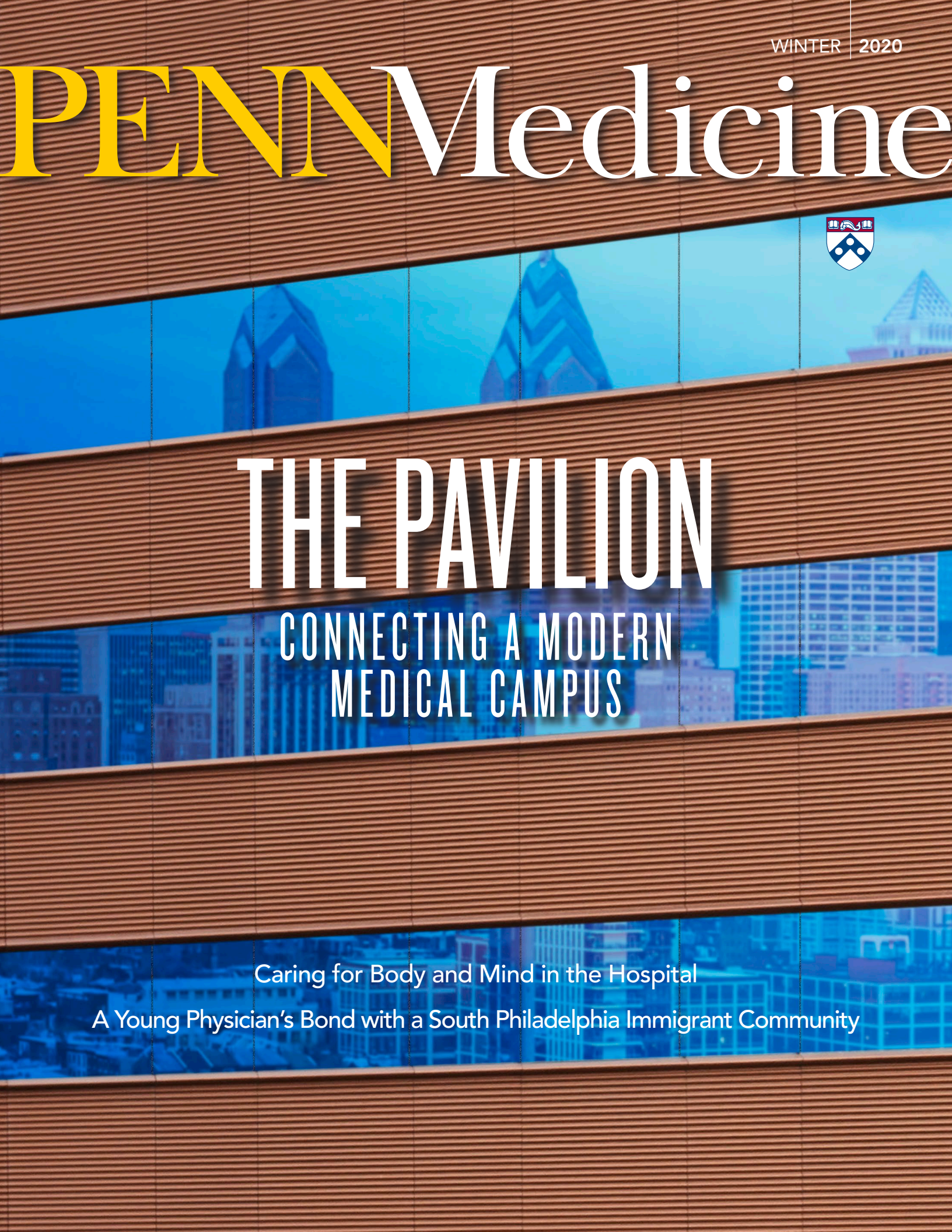
WINTER | 2020

PENN Medicine



THE PAVILION

CONNECTING A MODERN MEDICAL CAMPUS

Caring for Body and Mind in the Hospital

A Young Physician's Bond with a South Philadelphia Immigrant Community

A NEW PATH TO PARENTHOOD

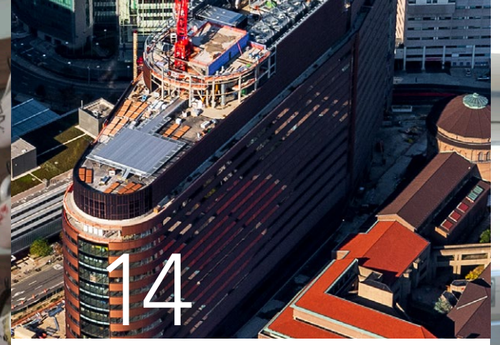
A uterus transplant at Penn Medicine made the impossible a reality for Jennifer and Drew Gobrecht.

Jennifer was 17 years old when she learned she could never bear children. When she initially became friends with Drew Gobrecht, in college, she was open about her congenital condition, Mayer-Rokitansky-Küster-Hauser (MRKH) syndrome, which means she has functional ovaries but does not have a fully formed uterus. When Jennifer and Drew fell in love and married, they knew their options for starting a family would be limited: adoption or gestational surrogacy. There was absolutely no way Jennifer could become pregnant.

But then, last year, she did. Jennifer, now 33, was the first participant in Penn Medicine's ongoing uterus transplant clinical trial. In November 2019, she became the second woman in the U.S. to give birth to a baby following a uterus transplant from a deceased donor. Baby Benjamin Thomas Gobrecht was delivered via cesarean section, attended to by a team of more than 20 specialists in high risk obstetrics, transplant surgery, fertility, gynecologic surgery, neonatology, pediatrics, urology, nursing, and anesthesiology.

"As a woman it meant everything to me to be able to have that journey of becoming parents in the way that most people around you get to experience," Jennifer said.

Watch a moving documentary video of the Gobrecht family's journey at PennMedicine.org/magazine/babyben.



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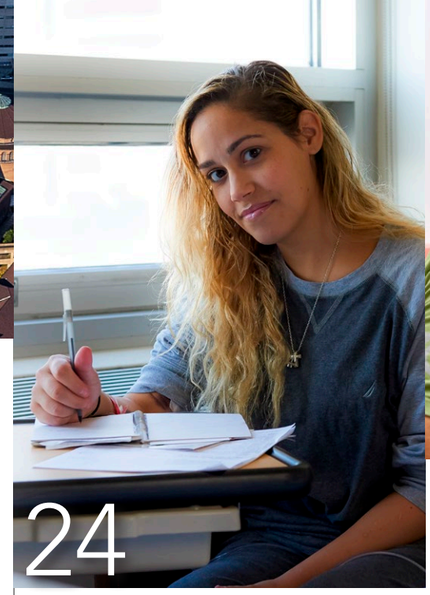

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The Pavilion at the Hospital of the University of Pennsylvania represents the latest piece in decades of investment in a connected medical campus.

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The health care system treats body and mind as separate. But in the hospital and in the clinic, a new integrated care model treats a person as a whole.

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By Rachel Ewing and Queen Muse
Over the course of a decade of volunteering with Puentes de Salud, Daphne Owen became a doctor, championed education in an underserved community, forged bonds of friendship, traveled across the continent, and emerged as a leader who will continue to take the South Philadelphia health clinic forward.

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Bridges and Visions

The Carnaval de Puebla parade in South Philadelphia in April is the largest of its kind outside of Mexico, the first in a series of festivals celebrating Mexican independence that culminates in Cinco de Mayo. One year not long ago, if you'd looked closely at one group of four masked *Carnavaleros* in South Philly, you might have spotted one who stood out by her manicured fingertips. Daphne Owen, MD'15, then a medical student at the Perelman School of Medicine, now an assistant professor of Emergency Medicine, stood alongside three Mexican-immigrant brothers. The four of them worked together at a restaurant where Owen bartended part-time and the brothers cooked and washed dishes. For Owen, donning a traditional men's costume and joining as an honorary fourth *hermano* was just a part of their friendship. To an outside observer, it's also a clue that this young physician's ties to South Philadelphia's Latinx community go deeper than most. That's partly due to Owen's compassion and personality as a connector, according to her colleague and mentor, Steven Larson, MD'88, an associate professor of Emergency Medicine. It also has a lot to do with her volunteer work with the nonprofit health center where Larson is executive director, called Puentes de Salud, which translates to Bridges of Health.

Daphne Owen, MD, at far right, marched in the Carnaval de Puebla parade with three Mexican immigrant brothers. Owen later stayed with the brothers' mother during a visit to their home village of San Mateo Ozolco where she worked to understand the subsistence poverty that drove so many families to migrate to Philadelphia.

A bridge is an apt metaphor for Owen's role as well as for the center itself—today, Puentes is much more than just a primary care health clinic. Puentes serves a Latinx immigrant community where 90 percent of the population is undocumented, and nearly 100 percent lives in poverty. As our feature story (p. 34) relates, the vision that Larson had for Puentes from the beginning was to help this community connect to better health by addressing health's underlying social determinants. And Owen, from her earliest days as a Puentes volunteer more than a decade ago, was a key part of realizing that vision and building a bridge to health by launching the first educational program at Puentes.

You'll find bridges, both metaphorical and literal throughout this issue—as well as visionaries like Larson who see a need to cross some chasm or build a connection and commit themselves to making it happen.

A major obstacle in the health care system is the historical division between care for mental and physical health ailments—and efforts to connect across that gap are the focus of another feature story in this issue (p. 22). Penn's Psychiatry department has two programs underway that integrate mental health services into care in other specialties, both inpatient and outpatient. The department's chief of integrated services, Cecilia Livesey, MD, envisions a future where mental health care is embedded in all kinds of medical practices, and as easy for a patient to access via another medical specialty as picking up a prescription or getting a recommended radiological scan.

Three new physical bridges (plus an underground tunnel, already completed) will soon connect Penn Medicine's new inpatient Pavilion to the other inpatient and outpatient buildings that are part of Hospital of the University of Pennsylvania (HUP) campus. Our cover story (p. 12), shows how the opening of the Pavilion (also known as HUP East) in 2021 will serve as a key connective piece in a campus transformation that has been decades in the making.

Where these bridges are built, there is a new path to walk—and the stories in this issue highlight those who are leading the way. ▽

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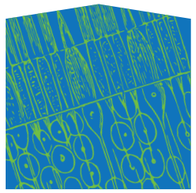
PSOM RANKS 3RD
in the Nation for NIH Research Grants

The Perelman School of Medicine (PSOM) consistently ranks among the top medical schools in the nation in research funding from the National Institutes of Health (NIH). In fiscal year 2019, PSOM received more than $493 million in awards across 970 projects, earning the third highest total among medical schools. When combined with researchers from Children's Hospital of Philadelphia—whose faculty share appointments at Penn—the united enterprise ranks #1 in the nation for NIH funding.

"The NIH funding we receive attests to the excellence of our faculty and the impact of their groundbreaking discoveries," said J. Larry Jameson, MD, PhD, executive vice president of the University of Pennsylvania for the Health System and dean of the Perelman School of Medicine. "It also reflects the outstanding breadth of Penn Medicine's research enterprise and the many ways in which it is improving health."

Check out a selection of the latest projects underway, by the numbers.

500,000 PEOPLE are living with Parkinson's disease in the United States. Penn is leading a multi-institutional effort to detect Parkinson's in the brain and track its progression through imaging.

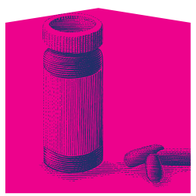


Supported by a five-year, $20 million grant, the team aims to create two tracers that will bind to specific proteins in the brain. This study has the potential to shift the ways in which researchers utilize molecular imaging tools and improve the study of Parkinson's treatments.

4,200 PATIENTS who received lung transplants will become part of a study to better understand the biological processes that can lead to post-transplant complications. Patients may experience a drop in lung function—a symptom of a form of chronic lung allograft dysfunction (CLAD) that is the leading cause of death among lung transplant recipients. Funded by a seven-year, $9.8 million grant, researchers will perform long-term phenotyping using biosamples, as well as data collected at routine clinical visits and exams conducted at six-months intervals to assess lung function and quality of life. The multi-site study aims to better understand the mechanisms that drive CLAD, who is at heightened risk for its different forms, and how to develop targeted treatments that improve long-term, post-transplant outcomes.

26 INVESTIGATORS across the U.S. and U.K. received a five-year, $9.7 million grant to establish CONNECT-TBI, a program that studies traumatic brain injury (TBI) and neurodegenerative diseases. The program is investigating the effects of TBI, which often include changes like memory loss, confusion, and depression. The team is also exploring the mechanisms of TBI-related neurodegeneration (TReND), and aims to define all subtypes of TReND and understand their progression. Of particular interest is chronic traumatic encephalopathy, a condition associated with repeated concussions in contact sports.

5 RESEARCH GRANTS totaling more than $22 million were awarded to teams exploring opioid use disorder (OUD) prevention and treatment. In the prevention effort, Penn is studying interventions that reduce pain and opioid use among patients with kidney failure as the lead institution of the Hemodialysis Opioid Prescription Effort (HOPE) consortium. Seven Penn Medicine sites were also designated specialized clinical centers for the NIH's Early Phase Pain Investigation Clinical Network (EPPIC-Net). Projects aiming to improve treatment include a study of the impact of a collaborative care model—which places social workers trained in mental health care in primary care offices—on the treatment of OUD and psychiatric disorders. (See "Ending the Isolation" on p. 22.) Another team is exploring the use of extended-release injectable naltrexone to reduce overdose and relapse risk. Researchers are also developing neuroimaging methods to assess the impact of opioid exposure on early brain development.



PENN FORGES POWERFUL PHILLY PARTNERSHIPS

A celebration of this new partnership was held at the Perelman Center for Advanced Medicine. Gritty, the iconic Philadelphia Flyers mascot, got down on one fuzzy knee and shared a moment with Brian Sennett, MD, following the announcement.

Home Team Hat Trick

Whether a Philadelphia Flyers hockey player is injured on the ice, an arena staff member is sick, or Gritty—the wild-eyed, orange-haired team mascot—suffers a mishap with a t-shirt cannon, Penn Medicine providers will be there to offer care on and off the ice. In January, Penn Medicine announced a major partnership with Comcast Spectacor, becoming the official health system for the Flyers and Wells Fargo Center. Penn Medicine will serve as the team's official medical services provider, the preferred provider for front office employees, and a teammate in joint community health initiatives.

"Not only will we provide the most advanced care for these players as needed on game nights, but they will also have access to the wide range of providers off the ice," said Brian Sennett, MD, chief of Sports Medicine and vice chair of Orthopaedic Surgery. "We look forward to working with the team, and to keeping the players safe and healthy for many seasons to come."

Penn Medicine Signs on for SEPTA Naming Rights

SEPTA's Regional Rail riders who pass through West Philadelphia have been able to watch Penn Medicine's new Pavilion rise higher and higher with each daily commute—but it soon won't be the only major change they'll notice.

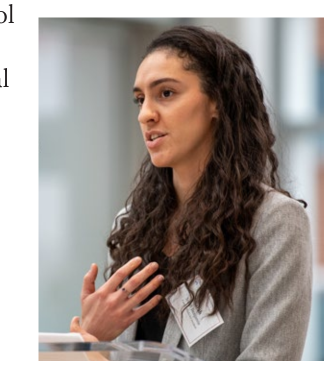
Following a newly forged partnership between SEPTA and the University of Pennsylvania Health System, University City Station has been renamed Penn Medicine Station. The station will bear new signage, maps, and interactive screens, and Penn and SEPTA aim to identify other opportunities to enhance the rider experience for the 6,400 passengers who pass through the station each day. As the construction of the Pavilion enters its final stages, a connecting bridge will be built to facilitate easier, more convenient travel between the station and the hospital for patients, visitors, and staff.

TREE OF LIFE TRAGEDY PLANTS SEEDS FOR COMMUNITY HEALTH

As Elliot C. Rabinowitz, MD'12, stood before dozens of staff, faculty, and supporters in the Perelman Center for Advanced Medicine, he admitted that it would be hard to sum up his "quirky and inspiring uncle Jerry." Jerry Rabinowitz, BA'73, MD'77, had an infectious belly laugh, a penchant for bow ties, and a talent for sharing pearls of wisdom when you needed them most. He held patients' hands at the height of the HIV/AIDS epidemic when other doctors were uncomfortable with the disease, and he regularly visited elderly patients long after his peers stopped making house calls. To the family physician, "medicine was about creating relationships and making sure people felt seen and heard."

In 2018, Rabinowitz was nearing retirement, and he shared his plans to get involved in the training of the next generation of doctors. But on October 27, he was among 11 congregants killed at the Tree of Life synagogue in Pittsburgh by a gunman who had shared anti-Semitic conspiracy theories on social media. Rabinowitz had run toward the sound of gunfire to tend to his wounded community members. He was unable to directly share his knowledge and experience with young physicians, but Rabinowitz's legacy lives on—both in the stories shared by the family, friends, and patients who adored him, and now through a new scholarship named in his honor.

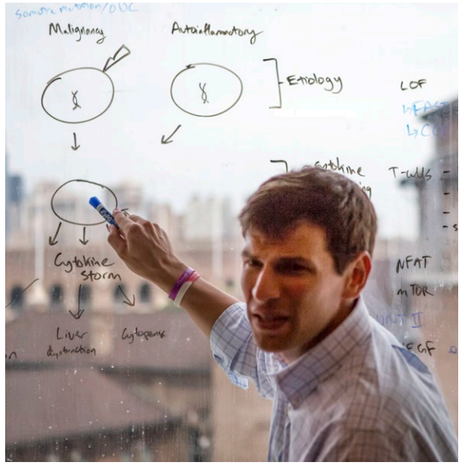
"In his humanistic approach to care and his commitment to serving the community, Dr. Rabinowitz exemplified the mission of family medicine," said Matthew Press, MD, MSc, interim chair of Family Medicine and Community Health in the Perelman School of Medicine. The Jerry Rabinowitz, C'73, M'77 Memorial Scholarship is an endowed scholarship that will be awarded annually to a Penn third-year family medicine resident who embodies Rabinowitz's dedication to treating the whole patient, as well as his selfless devotion to community outreach.



Sarah L. Smith-Benjamin, MD, received the inaugural scholarship. Described as a role model for her peers, an asset to Penn, and a positive force in the community, she regularly volunteers at the Heart Health Bridge to Care Clinic, an interdisciplinary, student-run clinic that helps uninsured patients in West Philadelphia manage their hypertension.

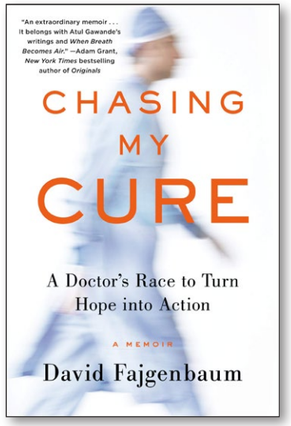
For Smith-Benjamin, Rabinowitz epitomizes the type of doctor she had dreamed of becoming since childhood. "During my journey to becoming a physician, there have been times when I've felt frustrated with the things that make it hard to connect with patients. Every time this happens, I go back to the community," she said. "There's a lot to be said for meeting people where they are to empower them to improve their health. Dr. Rabinowitz knew about that very well, and I'm honored to carry his legacy with me into all of my future work."

"It's Not Just My Cure I'm Chasing"



David C. Fajgenbaum, MD'13, MBA'15, MSc, was in his third year at the Perelman School of Medicine when he finished an exam, limped down the hall to the emergency department, and received news that changed the course of his life. Fajgenbaum had been a Division 1 athlete at Georgetown University and fastidiously maintained a healthy diet and a rigorous exercise routine, so when he started experiencing night sweats, fatigue, abdominal pain, and fluid accumulating in his legs, the quarterback-turned-medical student knew it was serious. During that fateful ED visit in 2010, he learned that his liver, kidneys, and bone marrow were all failing, and he needed to be hospitalized immediately—and by the time he was given the formal diagnosis of idiopathic multicentric Castleman disease (iMCD) a few months later, he was near death.

Over the decade that has followed, Fajgenbaum has undergone intense bouts of chemotherapy, experienced four near-fatal relapses, and had his last rites read to him. He also graduated medical school, married his college sweetheart, became a father, wrote a book—*Chasing My Cure: A Doctor's Race to Turn Hope Into Action*—and identified a drug that has kept him in remission for nearly six years. Now an assistant professor of Medicine in Translational Medicine and Human Genetics at PSOM, executive director of the Castleman Disease Collaborative Network, and director of the Center for Study & Treatment of Castleman & Inflammatory Lymphadenopathies, Fajgenbaum is paving the way for new treatment options for patients like him who don't respond to existing therapies.



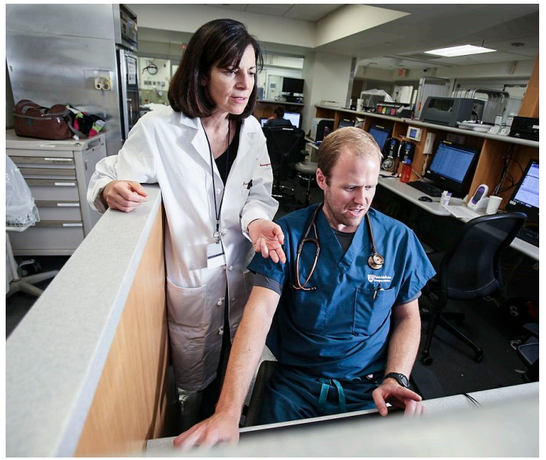
Castleman disease—which is diagnosed in about 5,000 people of all ages each year in the United States—is like a hybrid of an autoimmune condition and cancer. iMCD is the most severe subtype of this rare condition, with 35 percent of patients dying within five years of diagnosis. Fajgenbaum currently serves as both the principal investigator of a clinical trial to determine whether Sirolimus, the drug he initially tested on himself in 2014, can lead to sustained remission in other patients.

The possibility of relapse can feel like a sword of Damocles hanging over him, but it inspires action, Fajgenbaum said in a conversation on the *Ten Percent Happier* podcast. "I have the opportunity based on the laboratory that I run and the work that I do to really make a difference. It's not just my cure that I'm chasing. It's our cures," he said. Thousands of rare diseases do not currently have a FDA-approved drugs to treat them, but just as Fajgenbaum found unexpected success with an immunosuppressant originally developed for patients with kidney transplants, there may be other options hiding in plain sight. He is now leading an effort to incentivize and increase repurposing existing drugs for rare disease in partnership with the Food and Drug Administration, National Institutes of Health, and Chan Zuckerberg Initiative.

"Sometimes we hope, pray, and wish for something to happen, and we stop there. I hoped someone would find a drug for me, that progress would be made. But then I realized that if I wanted it to happen, I needed to do it," he said. As a man "living in overtime," every second counts. Fajgenbaum plans to spend those seconds—however many he has left—enjoying life with his wife Caitlin and daughter Amelia, finding answers, and driving change.

"Harnessing the Power" of Penn Providers to Combat the Opioid Crisis

As the nation grapples with the devastating impact of the opioid epidemic, overdoses continue to occur at an alarming rate. According to the Centers for Disease Control and Prevention, 130 Americans die each day from an opioid overdose—and about three of them are from Philadelphia. Staff across Penn Medicine have been hard at work combatting the deadly toll of opioid use disorder (OUD) at every point of contact. They are reducing prescribing and introducing alternative pain management protocols during all kinds of patient encounters. For patients with OUD, they offer medication-assisted treatment in the emergency department and connect patients with certified recovery specialists. To save lives, they provide free naloxone trainings in the community. To grow their impact, they lead dedicated research efforts.



Central to this work has been Jeanmarie Perrone, MD, a professor Emergency Medicine, director of Medical Toxicology, and a founding member of Penn Medicine's opioid task force. Under the leadership of Perrone, the newly launched Penn Medicine Center for Addiction Medicine and Policy will enhance the health system's already robust prevention, treatment, and education efforts. The center will focus on developing harm reduction policies—including naloxone dissemination—and addiction treatment initiatives, all with the goal of increasing access to evidence-based therapies, improving patient outcomes, and mitigating the stigma of OUD.

"Through this center, we're harnessing the power of many providers across Penn Medicine to integrate evidence-based treatments for substance used disorders in both our hospitals and outpatient practices," Perrone said. "It's our hope that we will be able to continue evolving our standard of care to support this vulnerable patient population."

Penn HealthX Endowment Supports Students' Entrepreneurial Spirit

Since 2013, Penn HealthX—a student-run organization within the Perelman School of Medicine—has empowered students who are interested in health care management, entrepreneurship, technology, and business to explore the many ways that they can use their medical degree outside of the clinic. Now, an endowed fund will create a scholarship to support medical students pursuing an MBA at the Wharton School of the University of Pennsylvania. The Roderick T. Wong Penn HealthX Program was made possible through the generosity of Roderick Wong, MD'03, a member of the program's advisory board and a managing partner of RTW Investments LLC, a health care investment firm in New York.

Penn HealthX is integrated into the medical school curriculum and awards a Certificate in Healthcare Management, Entrepreneurship, and Technology. The nationally recognized program offers opportunities to connect with visionary faculty, alumni, and industry leaders through an annual conference and regular interdisciplinary seminars and workshops. The HealthX Venture Fund also provides grants of up to $5,000 to teams developing projects to fill health care gaps. This new endowment will offer an additional level of financial support to students as they design and pursue innovative ventures that can shape the future of health care.

FROM MICRO TO MACRO

Whether exploring cellular mechanisms to engineer breakthroughs or eliminating barriers to enhance community health...

...Penn Medicine researchers are tackling questions that will impact the immune system and public health system alike.

A CRISPR FIRST: A groundbreaking clinical trial—the first of its kind performed in human patients in the United States—has found that immune cells edited using CRISPR/Cas9 technology can persist, thrive, and function months after a cancer patient receives them. Researchers from the Abramson Cancer Center partnered with the Parker Institute for Cancer Immunotherapy and Tmunity Therapeutics to edit T cells and safely infuse them back into the patients, two with multiple myeloma and one with sarcoma. Three edits were made to reprogram the cells to seek out and destroy tumors, followed by the insertion of a T cell receptor that told the edited cells to target a specific antigen. This marked the first-ever sanctioned investigational use of multiple edits to the human genome. This work is the latest milestone in Penn's history as cellular and gene therapy pioneers.

GPS FOR CAR T CELLS: When engineered CAR T cells are infused into a patient's body to fight disease, where do they go, and how long do they keep fighting? Penn researchers developed a novel way to track these cells in mouse models. First, they tagged the T cells with a bacterial protein—a reporter gene—to differentiate them from normal immune cells. Then, they created a radiotracer with an affinity for the bacterial protein, which caused the tagged CAR T cells to "light up" on a PET scan. This allowed the team to track their movements in real-time. The research team plans to test the reporter gene/radiotracer pairing in a clinical trial with humans.

T CELLS GET TIRED, TOO: Though the immune system is supposed to combat disease, T cells can become "exhausted" and ineffective. To determine what triggers exhaustion, Penn researchers worked backwards, examining the molecular mechanisms of newly formed "precursor" T cells. They found that a key transcription factor known as TCF-1 programs the cell's trajectory toward either exhaustion or becoming an "effector" cell that fights disease and potentially acts as a self-renewing "memory" cell that can respond rapidly in the event of another infection. Understanding the developmental path of T cells opens up the possibility of re-wiring them to prevent exhaustion.

ECONOMIC EROSION AND OPIOIDS: When automotive assembly plants close, a rise in opioid-related deaths is likely to follow. A Penn-led study examined these deaths over a 17-year period in 112 manufacturing counties, 29 of which experienced the closure of an automotive assembly plant during the study period. Five years after these plants' closures, overdose mortality rates were 85 percent higher than anticipated when compared to unaffected counties. These rates were particularly high among non-Hispanic white men between 18 and 34 years old, as well as their 35-and-older counterparts. These findings suggest that declining economic opportunities, combined with increased access to overprescribed medications, caused the opioid crisis to hit these particular areas hardest.

INFANT VACCINE INNOVATION: Why can't infants receive vaccines for illnesses like the flu and chickenpox soon after birth? It's all down to the maternal antibodies still in their systems, which protect them in some ways, but also fight back—too hard—against vaccines. Waiting six to 12 months for the antibodies to subside can leave infants susceptible to diseases that can be prevented in older children. Penn researchers explored whether a mRNA-LMP (nucleoside-modified mRNA encapsulated in lipid nanoparticles) vaccine—which provokes a more powerful immune response than a traditional vaccine—could overcome maternal antibodies in young mice. They found that it slipped under the antibodies' radar, prompting the mouse's own immune system to respond.

WHEN ZIP CODE AFFECTS SURVIVAL: If you experience sudden cardiac arrest, your location may have a bigger impact on your chance of survival than you realize. Penn researchers examined data from more than 27,000 cardiac arrest events and found that people who live in largely Hispanic communities are less likely to receive bystander CPR when compared to people living in predominantly non-Hispanic neighborhoods—resulting in a staggering 44 percent lower likelihood of survival. By partnering with local organizations that serve Philadelphia's Latinx and Hispanic communities like Congreso de Latinos Unidos, developing educational initiatives that break down language and economic barriers, and providing accessible CPR training through the Mobile CPR Project, Penn aims to address this disparity.

Virginia M.Y. Lee Earns $3 Million Breakthrough Prize

While Americans are living longer, debilitating neurodegenerative diseases are compromising quality of life for millions across the nation and placing a tremendous financial strain on the health care system. But what if we could understand what prompts brain and nervous system cells to function abnormally and use those discoveries to slow the progression of neurodegenerative diseases—or prevent them altogether?

Virginia M.Y. Lee, PhD, MBA'84, director of the Center for Neurodegenerative Disease Research and the John H. Ware 3rd Professor in Alzheimer's Research in the Department of Pathology and Laboratory Medicine at the Perelman School of Medicine, is dedicated to answering that question. Lee was recently awarded the Breakthrough Prize in Life Sciences by the Breakthrough Prize Foundation, which is sponsored by a cohort of prominent Silicon Valley figures: Sergey Brin, Priscilla Chan and Mark Zuckerberg, Ma Huateng, Yuri and Julia Milner, and Anne Wojcicki. Lee was recognized for her trailblazing research studying underlying mechanisms of neurodegenerative diseases.

By investigating how different forms of misfolded pathological proteins travel from cell to cell, Lee aims to understand the roles they play in the progression of Alzheimer's, Parkinson's, and other dementias and movement disorders. This transformative research serves as a springboard to identify advanced treatments—work that will be supported by the $3 million prize.

"I am really optimistic that maybe some treatment for Alzheimer's and Parkinson's will become available in the next, let's say, one or two decades," Lee said. "I am deeply honored to be a recipient of the Breakthrough Prize. It is very gratifying to know that our research on neurodegenerative diseases is being recognized by the scientific community."

Six Faculty Members Elected to National Academy of Medicine

Six faculty members from the Perelman School of Medicine at the University of Pennsylvania were elected to the National Academy of Medicine—one of the nation's highest honors in biomedicine. They were among 90 new U.S. and 10 international members elected by their peers for accomplishments and contributions to the advancement of the medical sciences, health care, and public health.

Penn Medicine now has 78 members in the National Academy of Medicine. This year's new members include **Charles S. Abrams, MD, GME'91**, the founding director of the Penn/Children's Hospital of Philadelphia (CHOP) Blood Center for Patient Care & Discovery, vice-chair for research and chief scientific officer in the Department of Medicine, and the Francis C. Wood Professor in the Department of Pathology and Laboratory Medicine; **Beverly L. Davidson, PhD**, director of the Raymond G. Perelman Center for Cellular and Molecular Therapeutics, chief scientific strategy officer at CHOP, the Arthur V. Meigs Chair in Pediatrics at CHOP, and a professor of Pathology and Laboratory Medicine; **George Demiris, PhD, FACMI**, a Penn Integrates Knowledge University Professor with joint faculty appointments in the School of Nursing and in the Department of Biostatistics, Epidemiology and Informatics; **James Eberwine, PhD**, the Elmer Holmes Bobst Professor of Pharmacology and co-director of the Penn Program in Single Cell Biology; **Stephan A. Grupp, MD, PhD**, director of CHOP's Cancer Immunotherapy Program and Translational Research for the Center for Childhood Cancer Research, and a professor of Pediatrics; and **Guo-li Ming, MD, PhD**, the Perelman Professor of Neuroscience and a member of Institute of Regenerative Medicine.

American College of Physicians Honors Jonathan A. Epstein

Established in 1958, the Harriet P. Dustan Award for Science as Related to Medicine is bestowed annually by the American College of Physicians (ACP) upon a nominee whose outstanding scientific work has contributed to the advancement of internal medicine and merited national or international recognition. During the ACP's scientific conference in April 2020, this award will be presented to physician-scientist **Jonathan A. Epstein, MD**, Executive Vice Dean and Chief Scientific Officer of the Perelman School of Medicine, and the William Wikoff Smith Professor of Cardiovascular Research.

Epstein is a renowned stem cell biologist, developmental biologist, and cardiovascular biologist. His work primarily focuses on the molecular mechanisms of cardiovascular development and has directly impacted the creation of new therapeutic agents for heart failure and myocardial infarction. This past fall, Epstein and his team published a first-of-its-kind study that found CAR T cell therapy could be a viable treatment for heart disease. The researchers used genetically modified T cells in mouse models to target and remove fibroblasts that contributed to cardiac fibrosis, or stiffening of the heart. While in its early stages, this research "marks a significant step forward in our efforts to treat—and potentially reverse—a condition that accelerates the progression of heart failure," he said.

Eydie Miller-Ellis Receives FOCUS Award for Advancement of Women in Medicine

Eydie Miller-Ellis, MD, is committed to ensuring that under represented groups are seen and heard. For example, she connects with her African American patients through their shared background and uses her family history with glaucoma to help patients better understand the disease. She is also proud to serve as a co-investigator of Penn's Primary Open-Angle African-American Glaucoma Genetics study, which focuses on glaucoma in patients of African descent—a group historically excluded from genome-wide association studies. (See "Correcting a Blind Spot" in *Penn Medicine*, Spring/Summer 2018.)

Miller-Ellis serves as the chief of Glaucoma Service and director of the Glaucoma Fellowship Program at the Scheie Eye Institute, vice chair for Faculty Affairs and Diversity, and a professor of Clinical Ophthalmology—and still finds the time to mentor her peers. She also serves as the co-director of the Rabb-Venable Excellence in Research Program for the National Medical Association, Ophthalmology Section, through which she aims to increase the number of underrepresented groups in ophthalmology residencies and academic ophthalmology.

Miller-Ellis' commitment to the advancement of women and people of color in medicine earned her the 2019 FOCUS Award for the Advancement of Women in Medicine. This award is presented annually to a faculty member whose efforts have promoted the success, leadership, and quality of life for Penn women in academic medicine.

"Many women struggle to balance their professional and family responsibilities, and finding visible role models who understand the special challenges that they face in academia can be difficult." Miller-Ellis said. "I am now in a position to ensure junior faculty have access to opportunities to speak at national meetings, work on committees, build their confidence, and advance their careers. I do my best to support women as they navigate these daily challenges."

A CURIOUS STUDENT OF COMMUNICATION AND COMFORT

A physician reflects on a morning spent shadowing a hospital chaplain.

By Jeffrey Millstein, MD

As we knocked on the sliding glass door, I heard sobs. I felt a heaviness in the air which I imagined as saline humidity from volumes of shed tears. We entered Room 8 in the emergency room observation unit to meet a family in mourning.

A few hours ago Mr. R., a 60-year-old man, died unexpectedly after coming to the Hospital of the University of Pennsylvania (HUP) with mild gastrointestinal symptoms. Without any apparent warning, he suffered a cardiac arrest, and 45 minutes of advanced life support efforts could not revive him. The emergency room was awash with disbelief, sadness, and a sense of failure—all the usual feelings which beckon for Chaplain Meggie.

That day I was not in my usual physician role. I was an observer and curious student of the craft of communication and providing comfort to the bereaved and traumatized. It is only recently, in mid-career, that I have come to thoroughly appreciate communication as more than an art arising from inborn talent. I have grown to see it as a skill, one foundational to doctoring.

This quest for communication skills, knowledge, and experience has led me to many extraordinary clinician mentors, and the list keeps growing. Venturing outside of Penn Medicine Woodbury Heights, where I work as an office-based general internist, has opened my eyes to the expertise of health care professionals to whom I've had little prior exposure. Talking with and learning from other seasoned experts is like experimenting with different photo filters, exposing nuances not previously clear with different lighting. And so I found my way to Chaplain Meggie.

Her full name is Margaret—Margaret Kobb. Originally from Milwaukee, she completed her Master of Divinity studies at the Lutheran Theological Seminary and has been a staff chaplain at HUP for the last five years. She has an intelligent, warm and friendly presence, with an expressive, lyric voice likely refined by her vocal musical training. Her own medical struggles require that she use a device to help her keep her balance when walking. In many of her daily interactions, "Morning Sunshine!" is her signature introduction, full of positive energy.

When we arrived in the emergency room, Chaplain Meggie's first stop was the nurse manager's office, where she was welcomed with, "Chaplain Meggie, I'm so glad you're here." The nurse manager provided a brief synopsis of the recent events with Mr. R., and asked how everyone was doing. The manager identified which clinicians and staff were involved with the resuscitation. Meggie's expression alternated between a smile and look of gentle concern, exuding empathy and kinship.

I followed as she made her way around the unit, debriefing the nursing and support staff.

"Quite a first day back from your fishing trip, wouldn't you say?" She smiled as she pulled up a chair next to a young ER technician, whom Meggie knew was the one who performed CPR on Mr. R. She is a master of injecting just the right amount of lighthearted humor into all of her conversations. And she makes a point to know about the staff's lives outside the hospital.

"What can you do?" he replied with a shrug and a head shake, and then smiled back. A heart-to-heart debrief ensued. Her language is real, devoid of any pretense, which has clearly helped her gain the trust of clinical staff, as well as the sick and their loved ones.

When we arrived at Mr. R's room, it was crowded with family—wife, sons, cousins, aunts, and uncles. Chaplain Meggie introduced herself, and then me. She was clearly aware that this space had been transformed into a sanctuary for the bereft, and respected boundaries. And then she said something magical. "How can I best be with you right now?" Not a perfunctory "How can I help you?" or "Can I offer you a prayer?" Her words were generous, sensitive and kind. The family spokesperson said that our mere presence was appreciated, and that they needed some time with their loved one before he was taken to the morgue. "Let's find you some extra chairs," she added, saying how sorry she was for their loss, and that she would check back with them later in the morning.

We did return later, to a smaller group of mourners. They shared stories about Mr. R. and even managed to laugh at some of them. This time we were welcomed into the room and were able to connect a bit more with the family, learning more about this person whose life was not supposed to end that day. I listened as chaplain Meggie offered words of comfort, and helped build enough trust to allow other staff to remove Mr. R.'s body from Room 8, so another sick person could come back and be cared for.

"I have cared for many grieving families, participated in hundreds of resuscitations, and treated thousands of patients. Effective communication, though, is not an area where experience necessarily confers expertise."

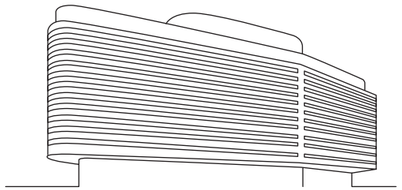
I have cared for many grieving families, participated in hundreds of resuscitations, and treated thousands of patients. Effective communication, though, is not an area where experience necessarily confers expertise. Connecting with people in their most difficult moments requires keen and curious observation and dedicated practice. The experience with Mr. R.'s family illustrates that it's not just a matter of what you say, but how you listen with humility and curiosity.

Chaplain Meggie often has first-year medical students follow her on her rounds as part of their introduction to patient care. I am farther along in my clinical journey, and I also enjoy the privilege of teaching medical students in the classroom, and in my office. But on that day, I placed myself once again as an observer to find renewal, wisdom, and inspiration.

Read this story online at PennMedicine.org/magazine/meggie

MORE THAN A NEW HOSPITAL

The Pavilion at the Hospital of the University of Pennsylvania represents the latest piece in decades of investment in a connected medical campus.



SLEEK, BRONZE, AND BIGGER than you might have imagined, a new 17-story structure in West Philadelphia looks complete from the outside. The final piece of the building's outer sheathing was fitted into place in November 2019. Now, construction work continues on the 1.5 million square feet inside during the final push before opening next year as the newest state-of-the-art inpatient building at the Hospital of the University of Pennsylvania (HUP). At $1.5 billion, the Pavilion is the largest capital project in Penn's history. It has been designed to evolve over the next century.

But it is so much more than a building. The Pavilion, also known as HUP East to those working on campus, does not stand alone.

The new facility is a key connective piece of the HUP campus, a culmination of two decades of change around the site that once housed the Philadelphia Civic Center. It will serve as the centerpiece of an expanded and unified hospital, integrating inpatient care spanning both sides of Civic Center Boulevard with advanced outpatient care at the Perelman Center for Advanced Medicine.

CHANGING CAMPUS

AT THE TURN OF THE 20TH CENTURY, just 25 years after HUP first opened at 34th and Spruce Streets in West Philadelphia, the Philadelphia Convention Hall and Civic Center rose as a cluster of buildings across the curving street that would later bear its name—Civic Center Boulevard. The Civic Center hosted major national milestones from Democratic and Republican national conventions to speeches and performances by Martin Luther King, Jr., Nelson Mandela, and the Beatles. But in 1996, it was finally shuttered, and its 20 sprawling acres offered space for new opportunities. Penn, Penn Medicine, and Children's Hospital of Philadelphia entered into an agreement to purchase and develop the site into what would become a vast biomedical district.

By the 1990s, along with the health system that had grown up around it, HUP's own physical footprint had begun to expand across the street. A blocky former 1970s-era Hilton hotel, Penn Tower—which once housed a rotating restaurant on its top floor—with its rooms retrofitted, became home to HUP executive and administrative offices and outpatient clinics.

In 2008, the Perelman Center for Advanced Medicine (PCAM) opened as HUP's state-of-the-art outpatient facility at the site where the Civic Center previously stood.

In 2015, demolition of Penn Tower and its attached parking garage began, in preparation for the future Pavilion. But to see the change as simply a matter of replacing one outmoded building with a modern one would miss the bigger picture. It was work toward the final piece of a campus transformation long in the making.

HOW A CORNER BECAME A CAMPUS

HUP'S ORIGINAL LOCATION at the corner of 34th and Spruce Streets has remained consistent—but virtually everything else about the building has been in a state of constant growth and change. Over the span of a century, the facility grew as new, connected buildings were appended and periodically renovated, from the Gibson building (1883), through Maloney (1924), Ravdin (1962), Founders (1987), and more. The original 1874 University Gothic-style building (similar to Penn's College Hall) was demolished in the 1940s. Over time, HUP formed an intertwined warren of structures from different eras that, together under one roof, were the ever-growing HUP.

When the Perelman Center for Advanced Medicine opened in 2008, it was connected by a raised bridge through Penn Tower and on over to HUP for staff and patients to travel between the inpatient and outpatient buildings. Three years later, a tower rose at the west end of PCAM: the Smilow Center for Translational Research. Then came an expansion of PCAM's south tower, including the Jordan Medical Education Center.

HUP's newest inpatient facility has been on the rise since 2017 at the former site of Penn Tower. Although it will boast over 500 patient rooms, the Pavilion will not replace the long-standing facilities now known as "HUP West" across the street. Refreshing and refitting services at HUP West into newly opened spaces are part of the plan, too.

CONNECTING "ONE HUP"

THE PAVILION is the connecting piece of a unified campus, what HUP CEO Regina Cunningham, PhD, RN, calls "One HUP."

With construction underway, in 2019 Cunningham began to host a series of town hall sessions for HUP staff, previewing changes to the hospital campus and answering questions, and reinforcing the message that the growing hospital remains "one team, one mission, one HUP." Numerous focus group sessions have empowered staff to shape the planning process for changes that will occur when the new facility is open.

Planning for operational changes, both at HUP East and HUP West, are already occurring. The Emergency Department has changed its patient flow model already, anticipating different needs with its two-story layout after moving to the new building.

An underground tunnel and three bridges will unite HUP West with HUP East (the Pavilion) and the Perelman Center for Advanced Medicine, through the Pavilion's bright connector level at the center.

Computer simulations of pathways and travel times between locations on the HUP campus are part of the transition team's planning process, as hospital leaders as well as the PennFIRST team composed of architects, designers, project managers, and clinical experts together prepare for the transport of supplies, transfer of patients between units, and travel between facilities by clinicians and visitors.

A MODEL MEDICAL DISTRICT

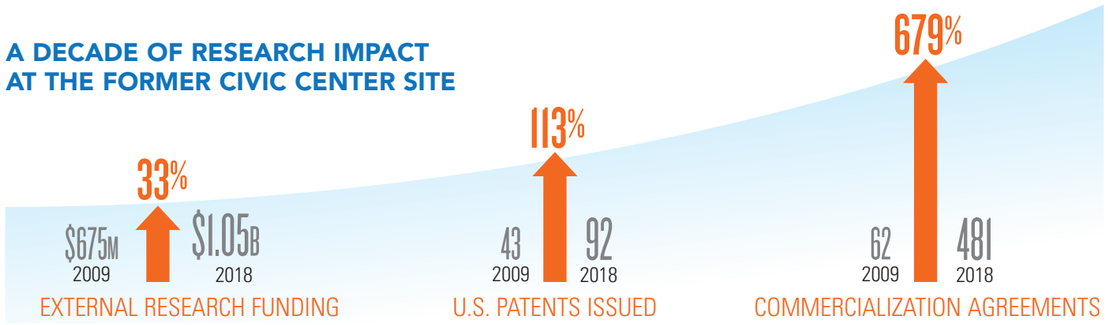
"CONNECTIVITY FOSTERS COLLABORATION," said University of Pennsylvania President Amy Gutmann. "The research and discoveries emerging from this centralized campus are mapping the future of medicine, and demonstrating the depth of what is possible when we work together to execute bold ideas." The new "One HUP" will sit at the northern edge of a vastly transformed University City Medical District, comprising a substantial footprint of the main campuses of Penn Medicine, the University of Pennsylvania, and Children's Hospital of Philadelphia (CHOP). In just the past few years, major scientific advances and FDA approvals for cell and gene therapies developed on this combined campus have helped establish the area as a world-renowned ecosystem for innovation and a magnet for startup companies. According to an analysis commissioned by the three institutions on the impact of development on the former Civic Center land and its adjacent properties, when the Pavilion is operational, this subset of the district alone will serve 1.8 million patients and visitors and be home to almost 10,000 employees working together to advance medicine.

ANNUAL ECONOMIC IMPACT OF THE UNIVERSITY CITY MEDICAL DISTRICT

17,600
JOBS SUPPORTED

$2.5 BILLION
CITYWIDE ECONOMIC IMPACT IN PHILADELPHIA

A DECADE OF RESEARCH IMPACT AT THE FORMER CIVIC CENTER SITE



All figures represent combined activities occurring at locations of the University of Pennsylvania, Penn Medicine, and Children's Hospital of Philadelphia built on the former Civic Center and related properties, not including portions of these institutions' campuses beyond that specific section such as HUP West and the Penn campus north of Spruce Street.

Ending the Isolation

By S.I. Rosenbaum *Photos by Peggy Peterson*

The U.S. health care system treats body and mind as separate. But in the hospital and in the clinic, a new integrated care model treats a person as a whole.

The patient was very sick, and she was alone.

Her name was Jessica Pino. She had been vomiting constantly for days; everything she ate made her ill. On one of her previous hospitalizations—there had been more than she could count; had it been 40 times now? 50?—she'd picked up a contagious bacterium, so now, on her first admission to the Hospital of the University of Pennsylvania (HUP), she was in an isolation room.

Usually her mother would be by her side, even in an isolation room. But her mother was sick too, this time. She was on her own.

It's hard to be in the hospital alone—even for someone like Pino, who had gotten good at keeping it together. For six years Crohn's disease had wracked her gut, disrupting every aspect of her life.

When she was first diagnosed, doctors told her not to stress: "Stress is the worst thing for you," she remembers them saying. Pino almost wanted to laugh the first time she heard that line. How could she not be stressed when she was vomiting for hours? When doctors were slicing open an inflamed cyst on her face? When she was too nauseous to get out of bed?

And there were other sources of tension too—not just tension, but trauma. There was her father's sudden death from an overdose when she was just 18. There was the abusive relationship she fell into afterwards, and the years she spent extracting herself from her ex's control. The years she spent estranged from her mother: talking about it still makes her cry. The doctors who first treated her gastrointestinal symptoms didn't ask her about any of this.

No patient arrives at the hospital a blank slate. In addition to whatever physical crisis they're experiencing and the upheaval of being in the hospital, they all come with troubles and pain of their own, issues their doctors may know nothing about and be underequipped to help them navigate.

"There's a backstory," Pino says. "Everyone has a backstory."

Now she was in the room by herself, feeling sick, trying not to stress, writing down questions for her doctors.

There was a knock on the door. For Pino, and for a growing number of patients who may experience a broad array of mental health challenges in the hospital, things were about to change.

Jessica Pino writes in a notebook in her hospital room at HUP.

THE PSYCHIATRIST'S CHALLENGE

Years earlier, when Cecilia Livesey, MD, GME'16 was a resident at HUP, she worked on the inpatient psychiatric consult rotation. She saw the mental health challenges patients like Pino faced, on the same inpatient medicine floor where Pino would later stay, from the other side. She met many of those patients in the midst of a far more acute psychiatric episode than Pino's creeping anxiety, though. Often she would get a call from a provider in the middle of the night, when a patient was in the midst of a psychiatric crisis.

"By the time the provider called me, both patient and provider were fairly worked up," she recalls. "I'd think, 'Why has this become a crisis? If only I'd known about this two days ago... if only we could have intervened before the situation escalated.'"

Because she wasn't on the ward until she was summoned, she often felt that she was being thrown into a scene already in progress. There were the dramatic cases, with hospital security on the scene, trying to calm a patient who was attempting to leave against medical advice. And there were also subtler ones: "Sometimes a medical team will call in a psych consult and say they have been trying to get a patient to go to dialysis for five hours. It turns out this patient is just anxious; if we'd known the story and known about the frustration and anxiety ahead of time, we could address that proactively and avoid these delays in care."

> Since MEND was implemented on two internal medicine units, 44 percent of patients have received a proactive consultation for support with their mental health needs—a nearly eight-fold increase.

Livesey found the lack of information ineffective: she often found herself having to react to the patient's distress without useful context for how it had developed.

There was a massive unmet need. Only three percent of patients across HUP were getting psychiatric consults, consistent with the national average—but research has shown that 25 to 40 percent of patients in the hospital have an acute or chronic psychiatric issue.

Yet, in medicine, physical and mental health have long been treated as distinct disciplines, divided from each other geographically, educationally, and financially.

Primary care doctors who wish to refer patients to mental health care must often contend with entirely distinct insurance and computer information systems, if the mental health practitioner takes insurance at all. In hospitals, mental health and physical health are separate departments; if a patient's upcoming gallbladder surgery prompts a psychological crisis, there's no mental health provider stationed on the ward to help them.

But for actual people, mental and physical health is rarely separable the way hospital architecture and insurance billing systems would have it.

Livesey wished the system were different. She wished she could help more patients, and help them sooner.

Cecilia Livesey, MD, is chief of Integrated Services in Psychiatry at the Perelman School of Medicine.

THE CONVERSATION

Leona Pierce was outside the door of the isolation room at HUP.

There was a lot Pierce, a licensed clinical social worker, already knew about the woman inside, a 36-year-old named Jessica Pino. She knew, for example, that she had been hospitalized many times before for her Crohn's disease at other hospitals in the region. She also knew that Pino had previously taken medication for anxiety and depression, and that she had a psychiatric history of complex trauma.

She recalls that she was "prepared to talk to someone that didn't really have a tool kit" to deal with stress. But Pino surprised her.

"I've been in therapy almost my whole life," Pino told her.

They sat together, talking.

Pino told Pierce about her first hospitalization, years before, when her then-boyfriend had left her at the hospital door and driven away. She talked about how, before she was finally diagnosed with Crohn's, some doctors had told her she was just having "stomach pain" and dismissed her. How

her mother had been with her every step of the way, and how hard it was to be in the hospital without her. How she missed her father every day and sometimes felt she could hear his voice.

"She shared her history, soup to nuts," Pierce says. "And from that point on every time she came back, which I think was four or five times, I was able to dive right in: 'How's your anxiety, how's your Crohn's, how are you feeling?'"

In the past, Pino's statements about her symptoms had been second-guessed or overlooked by doctors. Now, Pierce was able to help her communicate clearly with her physicians by vouching for her sound judgement about her own medical condition.

"I was able to stand next to her and say, 'Yes, I know her, we've gone through it,'" she says. "I was a witness to her admissions, I was a witness to her mental health care and to her medical health care and medical literacy. Sometimes that's all you want—you want someone there watching you and validating you."

> Only three percent of patients in the hospital receive a psychiatric consultation, on average—but research has shown that 25 to 40 percent have an acute or chronic psychiatric issue.

More than just advocating for Pino, Pierce was another key clinician on her team. In their therapy sessions, she was able to help Pino manage her anxiety and stress while in the hospital. As her mental health improved, so too did the symptoms of her Crohn's disease.

THE PROGRAM

The pilot program that brought Pierce and Pino together is called the Mental Health Engagement, Navigation & Delivery (MEND) program. It was spearheaded, along with its cousin, the primary-care-based Penn Integrated Care (PIC) program, by Cecilia Livesey, now the chief of Integrated Services for Psychiatry at the Perelman School of Medicine. MEND aims to join mental and physical health and their respective practitioners in a model known as integrated care, making it easier for patients to access mental health care where and when they access physical medicine. These programs are among the latest examples in a movement in mental health care that has been slowly unfolding. "The integration of behavioral health and general medical services has been the focus of intensive resources, planning, and education efforts for at least a decade," the American Psychiatric Association wrote in a 2016 report.

The need for a program like MEND was obvious, given that research shows the number of patients who experience psychiatric issues in the hospital could be as much as ten times higher than the number receiving psychiatric consultations. Some of these patients, like Pino, have past traumas and anxiety. Others have active substance use disorders, schizophrenia, major depressive disorder, eating disorders—the whole gamut of mental health difficulties people can experience outside of the hospital will naturally stay with them once they're admitted.

When she was offered the opportunity to proactively intervene on mental health in an inpatient medical setting, Pierce says, "I thought, 'This is perfect ... there is going to be a way for collaboration between disciplines and the attention that has never fully been given to the most important part of our bodies, our minds.'"

Beginning in January 2019 Pierce and a team of psychiatric health providers were assigned to be actively embedded in two general medicine units at HUP, comprising 78 beds. Patients on these units have a variety of non-surgical medical needs, from Pino's Crohn's disease and other gastrointestinal disorders, to complex cardiac and pulmonary conditions. As new patients enter these units, their medical case histories are scanned by an innovative computer algorithm that rates them by how likely they are to benefit from mental health services.

Eleanor Anderson, MD, GME'13, MEND's lead psychiatrist, then meets with the other members of the team—a social worker, a psychiatric nurse practitioner, and occasionally a rotating psychiatry resident—each day to go over the patients whose files have been flagged. They agree on which patients are good candidates. Then Anderson and her team go to the unit to talk with the rounding doctors from the medical services.

"There's no substitute for that face to face interaction," Anderson says. "One of the key points of this system is the collaborative feel of it; [doctors] need to feel we're there and available, so they don't feel alone, they feel like we're true collaborators … We're not just called in and then we leave, which is the standard consult model."

Besides, she says, "Sometimes the primary medical teams might not even know how we could be helpful yet. We had to give them an idea of, 'Here is what you can use us for.'"

When she runs into a doctor whose patient MEND has flagged as a good candidate, Anderson checks in to see if the doctor agrees. Sometimes they'll say that the patient seems fine, is about to be discharged, or for some other reason doesn't need mental health support. But usually they'll agree to dispatch a MEND team member to see the patient. Which team member depends on the individual patient's needs: A social worker might focus on a brief talk-therapy consultation, while a nurse practitioner may weigh in on a diagnostic workup question or managing psychiatric medications. Anderson, the medical doctor, works with the patients who have the most complex needs. It has turned out only one in five MEND patients need that level of care.

As a psychiatrist for MEND, Eleanor Anderson, MD, meets daily with a nurse practitioner (Colleen McKelvey, CRNP, at right) and a licensed clinical social worker to review cases flagged by the MEND algorithm based on keywords in their health records. They round together on the inpatient floor to discuss these patients with their medical providers.

Before MEND was implemented, about six percent of patients on the two units received psychiatric consultations. Since MEND was implemented, 44 percent of these units' patients have received a proactive consultation for support with their mental health needs—a nearly eight-fold increase.

THE DRAMATIC CHANGE

Emmanuel King MD, SFHM, FACP, a professor of Clinical Medicine at the Perelman School of Medicine, co-leads the medical units piloting MEND. He says the MEND program has transformed the ward.

Before MEND, "the patients weren't really having their needs met," King says. Often he and other doctors would call to request a psychiatric consult only after a patient was already in distress and acting out—on average, the fifth day they spent in the hospital.

He remembers being grabbed by his lapels by one patient, dragged close and sworn at, called derogatory names. But that patient might not have been so agitated when they were first admitted—his delirium or disorientation and other symptoms might have escalated over a period of days before he became violent.

Other times a patient might shut down, refusing to accept medication or skipping physical therapy sessions. It might take some time before the clinical team noticed these quieter patients who weren't improving as quickly as they should.

Even in such situations, however, King says they had to weigh whether a patient's behavioral health problem was serious enough to require the consult service to intervene. It was also likely to be a different person picking up the phone every time, as the position rotates among psychiatry residents, fellows, and attendings, so there would be little continuity or familiarity with patients.

"When you have a system where there are so many steps to get a patient seen, it becomes much more challenging and things break down," King says. It was hard on patients and doctors alike, he says, since patients in distress took up the bulk of doctors' time and tended to lead to burnout and fatigue as doctors struggled with crises they weren't trained to handle. Even when the traditional psychiatric consult team was called in, their capacity to help was limited—in order for a handful of psychiatrists to serve the entire hospital, they needed to limit their time to mainly focus on

concrete questions such as medication advice or assessing a patient's decision-making capacity.

"It's very different to have a team on the floor looking to help, proactively screening but also never turning away a request," King says. Now, according to statistics gathered by the MEND team, mental health providers on average meet with patients in need on their first day of stay in the hospital, not the fifth.

MEND has expanded the scope of mental health care that is available to patients on a medical unit. With the "old model," King says he probably wouldn't have consulted psychiatry for a patient like Pino: her situation couldn't be condensed into a request for medication or help with a singular crisis that required a psychiatrist's intervention. But MEND draws from a broader multidisciplinary bench, and they are able to treat not only diagnosable psychiatric illnesses but the psychological traumas and stresses of hospital stays.

Because Pierce was able to establish a rapport with Pino, her anxiety level dropped—and her next hospitalization was less stressful, King says. And her physical illness responded to her anxiety and mood. "The social worker would see her, catch up with her, and make sure she was doing ok," he says. The team also floated the possibility of connecting with an outpatient psychiatrist that had a special interest in patients with gastrointestinal disorders. "That brought her a lot of optimism," King says. "It was very different than her stay otherwise would have been before the service was there."

Matthew Press, MD, MSc, associate medical director of the Primary Care service line and an associate professor of General Internal Medicine in the Perelman School of Medicine, partnered with Livesey to bring Penn Integrated Care to primary care offices.

Connecting patients with ongoing treatment is a big part of MEND, and it's often crucial that that process begin while the patient is in the hospital, King says. For example, the MEND team was able to help one patient wean off methadone while she was in the hospital for a cardiac condition, and get on a waiting list for a drug recovery program she could participate in with her young child. She could leave the hospital with a support structure already in place.

King singled out the case in a letter he sent to HUP and Penn Medicine senior leaders, asking that MEND be made permanent and expanded throughout the hospital.

King and his colleagues could vouch for its measurable benefits beyond individual anecdotes: with MEND assisting in the care of patients with mental health needs, early data showed that fewer patients were being discharged to inpatient psychiatry and that fewer patients were readmitted within three months. Most remarkably, the unit experienced a decrease in length of stay for *all* its patients—not just the ones MEND clinicians interacted with.

It's because doctors and nurses are spending less time tied up with patients exhibiting behavioral or mental health problems—problems beyond the initial medical need that brought them to the hospital, something that can take extra time, and sometimes make clinicians feel helpless or frustrated. With MEND team members taking the lead, in particular with behavioral crises, the doctors can focus more on the physical ailments within their core specialties. Medical residents in internal medicine have reported that they feel better educated on psychiatric care after rotating in the units with the MEND team. Overall, the doctors on these floors feel less fatigued and burnt out, they've told King. Many signed on to endorse the program and its impact on both patients' care and their own job satisfaction in letters to HUP and Penn Medicine leaders.

THE MODEL

For Livesey, MEND is a balm and a step toward the transformation to the system that troubled her since her residency rotations on the psychiatry consult service. That model of treating mental health crises in a reactive way in the hospital didn't make any sense, she says, given how mental health can have ramifications for a person's physical health, and vice versa. For example, someone who contracts a physical illness can lose their ability to work or function at home the way they're used to. Being in pain can affect their temperament, and the stress of managing an illness can impact their relationships. For someone who is already prone to mental illness, this can be a disaster.

By the same token, a mental health condition like depression or bipolar disorder can take a toll on the body, disrupting sleep, exercise, diet, or treatment adherence for other health problems, leading to physical illness. And, the brain and the body share biological markers of distress, such as inflammation and hormone dysregulation. Congestive heart failure and depression involve a similar inflammatory cascade, for instance. "It's a chicken and egg question," Livesey says, "but they seem to be connected."

All of this was on Livesey's mind when she became medical director of strategy and integration for Psychiatry at Penn in 2017 with the support of Maria Oquendo, MD, PhD, the new chair of Psychiatry, and David Oslin, MD, the chief of Psychiatry at the Michael J. Crescenz VA Medical Center and a professor of Psychiatry at Penn. Her first project was what would become Penn Integrated Care, or PIC.

Similarly to how MEND embeds health care professionals in a hospital ward, PIC placed licensed clinical social workers in eight primary care locations starting in January 2018.

When patients come to see their primary care provider, they can access mental health care at the same location—rather than have to contend with a separate practice in another part of town. If a patient needs it, their provider can even just walk them down the hall to the social worker's office for a "warm hand off" so they can get immediate care.

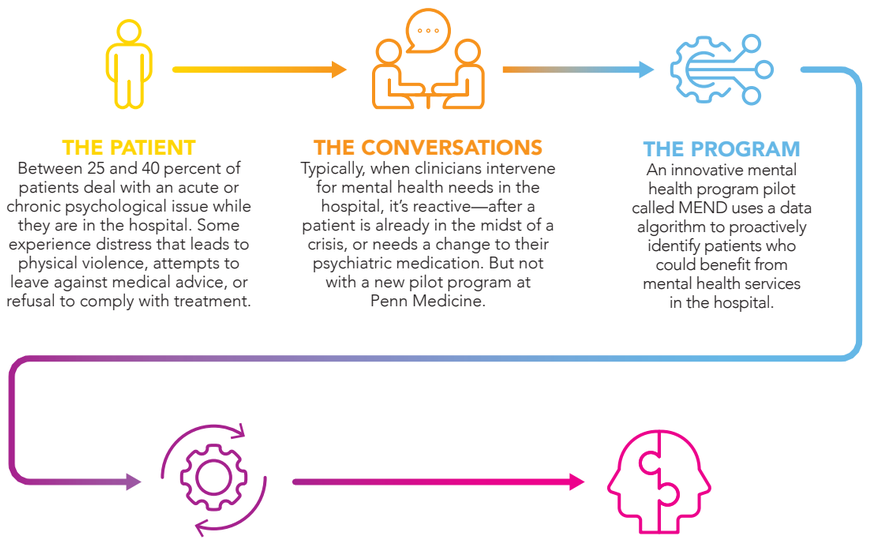
> With MEND team members taking the lead with behavioral health crises, the doctors can focus more on the physical ailments within their core specialties—and they report feeling less fatigued and burnt out as a result.

She was lucky, she says, to partner with Matthew Press, MD, MSc'10. Press had just started as associate medical director of the Penn Medicine Primary Care service line, fresh from a stint working for Medicare—where he helped develop a set of new billing codes that providers could use to bill for mental health care in a primary care setting.

"The collaborative care model had been studied and shown to be effective, but very few health care systems used it because there was no way to pay for it," Press explains. "Once Medicare created codes in January of 2017, it sets the example for the rest of the industry. Medicare creates the billing code, and then it's up to individual insurance companies to decide to cover it or not."

In the first year of PIC, Press and Livesey lobbied hard with insurance providers across the region to get them to accept the new codes. "When we went and made our pitch to them, we said 'This isn't just us asking you to pay for the

FROM THE PATIENT TO THE SYSTEM, HOW MEND TRANSFORMS MENTAL HEALTH CARE



THE PATIENT

Between 25 and 40 percent of patients deal with an acute or chronic psychological issue while they are in the hospital. Some experience distress that leads to physical violence, attempts to leave against medical advice, or refusal to comply with treatment.

THE CONVERSATIONS

Typically, when clinicians intervene for mental health needs in the hospital, it's reactive—after a patient is already in the midst of a crisis, or needs a change to their psychiatric medication. But not with a new pilot program at Penn Medicine.

THE PROGRAM

An innovative mental health program pilot called MEND uses a data algorithm to proactively identify patients who could benefit from mental health services in the hospital.

THE DRAMATIC CHANGE

MEND helps manage behavioral issues before they become crises. In the hospital units where it was piloted, physicians reported less stress and burnout. And even patients who didn't need MEND's services saw benefits—on average, *all* patients on the unit were able to go home sooner.

THE MODEL

Integrated mental health care—both in the hospital and for patients receiving outpatient care—is a growing movement in psychiatry. The MEND pilot has recently expanded to a second Penn Medicine hospital. And MEND's sister primary care program is expanding into outpatient specialty services.

newest tech or expensive drug," Press says. "'Those things are all important, but look, we've got in some ways a wonder drug, a program that is not only going to open access to your members to mental health and deliver better mental health outcomes to them, but it saves money overall."

When the program began, the team expected 500 patients to be referred in the first year. Instead they got 6,000.

The familiarity and ease of access is what made the program so popular, Livesey says. "When people are there with their primary care provider who they already know and trust, at a location that they know and trust, and you say 'I can offer you mental health services right here,' they say, 'Oh that's great!'"

"If you look historically, our national health care system has essentially created two separate systems, a mental health system and a medical system," says Press. "How we pay and the amount we pay is different between mental and physical health, and coordination and communication between them is completely siloed."

"But you can't carve a person up into different problems. They're one person."

THE PATH FORWARD

As PIC was getting off the ground, Livesey and a multidisciplinary team, including Colleen McKelvey, CRNP and Christine Chevellier, LCSW, were applying to Penn's Center for Health Care Innovation Accelerator Program—the organization's program to rapidly design, test, and implement transformative care models. They'd been looking into integrated care in hospital settings, visiting other institutions who had programs similar to MEND, and Livesey had an idea.

"One thing I'd noticed was that the identification and engagement piece was laborious," she says. Mental health clinicians triaging incoming patients would manually review their charts. "Wouldn't it be great if we could identify these patients right when they hit the floor?"

The winning application proposed creating a smart computer algorithm that could score incoming patients on the likelihood that they'd benefit from mental health intervention, shortcutting the triage process and allowing providers to move fast. It also suggested a multidisciplinary team approach and a focus on navigating patients to care outside the hospital.

Of course, that was no easy task.

Once accepted into the accelerator program, Livesey partnered with Kelley Kugler, MSc, an innovation manager with the center. As a former consultant, Kugler had experience developing data-led services for use in government, retail, and electronics. As a pair, they discussed how these tools might meet certain challenges of mental health. The idea, Kugler explains, was to create something that worked similarly to a spam filter for email—except instead of picking up on keywords that indicate spam, they'd be teaching a computer to pick up on keywords that indicated a history of mental illness.

> Livesey and her team dream big—of a world in which collaborative care is embedded in all medical practices, from cardiology to cancer care.

"We started out looking at things like what meds are someone on, or do they have a previous psychiatric diagnosis," Livesey says. "That got us nowhere." Because mental health care can be stigmatized and hard to access, many patients who needed it didn't have those elements in their health records.

So instead, with the support of coder-clinician David Do, MD, an assistant professor of Clinical Neurology, they were able to let the computer teach itself to recognize patients the way health care professionals do.

Four clinicians trained in psychiatry spent hours reviewing about 300 patient charts and graded them on a scale of one to five on how likely they might be to benefit from mental health care, as well as the severity of care they'd require.

"I'd pretend I was seeing them for the first time: 'OK, they're arrived on the floor, how likely are they to need a psychiatrist,'" recalls Anderson, who was one of the clinicians. She spent her own time, nights and weekends, on the project.

"It's kind of a labor of love," she says. "We really believe in the model. We wanted to create this tool for ourselves, and it has made things easier, so it was an investment."

The algorithm looks for charts that share certain code words with the charts Anderson, Livesey and others evaluated—like "noncompliance," "consequences," and "victims."

"There were over 2,000 words that were statistically significant," Livesey explains.

It's about 70 percent accurate, she says, at the end of the accelerator program's first phase, and the Penn Data Science team, led by Michael Draugelis, is at work on making it even more accurate.

Both PIC and MEND have proved popular with the medical teams. "The broader acceptance has been tremendous," she says. "It's a relief for clinicians to be supported as they care for these really complex patients."

Livesey points out that MEND can yield many benefits to the health system—addressing patients' clinical needs, alleviating provider burnout, and even reducing costs by allowing patients to go home sooner. Plus, she says, there may be an opportunity for insurers to support MEND's model for inpatient care, as they do in PIC for outpatients, through a case rate or the collaborative care codes.

Within the first two years of the PIC program, in eight practices, more than 14,000 patients were referred for mental health care. One in ten of these patients referred to care were identified as having had suicidal thoughts. PIC is in the process of expanding to six more practices with plans to support the whole primary care service line within the next 2-3 years. PIC is currently running a pilot in Penn Medicine's 24/7 OnDemand telemedicine urgent care service to serve Penn Medicine employees with mental health needs.

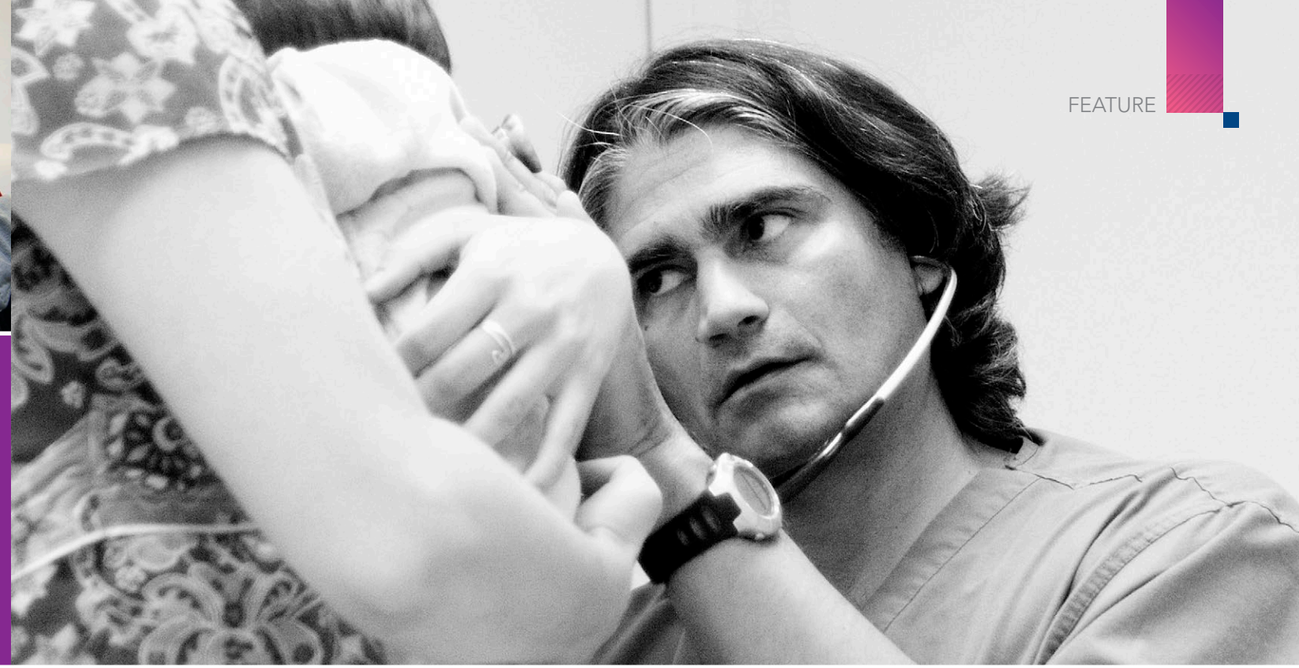
The model is growing, and Livesey and the PIC team dream big—of a world in which collaborative care is embedded in all medical practices, from cardiology to cancer care. While her main focus is the primary care expansion, Livesey's next goal is to integrate mental health with outpatient medical specialists. This spring, PIC will be expanding to a Penn Medicine obstetrics and gynecology office. And in January 2020, a MEND team launched at Pennsylvania Hospital, which is also home to two inpatient psychiatry units, a crisis center, and a community mental health center. Offering MEND in a new context will test the model and help demonstrate what MEND would look like on a broader scale, Livesey notes.

For patients like Pino, the program's support can make all the difference.

"Coming to such a big hospital, at first you're kind of worried, wondering, 'Am I going to get lost in the hustle and bustle?'"

"Having someone sit down and take the time, to where they're not saying 'Oh I gotta go,' it makes you feel like, 'Wow, it doesn't matter how big the team is, the doctors care, they want you to fully get better,'" she says. "Not only physically, but mentally get better."

Read this story online with related links at PennMedicine.org/magazine/integratedcare.



SERVICE IN ACTION

SALUD y COMUNIDAD

(Health and Community)

By Rachel Ewing and Queen Muse

When Daphne Owen, MD'15, GME'19, walked down the steps into the basement at the former Saint Agnes hospital in South Philadelphia for the first time more than ten years ago, she had no idea how the world she was about to enter would shape her career. As a young college graduate recently transplanted from California with conversational fluency in Spanish, Owen only knew she wanted to go to medical school and pursue her passion for social justice to make a difference. Those first steps would ultimately take Owen into elementary school classrooms. They'd take her to family celebrations, to waving a flag in the city's massive Carnaval de Puebla celebrations, and to a remote mountain village outside Mexico City. They'd lead to bonds of friendship both as a physician and as a part-time bartender—all in service toward a neglected community's health.

What she found in that basement was a then-tiny non-profit health clinic for documented and undocumented immigrants. By 2009, the Archdiocese of Philadelphia had already shut down St. Agnes Hospital, but the facility still housed physicians' private offices. One night per week at first, these cramped quarters were also home to Puentes de Salud, or Bridges of Health. Here, Philadelphia's Latinx immigrant families found compassionate care that was otherwise hard to come by, delivered by volunteer physicians and medical students from the Perelman School of Medicine like Owen would later become.

"I was so struck by the fact that Puentes really got it," Owen said. "After studying sociology in college, I was interested in thinking about health from a sociological and community health standpoint, and here I'd found a place where they were already doing that work."

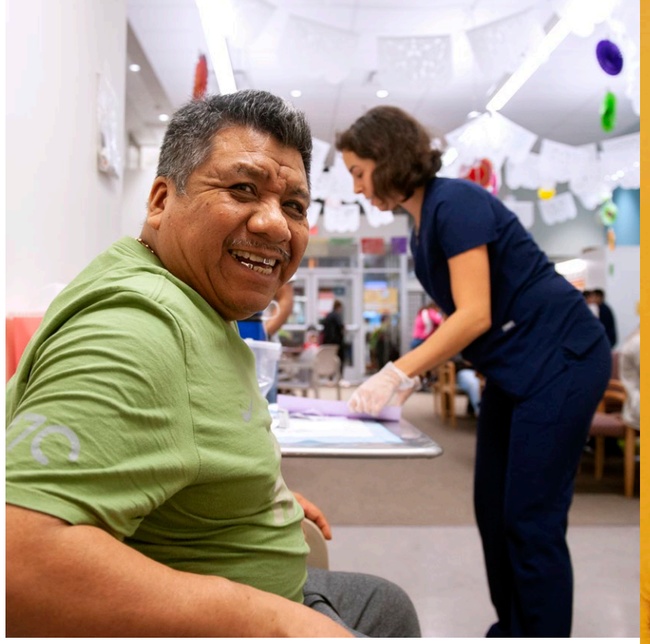
That basement at St. Agnes wasn't the clinic's first home and it wouldn't be the last. For the first few years after its inception in 2004, Puentes migrated from old church and hospital basements to any local health center or school that was willing to donate space. This limited Puentes volunteers to providing only the most basic preventative and primary care services. But that was all part of the vision of its founder, Steve Larson, MD'88: Start small, do the work, and grow once you've proven the value. He didn't wait until he could afford to hire an accountant in those early days of Puentes, for instance. A shoebox full of receipts under the front seat of his truck was enough of an accounting system, to start.

Larson always envisioned more. While Owen was getting acclimated as a new volunteer helping with basic administrative tasks and checking patients in, a small group of physicians from the Hospital of the University of Pennsylvania (HUP), led by Larson, an associate professor of Emergency Medicine, were on the brink of securing a new permanent location for Puentes. The new comprehensive immigrant health and wellness center would help families with a broader array of their unmet needs—not just to be healthy, but to thrive.

Growing to Meet the Community's Needs

In the rapidly growing Latinx immigrant community in South Philadelphia, roughly 90 percent of immigrants are undocumented and almost 100 percent live below the poverty line.

Many of the Latinx immigrants Puentes serves work in low-paying jobs, face linguistic and cultural barriers, and are at high risk of being uninsured because they have limited access to affordable coverage options. As such, many of the patients who come to Puentes have gone years without receiving even the most basic primary care, like blood pressure checks, standard vision and hearing tests, or other exams used to evaluate overall health. Volunteer physicians at Puentes have been able to help most patients reclaim their health by providing them with primary care for free or less than $20 per visit, depending on what the person can afford.



Larson hoped Puentes would become a resource for much more, though. "One of my goals was to shift Puentes from direct health care to community building and support, and education figured in prominently," he said. Over the years, Larson and Puentes volunteers had heard countless stories from parents about their desire to help their children with homework, and their feeling that they didn't have the language skills, or even the time, to be there for their kids and help them through their challenges with learning.

"They were voicing a need about wanting their kids to be successful in school and have a good education," Owen said. The need for an education program was there—but not the resources or staffing.

"I couldn't get that off the ground, though I'd tried with several Penn Med students previously," Larson said.

When Larson met Owen as a new volunteer, he saw that she could be the one to achieve this vision. Her stepfather, who is Mexican-American, is an educational leader in California, and Owen had absorbed his passion for empowering students' success as part of her own. And she demonstrated a commitment to hard work for Puentes, showing up at health fairs and community events at a time when becoming a presence in the community was one of Larson's primary goals. During her gap year before medical school, Owen readily took on the challenge of starting a small after-school education program for second and third graders as part of Puentes.

"Daphne is a ball of energy," Larson said. "She's incredibly resilient, and has a can-do attitude to achieve whatever we need. She may not know all the intricate details or how to get from point A to B, but she'll figure it out."

Owen needed all of those skills. The principal of Southwark Elementary with whom Larson had negotiated plans for the education program left within the year Owen was

When it first launched in 2010, the Hacia el Futuro education program offered tutoring assistance to a group of 10-12 students once a week in the basement of a small South Philadelphia nonprofit.

working to get it off the ground. In the school, where a majority of the students were either Southeast Asian or Latinx, many lacked proficiency in English—and all were economically disadvantaged. In the first year, Puentes didn't have the formal paperwork to run its program inside the school, so Owen set up shop in the offices Puentes then used around the corner—another dimly lit basement, this one at a small local nonprofit, United Communities Southeast Philadelphia.

From this modest start, Hacia el Futuro, or Bridges Toward the Future, began. The program at first offered tutoring and homework assistance to 10 to 12 students once a week. In the years that followed, it has expanded, first to two days per week, and ultimately to more than 100 children who take part in educational programs four days a week—and it was only the first of what would become a suite of social and education programs for children and adults at Puentes.

A Beacon in the Community

Before Owen began medical school, Larson turned to her and said he had another job that he needed her help with. He wanted her to travel to the remote village of San Mateo Ozolco, southeast of Mexico City in the state of Puebla. Unbeknownst to most Philadelphians, San Mateo is an unofficial (and much littler) sister city. In this tiny village of 6,000 adults, at any given time, 2,000 may be living and working in Philadelphia, many of them behind the scenes of the city's booming restaurant industry. Seeing the churn of Puentes patients who hailed from San Mateo, and who often flowed back and forth between the sister cities, Larson had begun to forge connections in the village. To understand the South Philadelphia Latinx community and their health needs, Larson realized, he needed to understand San Mateo and the socioeconomic forces that drove families across the continent seeking work.

Owen would be his "boots on the ground" to connect with the community in San Mateo. She arrived at the isolated village—high in altitude, frigid, and impoverished, to find a looking-glass miniature Philadelphia. There were families she recognized from Puentes and children walking around town in Phillies jerseys. Yet it was utterly different, too. The families lived in extreme poverty, getting by not as dishwashers and kitchen staff at urban restaurants, but through subsistence farming—many residents could eat only what they grew themselves. Owen came to understand the trauma, poverty, and struggle that drove so many to migrate north for work and opportunity, however limited.

"Daphne has this incredible capacity to build friendships," Larson said. "She went to San Mateo, she acclimated, and she

survived—and came back with the ability to give us all a deeper understanding of the social determinants that shape this community's health. She is a real beacon for Puentes."

Once back in Philadelphia, Owen began her medical studies at Penn. She secured a grant to hire Esther Morales to run the education program at Puentes, while she began to volunteer in clinical care.

At the same time, Owen worked part-time as a bartender to help finance her education. Ensconced in the restaurant industry where many Puentes patients work, she again found familiar faces. One night, in the wee hours, she spotted a sixteen-year-old who she'd known as a middle schooler in San Mateo. Driven north by lack of opportunity at home, he was in shock from the change from rural Mexico. In the restaurant, as in the clinic, Owen kept her eye out for him and for other San Mateo poblanos she knew.

Occasionally for parties and events, the walls at the Puentes clinic are adorned with images reflecting the population the center serves, including photos of young children who've taken part in the early child development program (top, right) and summer camp drawings on themes that celebrate multiculturalism.

In the clinic, she connected as a medical provider—offering as much basic care as she could, and trying to secure access to low-cost specialty care beyond the capabilities at Puentes. But for some, like Mery Martinez, a 40-year-old Honduran woman whose battle with leukemia was captured in the 2016 HBO documentary *Clínica de Migrantes: life, liberty, and the pursuit of happiness*, health issues had gone untreated for so long there was little left for the physicians to do.

Owen knelt beside Martinez's wheelchair to ask her in Spanish—Would she want to be with her family? Did she know the name of the airport closest to her remote hometown in Honduras? Would she be able to manage the commute alone? Puentes volunteers pooled resources and helped Martinez spend her final days with her children. The film depicted her writhing with grief, tears welling in her eyes, as she walked with Martinez, holding her hand all the way to the boarding entry for her flight, to make sure she knew she was not alone.

Larson, Owen, and the scores of other Puentes volunteers take pride in their successes—the preventive care delivered, the diseases caught early.

Yet they are motivated by so many others like Martinez who couldn't be saved. For Owen, it is these patients that are the driving force behind their desire to keep fighting for those that they can.

"Puentes has had a huge impact on me in terms of my thinking about the kind of doctor that I want to be," Owen said, "and what's possible to do with and for a community."

When Owen graduated from the Perelman School of Medicine in 2015, soon after sending Mery Martinez on her final flight home, she chose to remain at HUP for her residency in Emergency Medicine, working alongside Larson there, as well as at Puentes. She later became the assistant medical director at Puentes, and when she completed her residency in 2019, she was offered a position among the Emergency Medicine faculty at Penn.

Whatever her role at any given time, Owen forged personal connections with members of the Latinx community. Families of children she knew for years in Hacia el Futuro invited her to celebrations across South Philadelphia. Her friends from San Mateo invited her to bear the flag in the April Carnaval parade commemorating the Battle of Puebla, year after year.

More Than a Clinic— A Model of Care

In the early days, while Owen was first working on bringing education to Puentes, Larson was working on expanding capacity. Through conversations with leaders at Penn, in 2010, Larson was allowed to use clinical space at Penn Medicine Rittenhouse (formerly Graduate Hospital). Two years later, he

Steve Larson, MD, an associate professor of Emergency Medicine at the Perelman School of Medicine, is co-founder and executive director of Puentes de Salud.

Today, the Puentes afterschool tutoring program serves over 100 students with thousands of sessions each year, and Puentes also offers adult education programs.

secured a permanent location for Puentes at 17th and South streets in an abandoned space that Penn donated.

"This is when things really started to pick up, and people began to realize that the clinic was growing in size and mission and reputation," Larson said. "From that point on, both the University provost's office and the health system have continued to support us, and that support has really helped us to grow."

In the new location, the clinic extended its hours to five days a week, which allowed the team to serve more patients. And with additional resources, there was room for the educational and social programming to grow.

In addition to providing subject tutoring, Puentes now offers a broad array of educational programs to children ages 3 to 18, including computer coding and summer literacy camps to help families improve their knowledge of options for future careers and, most importantly, their health. Beyond education, Puentes also encompasses legal services, yoga, and opportunities for families that celebrate their native art and culture.

"Education and health and community wellness are all very interconnected," Owen said—a truth that holds for both tiny rural villages like San Mateo, and the big city. "What teachers in classrooms can do for health outcomes on a larger scale is so much more than what you can do in the clinic."

In her triple role today as assistant medical director for Puentes, and assistant professor of Emergency Medicine and director for Longitudinal Curriculum in Advocacy at the Perelman School of Medicine, Owen recruits volunteers and educates the next generation of medical students about the critical role physicians play in advocating for members of the most vulnerable and underserved populations. Penn students now represent roughly a third of all Puentes volunteers.

Other passionate members of the core staff have helped to grow Puentes in breadth and depth. Morales, who is now the clinic's managing director, initially grew Hacia el Futuro, and helped Larson upgrade the financial system from shoebox accounting, while also expanding the clinic's fundraising. Alexandra Wolkoff, who currently serves as the director of education, worked to increase participation and refine the Hacia el Futuro model. Under their leadership, the program has grown in complexity with an array of local college volunteers, and has expanded to include adult education programs that teach English as a Second Language and financial literacy.

The goal, as Wolkoff explained, is to build strong, trusting relationships with families and to equip them with the skills and confidence to speak and write English in everyday settings and to learn the keys to building wealth for themselves and their families.

With private fundraising and donations from Penn, in 2015, Puentes expanded its footprint in South Philadelphia, adding a new, 7,000-square-foot space to its existing Wellness Center on Penn Medicine's Rittenhouse campus.

The dimly lit basements from Puentes' early days are now replaced with a bright and colorful space, complete with beautiful Mexican folk art hanging daintily from the ceiling and ample room to welcome the ever-growing number of patients who continue to rely on Puentes for care.

Among health care providers across the country and around the globe, Puentes is recognized as a national model for immigrant health and wellness because of the team's ability to do so much with very little—and that makes it a potential model for health care in general, where there is a clear need to help more vulnerable patients like those at Puentes without adding to the skyrocketing costs of care.

"Puentes is important for those kinds of questions," Owen said. "For the future of health care, how do we do better by people who often are not well served by the system we have, and do it with less?"

In 2018, Owen's Hacia el Futuro afterschool program provided 7,000 tutoring sessions for more than 125 students. In the same year, Puentes saw 8,300 clinic visits; a 30 percent increase from the year before. Near the end of 2019, Larson estimated the clinic would soon reach more than 9,000 visits. Over the years, more than 500 volunteers, including students, physicians, and other clinical providers, have put in countless hours of pro bono efforts to help the community at Puentes.

With experience, willpower, and an army of dedicated volunteers in tow, the clinic's founders are preparing to take the Puentes model around the globe with hopes of helping other underserved communities in need of the same compassionate care.

While the vision moves forward, Larson is making plans to retire soon. He's planning to write a book about Puentes and to spend more time painting, a longtime passion.

"I'm a full time ER doc, and I'm bad with details," Larson said. "I'm a big-picture guy. Puentes is a beautiful thing as an artist to watch being developed. It's very natural. We've never outstripped our resources, and we never overreached. It has been a steady, slow, constant growth. The more people jump into the fray and bring their gifts and skills, Daphne and Esther and Alexandra and so many others, the more the vision comes to life. Nothing I've experienced in my career in medicine or as an educator, in the mainframe of a traditional health system, can compare."

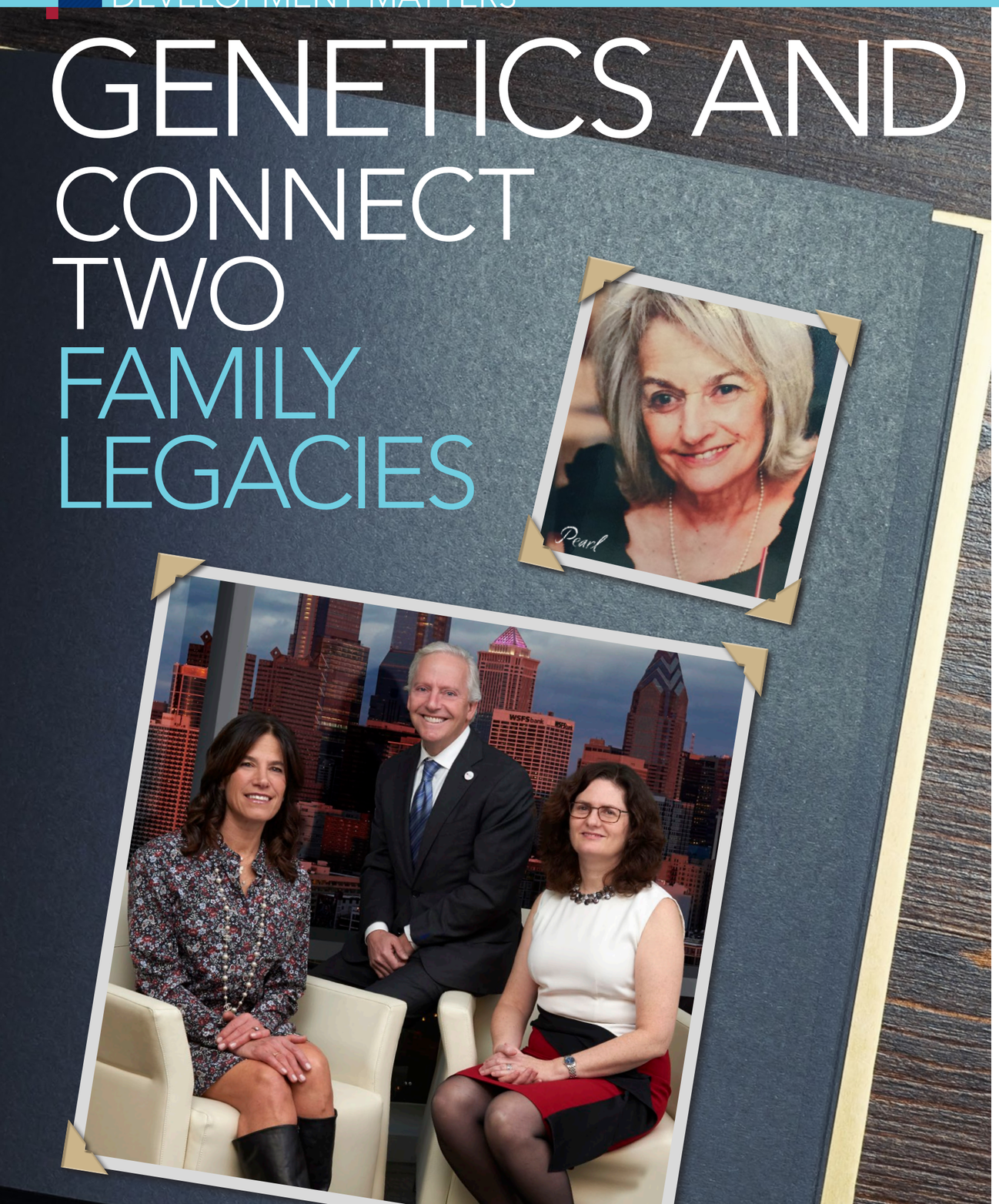
Looking ahead, Larson sees tremendous potential in Owen's character as a connector, and in her current role in the Perelman School of Medicine, to help forge new and responsible partnerships with communities in need.

"My ultimate dream is that this isn't just something that we're building for immigrants or people who are undocumented," Owen said. "It's a new way of thinking about how to do better by all of these groups that are underserved." ▽

More Stories of Service in Action

The story of Owen's work at Puentes is just one of the many ways Penn Medicine serves in the community. Find and follow more stories in the coming months—including infographics, photo essays, videos, and more—at the new multimedia Penn Medicine community benefit report, *Service in Action.* Access the report online this spring via **PennMedicine.org/community.**

GENETICS AND GENEROSITY CONNECT TWO FAMILY LEGACIES



By Laura M. Brennan

The Pearl Basser Professorship cements a connection to drive change—and provide hope—for families affected by BRCA-related cancers.

Katherine L. Nathanson, MD'93, grew up in a scholarly household. In grade school, she became fascinated by genetics and the idea of hereditary diseases, and that interest stayed with her. Today, as deputy director of Penn Medicine's Abramson Cancer Center and director of genetics at the Basser Center for BRCA, she's one of the world's foremost experts in cancer genetics and genomics.

Shari Potter, C'87, was raised by a mother who instilled the value of volunteering and giving back. When Shari's older sister, Faith, died of ovarian cancer caused by a BRCA genetic mutation, unbeknownst to either of them, her family and Nathanson's were set on a trajectory to connect.

Last year, Shari and her husband, Len, established the Pearl Basser Professorship in BRCA-Related Research, and Nathanson was named its inaugural chairholder.

A Love of Science

No doubt Nathanson's parents, both in academia, played a big role in her journey to becoming a scientist: not everyone can say they've been aware of grant deadlines since they were little. In high school, Nathanson spent one summer vacation taking a course in molecular biology, and another working in the Penn lab of microbiology professor Susan Weiss, PhD.

These experiences led her to a BA in biology from Haverford College and, eventually, an MD from Penn's Perelman School of Medicine. Since then, she has risen to become one of Penn's most distinguished faculty leaders—at a time when the exploding field of genetics is reframing medicine.

But, as Nathanson tells it, that hasn't always been the case.

"When I interviewed for residency and said I wanted to do genetics, they thought I was out of my mind," she recalls. "No one could understand why." At the time, genetics was relegated primarily to pediatrics and dysmorphology, or birth defects, and considered a strange choice for an internist. (Even today, there are not many internists/geneticists, with fewer than 100 in the U.S.)

Still, Nathanson persisted and went on to become the first internist to train in genetics at Children's Hospital of Philadelphia and the first person hired into the Genetics Division of the Department of Medicine at Penn. Gene therapy pioneer Jim Wilson, MD, PhD, who heads Penn's Gene Therapy Program, brought her on. Wilson is also the Rose H. Weiss Orphan Disease Center Director's Professor and Director of the Orphan Disease Center.

"It's hard to imagine what a different time it was; no one knew what to do with me," Nathanson remembers. But she knew what she wanted to do. "Understanding how things can vary with inheritance, and the science around genetics—I just loved it."

Creating a Legacy of Hope

"The genetics component of Basser's mission is really important and it's where the future of medicine lies," says Len Potter. "Dr. Nathanson is a brilliant, creative, and beautiful person, and we're thrilled that she's the new Pearl Basser Professor."

The professorship is named for Shari's mother, who died in 2017. "My mother constantly volunteered, giving back to our synagogue, Hadassah (a Jewish women's benevolent organization), the Board of Elections, the Franklin Institute…," recalls Shari, a Philadelphia native.

The endowed chair will augment the work of Nathanson and Penn Medicine's Basser Center for BRCA, the world's first center dedicated solely to advancing research and raising awareness surrounding BRCA-related cancers. BRCA stands for BReast CAncer susceptibility gene, and it increases the risk of breast, ovarian, prostate, and pancreatic cancers. There are two different genes, *BRCA1* and *BRCA2*, distinguished by the particular chromosome on which they are located.

The Basser Center was established in 2012 by Shari's sister and brother-in-law, Mindy C'92 and Jon Gray C'92, W'92. Its creation was inspired by the loss of Mindy and Shari's 44-year-old sister Faith, to BRCA-related ovarian cancer. The center's mission is to eliminate BRCA-related cancers and increase critical awareness and hope for individuals affected by a BRCA mutation. To date, the center has raised $100 million to support this life-saving mission.

A LEGACY OF EXCELLENCE AND IMPACT

"When we lost Faith, it felt very dark," recalls Shari. "We were all obviously devastated, but when Mindy and Jon created the Basser Center, it gave us the hope that if we all work really hard by bringing together an incredible team of people, the world doesn't have to lose any more Faiths."

'No One Has Really Done It This Way Before'

With this one aim in mind, the Potters have been pivotal champions of the Basser Center and, together with the Grays, have mounted a full-scale charge against BRCA-related cancers. "It's this goal of beating cancer—particularly BRCA-related and other hereditary cancers—through research, clinical care, and outreach in a way that no one has really done before," says Len.

In addition to establishing the chair, the Potters founded and endowed the Basser Global Prize, a $100,000 award given each year to a visionary scientist who has advanced *BRCA1/2*-related research. The prize is presented at the annual Basser Center Scientific Symposium, at which renowned *BRCA1/2* scientists, clinicians, geneticists, and genetic counselors from around the world share their research with fellow investigators and care providers.

The Basser Center team leverages Penn's world-leading stature—and the enthusiastic support of University leadership—to reach way beyond the Penn campus. Not only does the Basser Center award research grants to Penn investigators (27, so far) but, in a move virtually unheard of in the halls of traditional academic medicine, it also gives grants to other leading research institutions in the US and abroad.

"Penn's administration has allowed us to really break down barriers and walls and begin to make an impact around the world," says Len. "We talk about bench to bedside breakthroughs, but the Basser Center really goes even wider than that, and everyone on the team has adopted that philosophy."

In Seven Short Years

When the Basser Center was created, scientists at Penn were working hard to better understand the characteristics of tumors associated with a *BRCA1/2* mutation. The resources of the Basser Center, and now the Pearl Basser Professorship, are allowing Nathanson and her team to delve deeper, learning exponentially more about the genetic, genomic, and immunology landscape of these tumors.

One of the most exciting research developments includes PARP inhibitors, a therapy that can stop cancerous cells from repairing themselves. (PARP is an enzyme that helps repair DNA.) There are now four FDA approvals for PARP inhibitors to treat BRCA-related breast and ovarian cancers, and ovarian cancer at large. According to Nathanson, PARP inhibitors are being used at increasingly earlier stages of disease. "This is clearly very exciting and fantastic for our patients, which is what it's all about," she says.

> "As a child and as an adult, [my mother's] influence has stayed with me and I hope I've passed that along to my children: being grateful for what we have and paying it forward." – Shari Potter

Scientists are continuing to learn more about the function of *BRCA1/2*, including how it might interact with the immune system, Nathanson adds. Basser Center physician-researchers are also developing a preventative vaccine, with the goal of preventing BRCA-related cancers altogether. In addition, they are looking at the origin of ovarian cancer in the fallopian tubes to develop less invasive and more effective prevention and early diagnostic strategies.

Besides research, increasing awareness is key to the Basser Center mission. BRCA mutations are carried by men and women, can be passed on to male and female children, and can be found with a genetic test using blood or saliva. "In this instance, knowledge is power," says Shari. "If you know you have this genetic mutation, you can do something." That's why the Basser Center is focused on making people around the world aware of genetic counseling and testing, through innovative programs like "telegenetics," a genetic counseling model that extends these services to communities with limited or no access to local counselors through the use of telephone or videoconferencing technologies.

For the Potters, the progress being made is a testament to the "wonderful energy of the Basser team, and the leadership of Susan Domchek, [MD]," the Basser Professor in Oncology and the center's executive director. "It's remarkable what you can do if you put great minds together and provide the resources they need," says Shari. "In just seven years, we have made a difference."

Two Families, One Goal

The importance of making a difference is a lesson Shari learned from Pearl Basser. "As a child and as an adult, her influence has stayed with me and I hope I've passed that along to my children: being grateful for what we have and paying it forward," says Shari.

Pearl grew up with two deaf parents, both Russian immigrants, and a high school diploma was the extent of her education before marriage. It wasn't until after she raised four children (Shari's brother, Stephen, is the oldest) that Pearl earned her degree at a community college. Shari's dad, Phil, was reared in an orphanage and appreciated the German Jewish philanthropists who sustained the orphanage through the Depression—a gratitude that always stuck with him and that he imparted to his children.

For Nathanson, too, the influence of family has shaped her passions. Her father, virologist Neal Nathanson, MD, chaired Penn's Department of Microbiology for 15 years, was the University's vice provost for Research, and then vice dean for Global Health at the Perelman School of Medicine. Her mother, Constance Nathanson, PhD, is a professor of sociomedical science at Columbia University's Mailman School of Public Health.

Nathanson's path has also been informed by her late stepmother, Phoebe Starfield Leboy, PhD, a biochemist at Penn's Dental School, who for 21 years was its only tenured female professor. As such, Leboy also made her mark as an activist for women in science, founding the Women for Equal Opportunity at the University of Pennsylvania, and organizing initiatives that led to other advances for women.

Proud to be part of a legacy of women leaders in science, Nathanson is also adamant about carrying it forward. "When I give talks, I make a point of telling young women that it's possible to be a successful scientist and still have a family," she says. "It's so important to believe in what you do and follow your passion."

And now, thanks to the Pearl Basser Professorship, these two families, both with deep Penn ties (and both with Penn undergraduates of their own), have intersected to find answers that will save countless lives.

"We've found a way to give back to the world in a way that is personal to us and will help future generations," says Len. "We're fueling the fire at the Basser Center with just one goal: let's eradicate this."

Susan Domchek, MD, Mindy Gray, Katherine L. Nathanson, MD, and Shari Potter

In creating the Pearl Basser Professorship in BRCA-Related Research, Shari and Len Potter join a proud legacy of benefactors. Since the first endowed chair at Penn Medicine was established in 1877, far-sighted donors have understood the considerable value they bring to sustaining scholarship, accelerating research, and advancing care. Endowed professorships assist in the recruitment and retention of distinguished faculty members, and the funds empower Penn's physician-scientists to expand knowledge and develop treatments to improve patients' lives. They also honor the remarkable individuals for whom they are named.

To learn more about the power of endowed professorships and discover how you can make a difference that is most meaningful to you—and the world—please contact Kathryn J. Griffo, Chief Advancement Officer, at (215) 898-0578 or kgriffo@upenn.edu.

Read more about the Basser Center in the Winter 2018 issue of *Penn Medicine* at PennMedicine.org/magazine/basser.

Kelly Abramson, an executive in International Business Development, earned the inaugural Vizient University Health System Consortium Global Executive Services Network Leadership Award. This award is granted to an individual who embodies the network's spirit of collaboration, shared knowledge, and dedication to excellence.

Alison Buttenheim, PhD, MBA, an associate director of Penn's Center for Health Incentives & Behavioral Economics (CHIBE), an associate professor of Nursing, and an assistant professor of Health Policy, and **Harsha Thirumurthy**, PhD, an associate director of CHIBE and an associate professor of Medical Ethics & Health Policy, have received a three-year, $3.5 million grant from the Bill and Melinda Gates Foundation to establish a first-of-its-kind HIV-focused nudge unit in South Africa.

Yi-Wei Chang, PhD, an assistant professor of Biochemistry and Biophysics, was awarded the 2019 Packard Fellowship for Science and Engineering and a five-year, $875,000 grant to support his research deciphering the mechanisms of cellular processes through innovative electron and optical imaging.

Ebenezer Daniel, MBBS, MS, DO, MPH, PhD, an assistant professor of Ophthalmology; **Maureen G. Maguire**, PhD, the Carolyn F. Jones Professor of Ophthalmology; **Graham E. Quinn**, MD, MSCE'01, an emeritus professor of Ophthalmology; **Prithvi S. Sankar**, MD, a professor of Clinical Ophthalmology; **Michael E. Sulewski**, MD, chief of Ophthalmology at the Corporal Michael J. Crescenz Veterans Affairs Medical Center, co-director of Cornea and External Diseases Service, director of Refractive Surgery, and a clinical associate of Ophthalmology; and **Brian L. VanderBeek**, MD, MPH, MSCE'15, an assistant professor of Ophthalmology, received awards at the annual meeting for the American Academy of Ophthalmology. These awards honored their contributions to the profession, humanitarian service, and mentorship.

Julie Dees, MA, LPC, director of Behavioral Health at Penn Presbyterian Medical Center; **Shreya Kangovi**, MD, MSHP'13, founding executive director of the Penn Center for Community Health Workers and an associate professor of General Internal Medicine; **Carrie Kovarik**, MD, an associate professor of Dermatology; **Cecilia M. W. Livesey**, MD, GME'16, chief of Integrated Services in Psychiatry; and **Nicole O'Donnell**, a certified recovery specialist, were recognized at the *Philadelphia Inquirer*'s Influencers of Healthcare Awards for their excellence in innovation, patient care, education, and volunteerism.

James Eberwine, PhD, the Elmer Holmes Bobst Professor of Pharmacology and co-director of the Penn Program in Single Cell Biology, was recognized by the National Institutes of Health, earning the Pioneer Award for the second time. He will receive up to $3.5 million to investigate RNA structure within single cells in cortex and hippocampus tissue in the brains of mice and humans.

Yale E. Goldman, MD'75, PhD'75, a professor of Physiology, was recognized by the Biophysical Society for his contributions to the field of single molecule biophysics and for his work measuring motor proteins. He received the 2020 Kazuhito Kinosita Award in Single Molecule Biophysics.

Penn Medicine's Palliative and Advance Illness Research (PAIR) Center—led by **Scott Halpern**, MD'03, MSCE'01, PhD'02, MBE'02, a professor of Medicine, Medical Ethics & Health Policy, and Epidemiology, and founding director of PAIR—has been awarded a five-year, $2.5 million grant from the National Institute on Aging to fund a Roybal Center. Penn now has the distinction of being the only institution in the country with two Roybal Centers.

John H. Holmes, BA'76, PhD, FACE, FACMI, a professor of Medical Informatics in Epidemiology, was appointed for a second term on the Health Informatics Accreditation Council of the Commission on Accreditation for Health Informatics and Information Management Education. In this role, he will review applications for master's degree programs in informatics, set national accreditation standards, and oversee site visitors who evaluate program candidates for accreditation.

Rebecca A. Hubbard, MSc, PhD, an associate professor of Biostatistics, and **Jason Karlawish**, MD, a professor of Geriatrics and co-director of the Penn Memory Center, were reappointed to the National Academies of Sciences, Engineering and Medicine's (NASEM) Committee on Care Interventions for Individuals with Dementia and Their Caregivers. The committee is advising on interventions for Alzheimer's disease through a study with NASEM.

Rajan Jain, MD, an assistant professor of Medicine and Cell and Developmental Biology and member of the Cardiovascular Institute and the Institute for Regenerative Medicine, and **Arjun Raj**, PhD, a professor of Bioengineering, received the National Institutes of Health's Transformative Research Award and $5 million. This funding will allow their labs to elucidate factors that control cell identity and regulate transdifferentiation approaches.

Corey J. Langer, MD, a professor of Hematology-Oncology and director of Thoracic Oncology in the Abramson Cancer Center, was named the 2019 Honorary Member of the American Society for Radiation Oncology—the society's highest honor for physicians and researchers in disciplines outside of radiation oncology, radiobiology, and medical physics.

L. Scott Levin, MD, FACS, FAOA, chair of Orthopaedic Surgery, the Paul B. Magnuson Professor of Bone and Joint Surgery, and a professor of Plastic Surgery, was inducted into the Academy of Master Surgeon Educators.

Maayan Levy, PhD, an assistant professor of Microbiology, **Ophir Shalem**, MSc, PhD, an assistant professor of Genetics, and **Christoph A. Thaiss**, PhD, an assistant professor of Microbiology and a member of the Institute for Immunology and the Institute for Diabetes, Obesity & Metabolism, each received a New Innovator Award from the National Institutes of Health. The award includes $2.4 million in research funding over five years.

Foteini Mourkioti, PhD, an assistant professor of Orthopaedic Surgery and Cell and Developmental Biology, and co-director of the Musculoskeletal Regeneration Program in the Penn Institute for Regenerative Medicine, received a research grant from NASA to investigate how space-flight-like conditions impact telomere length in muscle stem cells and how that impacts muscle atrophy.

Charles L. Nelson, MD'92, chief of Adult Reconstruction and a professor of Orthopaedic Surgery who specializes in joint replacement, was one of only 21 members elected to a 10-year term on the American Board of Orthopaedic Surgery.

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1960s

Patricia Gabow, MD'69, received the 2019 Gustav O. Lienhard Award for Advancement of Health Care from the National Academy of Medicine for transforming a safety net hospital into a national model for quality care.

1970s

Joe B. Massey, MD, GME'72, has joined Inception Fertility Ventures, LLC, a network of top-tier providers focused on comprehensive fertility care and family planning.

Robert I. Grossman, MD'73, was honored by NYU Langone Health's board of trustees following a decade of service as dean and CEO. The school has been renamed the NYU Robert I. Grossman School of Medicine.

Diane K. Jorkasky, MD'77, GME'82, was named an expert consultant of NDA Partners, a life sciences management consulting and contract development organization.

1980s

Paul M. Palevsky, MD, GME'84, has been appointed president-elect of the National Kidney Foundation, a nonprofit organization focused on kidney disease prevention and education.

Mehmet Cengiz Oz, MD'86, GME'86, was appointed to the board of directors at Pan Theryx, a biotechnology company focused on developing nutritional therapeutics derived from colostrum.

Mats Agren, MD'87, has joined the Neurosurgery and Spine department at Maine Medical Partners, the largest network of primary care and specialty practices in Maine and New Hampshire.

James Bryan Bushick, MD'88, GME'89, has been appointed chief healthcare innovation officer at Amplifire—a learning and performance improvement platform.

Theodore M. Danoff, MD, PhD, GME'88, has been appointed chief medical officer at Complexa, Inc., a clinical stage biopharmaceutical company that develops treatments for fibrotic and inflammatory diseases.

Perelman School of Medicine Alumnus Earns Nobel Prize

For physician-scientist and University of Pennsylvania Perelman School of Medicine alumnus **Gregg L. Semenza**, MD'84, PhD'84, one question has informed most of his career: how do the body's trillions of cells—which continuously require oxygen in order to make energy—sense and adapt to changes in oxygen availability? For three decades, Semenza, a professor at Johns Hopkins University, has led pioneering research examining the molecular mechanisms of oxygen regulation, leading to the groundbreaking discovery of the HIF (hypoxia-inducible factor) 1 protein, which constantly monitors oxygen levels and switches genes on and off in response to low-oxygen conditions.

In recognition of this exceptional work, Semenza was awarded the **2019 Nobel Prize in Physiology or Medicine** by the Royal Swedish Academy of Sciences. He shared this honor with William G. Kaelin, Jr., MD, of the Dana-Farber Cancer Institute, and Peter J. Ratcliffe, FRS, FMedSci, of Oxford University. With this honor, Semenza became the 29th Penn-affiliated Nobel laureate. In May 2020, the Perelman School of Medicine will further recognize Semenza's achievements with an honorary degree and the Distinguished Graduate Award.

Semenza received his bachelor's degree from Harvard University, then earned his medical degree and doctorate from the University of Pennsylvania through the Medical Scientist Training Program. He completed his pediatric residency at Duke University Medical Center, then performed postdoctoral research in medical genetics at Johns Hopkins University School of Medicine, where he became a faculty member in 1990. He currently serves as the C. Michael Armstrong Professor of Pediatrics and a professor of Radiation Oncology and Molecular Radiation Sciences, Biological Chemistry, Oncology, and Medicine at Johns Hopkins, as well as director of the Vascular Program at the Institute for Cell Engineering.

When he took to the stage at the Karolinska Institute in December to deliver his Nobel Lecture—dedicated to his high school biology teacher and scientific inspiration, Dr. Rose Nelson—Semenza explained the implications of understanding the role of HIF-1 plays in conditions like anemia, diabetes, coronary artery disease, and cancer. His lab continues to investigate whether HIF-1 can stop diseased cells from surviving in low-oxygen environments, as well as if HIF-related treatments can encourage the production of oxygen-carrying red blood cells.

Reflecting on her colleague's achievement, **Celeste Simon**, PhD, the Arthur H. Rubenstein, MBBCh Professor in Cell and Developmental Biology in the Perelman School of Medicine and scientific director of the Abramson Family Cancer Research Institute, noted in a commentary for the journal *Cell* that this level of international recognition is not only exciting, but it "confirms our belief in the overall importance of hypoxia research." Noting that the mechanisms Semenza and colleagues discovered were extremely novel and surprising in 2001, she said she looks forward to the future surprises the field still has in store.

"In the meantime," she said, "we heartily celebrate the outstanding achievements of these three recipients of the 2019 award."

1990s

Dana C. Covey, MD, GME'90, received the 2019 William W. Tipton, Jr., MD, Leadership Award from The American Academy of Orthopaedic Surgeons in recognition of his contributions to military and trauma orthopaedics.

Jeannie T. Lee, MD'90, PhD'93, has been appointed to the scientific advisory board at Skyhawk Therapeutics, a drug development company focused on treating diseases with novel RNA expression-modifying molecules.

Wendye R. Robbins, MD, GME'91, has been appointed to the board of directors at RAPT Therapeutics, Inc., a clinical-stage, immunology-based biopharmaceutical company that develops small oral molecules to treat oncology and inflammatory diseases.

Elizabeth Tarka, MD'92, GME '99, has been appointed chief medical officer at Idera Pharmaceuticals, a biotech company focused on immunotherapy methods to treat cancer.

Gary J. Romano, MD, GME'96, has been appointed chief medical officer of Passage Bio, a genetic medicines company developing AAV-delivered gene therapies for the treatment of rare central nervous system diseases.

Kenneth W. Altman, MD, PhD, GME'98, has been appointed chair of the department of Otolaryngology – Head and Neck Surgery at Geisinger Health System.

Douglas S. Smink, MD'98, MPH, has been promoted to chief of Surgery at Brigham and Women's Hospital. He also serves as the associate chair of education in Surgery and the program director of the General Surgery Residency.

2000s

David Avi Hollander, MD'00, GME'00, has been appointed chief research and development officer at Aerie Pharmaceuticals, Inc., an ophthalmic pharmaceutical company developing treatments for patients with open-angle glaucoma and retinal diseases.

Paul McGovern, MD, GME'01, has been appointed vice president of Medical Sciences at VenatoRx, a private pharmaceutical company developing novel anti-infectives to treat multi-drug-resistant bacterial infections.

Kevin Navin Sheth, MD'03, has teamed up with Hyperfine Research, Inc., to pioneer the world's first portable, low-cost MRI technology for use in the neuro intensive care unit of Yale New Haven Hospital.

Roderick Tzeian Wong, MD'03, has been appointed to the board of directors at Avidity Biosciences, a biotechnology company focused on antibody-oligonucleotide conjugates for the treatment of rare muscle disorders.

Giang T. Nguyen, MD, GME'07, MPH, MSCE, has been appointed director of Harvard University Health Services. He previously served as executive director of Student Health Services at the University of Pennsylvania.

Subha Airan Javia, MD, GME'07, has been appointed chief executive officer of TrekIT Health, a tech startup that supplies its Penn-grown, patient-focused workflow software to other health systems.

Anne Traas, DVM, MS'09, has been appointed chief development officer at Scout Bio, a biotechnology company focused on delivering one-time therapeutics for chronic pet health conditions.

2010s

Rodrigo Cerda, MD'10, has been appointed vice president of Clinical Care Transformation at Independence Health Group.

David Chacko, MD'10, MBA'11, has been appointed chief business officer at Erasca, a company dedicated to advancing scientific approaches to erase cancer.

David C. Fajgenbaum, MD'13, MBA'15, MSc, has published *Chasing My Cure: A Doctor's Race to Turn Hope into Action*, which chronicles his pursuit of a cure for his own rare disorder, Castleman disease. See "It's Not Just My Cure I'm Chasing" on p. 6.

Natalie Clark Stentz, MD, MSCE, GME'18, has joined Shady Grove Fertility Atlanta. She has made numerous significant contributions to the field of reproductive endocrinology.

OBITUARIES

1940s

Albert Joseph Weiss, MD'45, a pediatrician; Aug. 21. He served in the U.S. Army during World War II, then earned his medical degree from the University of Pennsylvania School of Medicine. He continued his training at Johns Hopkins Hospital and Sinai Hospital. Over the course of his career, he served as an instructor and assistant professor of Pediatrics at Johns Hopkins Hospital, the director of the Children's Chest Clinic, and an honorary staff member at Union Memorial Hospital and Sinai Hospital. Weiss operated his own practice until retiring in 1985.

Ellis A. Perlswig, MD'48, a child psychiatrist; Aug. 23. He earned his medical degree from the University of Pennsylvania School of Medicine and completed his fellowship at the Child Study Center at Yale University School of Medicine. He served as a first lieutenant in the U.S. Air Force during the Korean War. He was a clinical associate professor of Psychiatry at Yale, operated a private practice, and consulted for the Superior Court Juvenile Matters in New Haven, Conn. Perlswig was also a member of The Medical Committee for Human Rights and was a founding member of AIDS Project New Haven.

John J. Yaeger, MD, GME'49, a radiologist; Sep. 1. After receiving his medical degree from Georgetown University, he completed his training at the University of Pennsylvania School of Medicine and Johns Hopkins University. He served as a captain in the U.S. Army Air Corps in Germany during World War II, then worked as a radiologist for Stonewall Jackson Memorial Hospital and the Greenbrier Clinic.

1950s

Richard H. Seibert, MD'50, an internist; Sep. 17. After graduating from the University of Pennsylvania School of Medicine and completing his residency at University Hospitals of Cleveland, he served as a commissioned officer in the U.S. Public Health Service. He contributed to the Salk Poliomyelitis Vaccine Field Trial Evaluation of 1954 and later taught at University Hospitals of Cleveland while practicing full-time as chief of Medicine at Euclid Meridia Hospital.

John E. Keith, Sr., MD'51, an orthopaedic surgeon; Nov. 16. After serving in the U.S. Army during World War II, he graduated from the University of Pennsylvania School of Medicine and completed his residency at the University of North Carolina. He practiced for 37 years in South Carolina, serving as chief of staff at Spartanburg Regional Medical Center and chairman of the Medical Executive Committee. He directed the Cripple Children's Clinic at the county health department and co-founded Orthopaedic Associates.

Lewis W. Bluemle, MD, GME'52, a physician, Aug. 13. During his service in the U.S. Army, he earned his medical degree from Johns Hopkins School of Medicine. Following an internship and residency at the Hospital of the University of Pennsylvania (HUP), he returned to active duty at Valley Forge Army Hospital. He was discharged with the rank of captain in 1951 and returned to HUP, where he developed one of Philadelphia's earliest dialysis units. Some of his many celebrated achievements include developing an artificial kidney, patenting a dialyzer in 1963, and directing Penn's first NIH-supported clinical research

center. Over the course of his career, he served in many key roles—among them, charter member of the American Society for Artificial Organs; consultant to the National Institutes of Health; president of SUNY Upstate Medical University, Oregon Health and Science University, and Thomas Jefferson University; and senior vice president of the Connelly Foundation.

John J. F. Holmes, MD'52, a family medicine physician; July 17. After earning his medical degree from the University of Pennsylvania School of Medicine, he completed his residency at Geisinger Medical Center. He served as a doctor in the U.S. Army in West Germany before receiving an honorable discharge and returning home. He operated his practice in Jermyn, Pa., for nearly 50 years. Like many general practitioners at the time, Holmes also practiced obstetrics. He delivered hundreds of baby boom children in his community, including several of his own nephews.

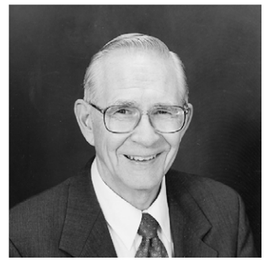
Dewitt H. Montgomery, Jr, MD'53, a psychiatrist; Aug. 8. After graduating from the University of Pennsylvania School of Medicine, he completed his training in the U.S. Public Health Service and his residency in Psychiatry in Lexington, Ky. He worked as attending physician at the Norristown State Mental Hospital and served in the Coast Guard during the Korean War. He worked at Hahnemann University Hospital for nearly 30 years and at the Green Tree School for nearly 50 years. Montgomery was an active member of several national and international societies, as well as a founding member of the Philadelphia Psychoanalytic Society.

Richard A. Ellis, MD, GME'55, an ophthalmologist; June 2. After completing his residency at the University of Pennsylvania School of Medicine, he spent four months performing cataract surgery for underserved patients in India and Pakistan. For more than 40 years, he practiced in Center City and Bala Cynwyd, and performed eye surgery at Wills Eye Hospital. He also taught at the University of Pennsylvania School of Medicine and endowed the Richard A. Ellis Lecture at the Wills Eye Hospital Annual Conference.

Peter White, MD'55, GME'59, an emeritus professor; Nov. 16. He completed his medical degree and residency at the University of Pennsylvania School of Medicine, serving as chief medical resident. After serving in the U.S. Air Force as a medical doctor with the rank of captain, he returned to the Hospital of the University of Pennsylvania for his fellowship, then as an assistant professor of Medicine and Hematology. He helped create the Medical College of Ohio, serving as deputy chairman of Medicine and chief of the medical staff.

James R. Zuberbuhler, MD'55, GME'59, a pediatric cardiologist; June 24. After graduating from the University of Pennsylvania School of Medicine, he joined Children's Hospital of Pittsburgh. As director of Pediatric Cardiology, he established a world-renowned training program. He was appointed acting chair of Pediatrics and later served as Children's Medical Director before returning to practicing pediatric cardiology until his retirement.

David Lewis Aronson, MD'56, a laboratory medicine specialist; Nov. 1. After graduating from the University of Pennsylvania School of Medicine, he completed an internship at Mt. Auburn Hospital and two summer research fellowships at Cambridge University in England. He worked for almost 30 years at the Office of Biologics Research and Review within the Food and Drug Administration. He also served as a consultant to the World Health Organization and was a founding member of the International Society on Thrombosis and Haemostasis.



Carl T. Brighton, MD'57, GME'62, an orthopaedic surgeon; July 3. He earned his medical degree at the University of Pennsylvania School of Medicine, then served in the U.S. Navy during the Vietnam War. He was chairman of Orthopaedic Surgery at the University of Pennsylvania for more than 15 years and editor-in-chief of Clinical Orthopaedics and Related Research. He was a visiting professor at 36 universities and medical schools around the world, published more than 200 articles, and obtained 29 patents.

John T. Fisher, MD'57, an ophthalmologist; Oct. 7. After graduating from the University of Pennsylvania School of Medicine and interning at Hartford Hospital, he trained in the U.S. Air Force as a flight surgeon. He then completed his residency at New York Hospital–Cornell Medical Center. He was the only board-certified ophthalmologist in central Pennsylvania when he opened his practice in State College in 1965. Fisher practiced for 44 years.

Joel G. Flaks, PhD'57, an emeritus professor; Nov. 27. He graduated from City University of New York–Brooklyn College with a degree in chemistry, then pursued his doctorate and became a biochemistry instructor at the University of Pennsylvania. He continued to teach at the Perelman School of Medicine at the University of Pennsylvania until retiring and earning emeritus status in 1994. In recognition of his role in developing the biochemistry course for medical students, Flaks received PSOM's Basic Science Teaching Award.

Robert P. Kamrin, MD'59, GME'66, a neurosurgeon; Aug. 10. After studying zoology at Cornell University, he received his medical degree from the University of Pennsylvania School of Medicine. Kamrin returned to New York to complete his residency at Columbia-Presbyterian Medical Center. He practiced for many years in Pennsylvania before retiring.

John H. Moore III, MD, GME'59, an obstetrician and gynecologist; May 13. After earning his medical degree from the University of Pittsburgh Medical School, he interned at Geisinger Medical Center, then served in the U.S. Air Force. He completed his residency at the Hospital of the University of Pennsylvania. For more than 40 years, he practiced in Kingsport, Tenn., delivering more than 8,000 babies. He

served as president of the Sullivan County Medical Society and head of staff at both the Holston Valley Medical Center and the Indian Path Medical Center.

Richard A. Olafson, MD'59, GME'60, a neurosurgeon; July 27. He received his medical degree from the University of Pennsylvania School of Medicine and finished training at the Mayo Clinic. He was one of the first neurosurgeons in North Dakota and held many positions at the University of North Dakota School of Medicine. Over his career, he served as assistant dean, director of Health Education, and professor and chairman of Neuroscience.

1960s

William W. Weiss Jr., DDS'56, GME'60, an oral surgeon; July 12. After graduating from the University of Pennsylvania Dental School, he completed his internship at the University of Pennsylvania School of Medicine. He served as a professor and chairman of Oral and Maxillofacial Surgery/Dentistry at Hahnemann Hospital, and he was the proud founder of the first DDS/MD program in Philadelphia.

Walter R. Morris, MD, GME'61, an ophthalmologist; Aug. 2. After serving in the U.S. Army, he received his medical degree from the University of Louisville. He worked as a general practitioner for several years before training in ophthalmology at the University of Pennsylvania School of Medicine. Morris practiced for nearly 30 years in Louisville, where he was the first to fit contact lenses and to employ lasers to repair retinal detachments.

James S. Hewson, MD, GME'62, an orthopaedic surgeon; May 31. After graduating from Temple University's School of Medicine, he completed his orthopaedic surgical residency at the University of Pennsylvania School of Medicine. His 50-year career was spent largely at Beverly Hospital, where he had completed his general residency. He became their first orthopaedic surgeon and founded their orthopaedic department. He served as president of the medical staff and as a hospital trustee. His career also included appointments with the Academy of Orthopedic Surgeons, the Massachusetts Medical Society, and Massachusetts General Hospital.

John N. Giacobbo, MD, GME'63, a pediatrician; May 29. After graduating from Jefferson Medical College, he completed his residency at the University of Pennsylvania School of Medicine. He opened a pediatric practice at Methodist Hospital in South Philadelphia, where he operated for more than 30 years and held the titles of chief of Pediatrics and Neonatology, vice president of Medical Affairs, and director of Medical Education. He later practiced and taught at the University of Medicine and Dentistry of New Jersey.

Martin J. Kushmerick, MD'63, PhD'66, an emeritus professor; June 22. He earned his medical and doctoral MD degrees from the University of Pennsylvania. After his post-doctoral positions at the National Institutes of Health and at University College London, he assumed a position at Harvard Medical School. In 1988, he moved to Seattle and joined the University of Washington Medical School, where he was a professor of Radiology, Bioengineering, Physiology, and Biophysics. Kushmerick devoted his scientific career to the field of biological energetics.

Richard D. Yentis, BA'59, MD'63, a psychiatrist; Nov. 5. He completed his undergraduate and medical degrees at the University of Pennsylvania. The Philadelphia native—who was also known as a gifted piano player—then moved south, settling in Fort Worth, Texas, where he built his psychiatric practice.

Vincent J. Giuliano, MD'65, a rheumatologist; July 12. After receiving his medical degree from the University of Pennsylvania School of Medicine and completing his training at Jefferson Medical College Hospital, he served as a rheumatologist in the U.S. Army during the Vietnam War. Over the years, he taught at the University of Virginia School of Medicine—where he was awarded the Excellence in Education Award in 2015—co-founded Albemarle Arthritis Associates, served as the president of the Albemarle County Medical Society, and joined the staff of the Martha Jefferson Hospital.

David W. Schall, MD'68, a physician; July 26. He received his medical degree from the University of Pennsylvania School of Medicine and completed his residency in family practice at the Hunterdon Medical Center—one of the few residencies of its kind. He served in the U.S. Navy in Brunswick, Maine, where he later became a family practitioner. He served as the president and CEO of Bowdoin Medical Group, and he was the founding director and chairman of Health Source Maine.

1970s

Francis M. Krakowski, MD'72, GME'76, a physician; July 3. He graduated from the University of Pennsylvania School of Medicine and the Robert Wood Johnson Scholars MD/MBA program at the Wharton School of Business. He was described as "a doctor's doctor with a gift for geriatric medicine." His career included key executive positions at Merck, Johnson & Johnson, and CR Bard. Krakowski managed several continuing medical education companies until his retirement.

Janette Goddard-Finegold, BA'70, MD'74, a developmental pediatrician; Oct. 13. After earning her medical degree from the University of Pennsylvania School of Medicine, she completed her pediatric internship and residency at Baylor College of Medicine and Texas Children's Hospital, followed by a fellowship in neurodevelopmental pediatrics and research in neonatal brain injury. Her laboratory work led to transformational changes in the care of premature infants, including the "minimal stimulation protocol" that has been adopted in nurseries worldwide. The protocol reduces cerebral hemorrhages and brain damage. She then devoted her skills to clinical developmental pediatrics until her retirement in 2002.

Josephine Templeton, MD, GME'75, a pediatric anesthesiologist; Oct. 25. She earned her medical degree from the University of Rome in 1968, then returned to the United States to continue her medical training at the Medical College of Virginia. She also completed her anesthesiology residency at the Hospital of the University of Pennsylvania, followed by her fellowship in pediatric anesthesiology and critical care at the Children's Hospital of Philadelphia (CHOP). She joined the University of Pennsylvania faculty in 1978 and worked at CHOP for 20 years, where she often worked on surgical teams with her husband and served as a role model for women who aspired to join the specialty. Templeton and her husband were beloved members of the Philadelphia community and dedicated philanthropists who supported a wide variety of medical, historical, and cultural causes.

Domenico Falcone, MD, GME'77, an anesthesiologist; May 13. He received his medical degree from Jefferson Medical College, then completed his anesthesiology residency at the University of Pennsylvania School of Medicine. He worked at Lehigh Valley Hospital and was named president of both Allentown Anesthesia Associates and the Lehigh Valley Medical Society. He worked there for 25 years before taking a position at UPMC Altoona Hospital, where he worked for 18 years.

Eric L. Michelson, BA'69, MD, GME'77, a cardiologist; May 29. He graduated from Columbia University Medical School, then completed his advanced training in cardiology and cardiac electrophysiology at the University of Pennsylvania School of Medicine. He became chief of the clinical research unit at Lankenau Hospital and Medical Research Center, then directed Cardiology and the Cardiology Fellowship at the Likoff Cardiovascular Institute of Hahnemann University Hospital. He later served as senior director of Clinical Research at Astra Zeneca, where he brought to market several drugs to treat cardiovascular disease.

1980s

Stephen L. Cavalieri, BA'81, MD'82, an internist; July 6. After graduating from the University of Pennsylvania School of Medicine, he served as a primary care physician with the National Health Service Corps. He joined Associated Internists, Inc. at St. Mary's Hospital, then joined Coventry Healthcare, where he was named corporate vice president of Medical Affairs for Medicare programs. He was CMO at inHEALTH while consulting for the Bon Secours Health System, then became senior vice president and CMO at Envera Health. He later founded his company, Value Health Insights, LLC.

Ellen C. Maitin, MD, GME'83, an orthopaedic surgeon; June 7. After attending medical school at Stonybrook University, she completed her residency in orthopaedic surgery and a fellowship in hand and microsurgery at the University of Pennsylvania School of Medicine. She became chief of Hand Surgery at The Medical College of Philadelphia before practicing privately at Jeanes Hospital. Maitin then worked at Orthopedic Surgery & Rehabilitation Associates for more than 25 years.

FACULTY

Carl T. Brighton, MD. See Class of 1957.

Richard A. Ellis, MD. See Class of 1955.

Joel G. Flaks, PhD. See Class of 1957.

Josephine Templeton, MD. See Class of 1975.

A Family's Gift to Penn and to the Future

A love of history is one of many things shared between **Barnard Kaplan**, C'70, MD'74, and his wife Amy. Kaplan—known as "Barney" to his loved ones—studied the subject as an undergrad, and Amy is a librarian. The history buffs believe that understanding the past is key to understanding the present, and it's also important to create the future they want to see, whether by sharing their passion for history with others or through meaningful, forward-looking philanthropy.

A practicing ophthalmologist and a proud graduate of the Perelman School of Medicine, Barney has a deep love for his patients. Throughout his career, he watched generations grow up and have families of their own, their children then becoming his patients too. Similarly, his own family's relationship to Penn Medicine has extended beyond his generation. One of his daughters, Naomi Kaplan Morris, C'11, attended the University of Pennsylvania, where she was elected to the Sphinx Senior Society for her leadership on campus, and—on the very first day of class—she met the man who would become her husband. For the Kaplans, Penn is more than a school: It is family.

Barney knew this was a place he wanted to leave his legacy, so when he learned about charitable gift annuities, he was intrigued. "It has always been my intention to leave a gift to Penn Medicine, but this is something I could do now," he explained. "And they made it very easy to do."

With a gift of cash or stock, donors can set up a charitable gift annuity that provides benefits to both the donor and Penn Medicine. Barney and Amy appreciate this dual benefit that gift annuities provide; they receive guaranteed, lifetime payments from his charitable gift annuity, while also laying the foundation for future students through the Medical Class of 1974 Scholarship Fund.

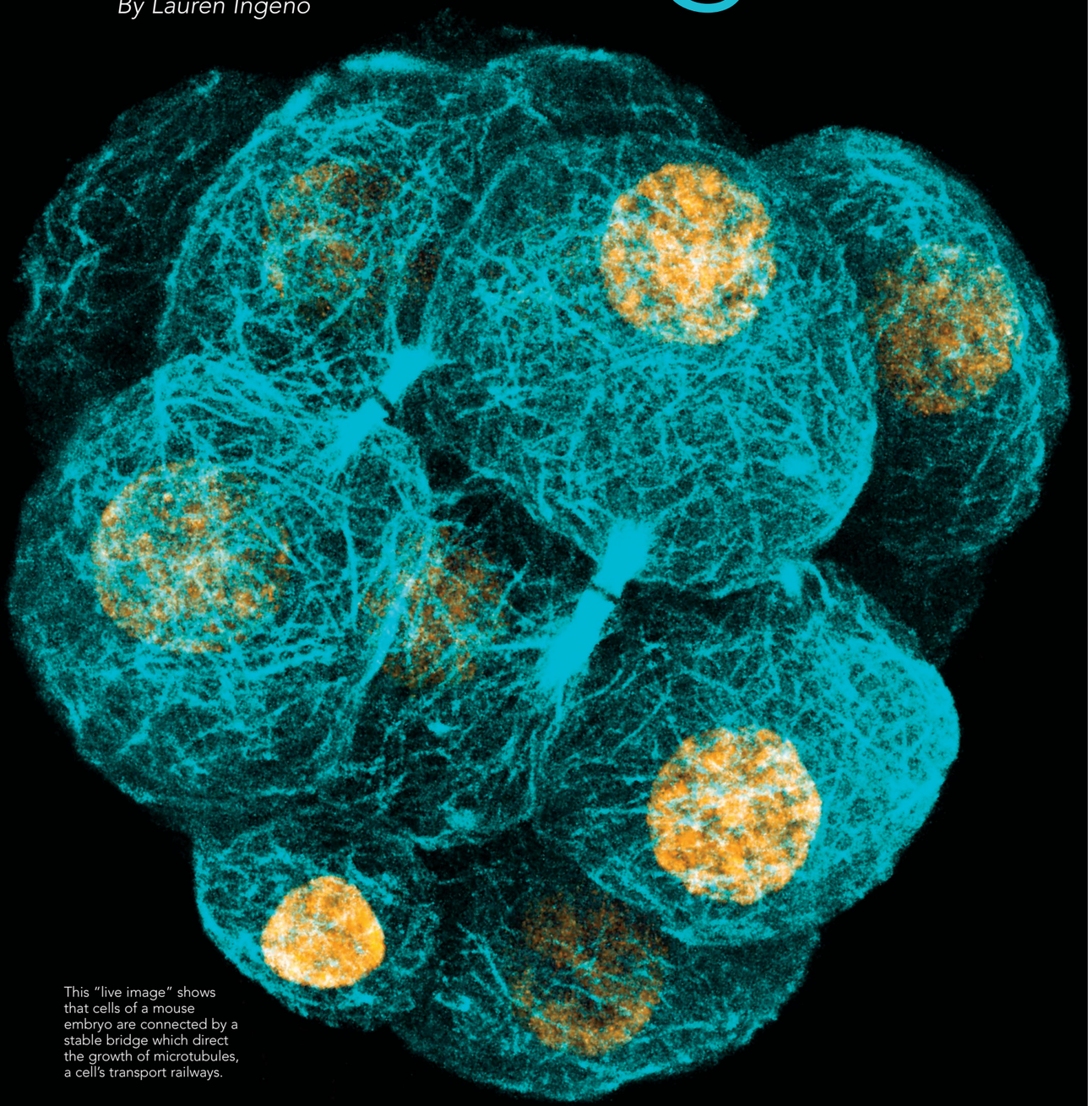
"I know I have participated in a little piece of history by making a contribution," Barney said. "I have very fond feelings toward Penn, and this is a way to express my gratitude."

> Planned giving is often described as the final piece of a philanthropic puzzle. Figuring out how this important puzzle piece can work best for you, your family, and your philanthropic goals is what we do best. Speak with us to learn more about giving options. Contact Christine S. Ewan, JD, executive director of Planned Giving, at 215-898-9486 or cewan@upenn.edu.

For more information, please visit our website at www.plannedgiving.med.upenn.edu.

Watching Life Begin

By Lauren Ingeno



This "live image" shows that cells of a mouse embryo are connected by a stable bridge which direct the growth of microtubules, a cell's transport railways.

Within every embryo are the raw ingredients of life. A new lab at Penn points the camera lens to watch how these ingredients come together in early mammalian development.

A single cell forms when sperm and egg meet. It multiplies, and those cells rearrange and transform, giving rise to some 37 trillion cells in the human body. It's a familiar story. Yet, the mysteries of the earliest stages of mammalian reproduction—how these cells resolve their fate, shape, and position—remain largely unsolved.

In the lab of Nicolas Plachta, PhD, who joined the Department of Cell and Developmental Biology at the Perelman School of Medicine this fall from A*STAR in Singapore, cell biologists are watching these processes play out in real time. With the help of laser scanning microscopy, Plachta is creating vivid time-lapse images of live mouse embryos—and, along the way, discovering new details about how life begins.

Q: What is live cell imaging, and why did you decide to use this approach to study developmental biology?

In the first seven days of mammalian development, the embryo divides into two, four, eight, and then into a cluster of cells called the blastocyst. During that division, the embryo is just floating around the uterus, and if you take it out, it does the exact same thing in a dish that it would do in the body. And then you can use microscopy to image it. Watching these stages in a model organism is accessible, it's easy to manipulate, and it's simple. All the factors the embryo needs for those early divisions are already inside the cells. That means you can do a lot of basic cell biology, in a real group of mammalian cells, in real time.

When I arrived at Caltech for my post-doctoral research, no one was imaging embryonic development in mice, even though the mouse is one of the most important mammalian models for research in biology. People thought that a mouse embryo would be hard to image because it would be too sensitive and easy to damage with the microscope. So, sort of by default, to stay away from the crowds, I started to play around with mouse embryos and microscopes, and I found it's not so difficult.

Q: What questions in particular is your lab trying to answer?

We are not a hypothesis-driven lab. We have two or three microscopes filming embryos overnight, and the next morning, we have 10 to 20 movies of different embryos to watch and analyze and see what happened in each case. And every night, we're imaging completely different types of components inside the cell or different types of cells inside the embryo. We have different projects: Some are more focused on dynamics in the cell nucleus, which later controls the behavior of the cells; or on the cytoskeleton. Others focus on mechanical interactions—how the cells veer and pull against each other in the embryo. Most of what we find are these random discoveries about how the embryo does what it does.

Q: What can studying live mouse embryos teach about human reproduction?

What we do is purely basic research—it's just to know more about how this thing works, how you build an embryo. However, there is biomedical relevance. We may be able to study what happens when these mechanisms fail. With in vitro fertilization (IVF), for instance, many seemingly healthy embryos that are transferred to the uterus fail to implant because of abnormalities that doctors do not fully understand, nor can currently detect. With imaging, we can find out which structures and processes are essential for the embryo to form normally during the pre-implantation stage. Down the line, if we could use some non-invasive ways to visualize these structures in human embryos, we could find new ways to screen which ones would be the most medically appropriate for implantation and would have the best chance of developing into a baby. Right now, we are trying to figure out as much as we can about how an early mammalian embryo is put together at the earliest stage of life.

View more images online at PennMedicine.org/magazine/lifebegins.

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Serving Community Health through Education

More than a decade of volunteering with the immigrant health clinic Puentes de Salud has taken Daphne Owen many places: To elementary school classrooms and South Philadelphia family celebrations. To waving a flag in the city's massive Carnaval de Puebla celebrations, and to a remote mountain village outside Mexico City. And it has led to bonds of friendship both as a physician and as a part-time bartender—all in service toward a neglected community's health.

Read more about Owen and Puentes on p. 32.

Service in Action

Find and follow more stories of Service in Action from Penn Medicine beginning this spring via PennMedicine.org/community.