H. Basson, MD, and Monette Green Basson, MD
Gene A. Baker
Rudy Antoncic, MD
David E. Barensfeld and Ebraheem J. Alghanim
Nicholas J. Aitken

*Before an individual’s name indicates the person is deceased

Stephanie A. Alexander
Joel W. Alexander, MD
Irene V. Alexander
John R. Alexander
Sara Therrell Alexander and Elizabeth Aronson
Thelma I. Badwey
Theodore Vuchinich III, MD
Graham Bargeron
Egil Aukrust
Ellen I. Beckjord
Karin Ann Baker, MD
Allan Braslow and Virginia Klunder
Allyce M. Brand
Alan P. Burckin, MD
Tara A. and Jason J. Borofka
Joan Rosenbaum Bloch and Nicholas J. Alfano
Nancy L. Aitken
Theresa M. Aloise and Michelle Aloise
Richard Louis Altman, MD
David E. Barensfeld and Ebraheem J. Alghanim

"I'm very happy to have my name associated with this fund, because it's really all about supporting the students," Hofkosh says. "I have found that acknowledging my sexuality and using my authentic voice in allyship and advocacy have brought me such a sense of meaning, joy and peace," she said at the fundraiser. Hofkosh retired in 2021 after nearly 40 years as a faculty member.

"There's still work to be done, and the new fund will help those who are taking on the challenge. The awards will be based on students' financial need and their service to diverse communities at the School of Medicine. The first recipient, Elyse Mark (Class of '24), was a student coordinator of the MSPA. She intends to specialize in psychiatry, with hopes of improving the quality of care for LGBTQ+ patients."

"I plan to take a research year before finishing medical school so I can learn more about clinical practice at Pitt. This award will help support some of my financial needs during that time, allowing me to focus more on learning," Mark says.

The fund now totals more than $135,000, every dollar of which will directly benefit students.

"I'm very happy to have my name associated with this fund, because it's really all about supporting the students," Hofkosh says. "I feel very honored."
from her adolescence during the civil rights movement to her current role as vice dean of the School of Medicine. Ann Thompson has noticed an uncomfortable truth. Very little of her education in social justice came from formal schooling.

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

Thompson, an MD, MCCM professor of critical care medicine and pediatrics, has been highly influential in her field. In the 1980s, she was involved in early uses of extracorporeal life support in pediatrics. As chief of pediatric critical care at UPMC Children’s Hospital of Pittsburgh from 1981 to 2019, she presided over growing clinical and fellowship programs and helped to define the entire field along the way.

Later in her career, Thompson has focused more on addressing barriers to success for underrepresented communities in academic medicine. Her appointment as vice dean of Pitt Med in 2014 gave her a new platform to do something about it.

Thompson helped establish Tostat to Diversity, an annual celebration that brings together women and underrepresented communities at the school; the event has spurred new connections and research collaborations. She has also continued her advocacy for social determinants of health, which she herself is a conscious untrained bias educator.

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

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“...the next year we went back, and they had set up some outpatient clinics,” Markle said. “And they did. The Emerson D. Farley Jr., MD, and Mary S. Farley Medical Profits, a Pitt Med fund, provides major gifts supporting experiences for Pitt Med students abroad. Like Farley, Markle devoted his career to serving the underserved, abroad and locally. For many years Markle was in solo practice in a rural Virginia town. During his time on the family medicine faculty from 2004–2019, Markle noticed “interest in international experiences grew. Some students felt they train in resource-poor locations abroad. For the next 10 years, the fund will support students taking part in a month-long intensive learning experience.”

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It’s going to be a long flight that involves a couple of connections. But if you are prone to jet lag, your problems go beyond your way through crowded airports and trying to stay focused for your carry-on.

Jet lag is a troublesome enough that it has its own medical name: desynchronization. People who experience it can struggle with extreme fatigue and have trouble concentrating, which is especially unwelcome for the businessperson stepping off a plane and into a meeting. And those with certain underlying conditions may be putting themselves at risk.

Circadian rhythms influence a lot more than how awake we are throughout the day. They are key to health. Disturbing the circadian cycle can disturbs many of us sleep patterns, which leads to a number of health issues including diabetes, heart disease and more. The key to these cycles is the so-called master clock.

Dr. Stephen Chan, professor of psychiatry and the director of reward, rhythms and sleep at the University of Pittsburgh Medical Center, says that these rhythms are key to health. He says that they are key to maintaining a healthy weight, as well as maintaining a healthy heart.

Dr. Colleen McClung, professor of psychiatry and clinical and translational science, has been working on the circadian clock for the past 10 years. She has been studying the genetic and environmental factors that contribute to our sleep patterns.

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