

Temple Health

FALL 2014

Magazine

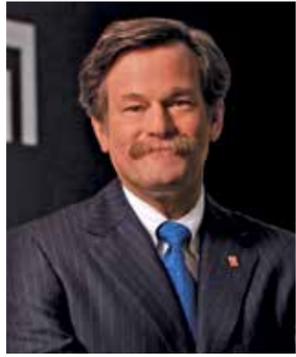
The Galaxy Within

Conquering
New Constellations
In Neuroscience

AIDS UPDATE:
DELETING THE VIRUS FROM
CULTURED HUMAN CELLS

FULBRIGHTS & FARMHANDS:
TOMORROW'S PHYSICIANS,
HAND-PICKED





AGENDA

Temple Health
Magazine

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- Jeanes Hospital
- Temple Health Oaks
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- Temple Physicians, Inc.
- Temple University Physicians
- Temple Transport Team

Temple Health refers to the health, education, and research activities carried out by the affiliates of Temple University Health System, Inc. (TUHS), and Temple University School of Medicine. TUHS neither provides nor controls the provision of health care. All health care is provided by its member organizations or independent health care providers affiliated with TUHS member organizations. Each TUHS member organization is owned and operated pursuant to its governing documents.

Science on a Human Mission

The news broke in July that a research team at Temple led by Kamel Khalili, PhD, successfully eradicated the HIV virus from cultured human cells for the first time — setting the stage for a permanent cure for AIDS. The international science community is still abuzz with this game-changing discovery.

Innovative research is exploding throughout Temple's health enterprise. We are creating tools to address the most challenging clinical problems, from AIDS to heart failure, cancer, neurological disease, and many other disorders.

Two things drive the advancement of medicine through research.

One is funding. Only with the generous support of the federal government, industry, foundations, and individual philanthropists can we elevate the output and impact of our research portfolio. The other is the innate desire of each individual researcher to make a *difference* in the world.

The passion to improve human health is what drives investigators throughout Temple to conquer challenges of enormous scientific complexity. Long before the sun comes up and long after it sets, you'll find these scientists in their laboratories, transfixed by the quest to transform discoveries at the molecular level into new therapies that save and improve people's lives.

This is science at its best, science on a human mission.

Larry R. Kaiser, MD, FACS
*Senior Executive Vice President for Health Sciences, Temple University
Dean & Professor of Surgery, Temple University School of Medicine
President & CEO, Temple University Health System*

GARDEN AT FOX CHASE CANCER CENTER; JESSICA HUI; KAISER: DOMINIC EPISCOPO



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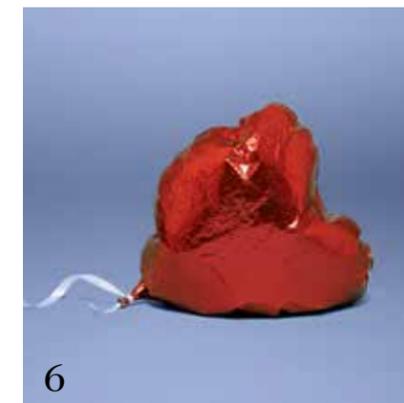
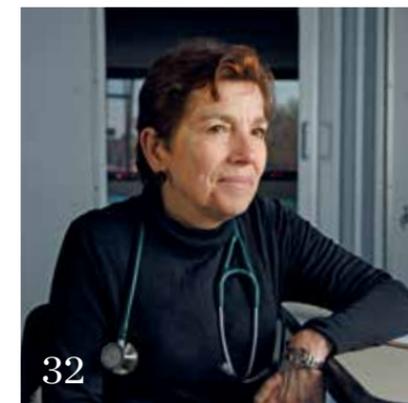
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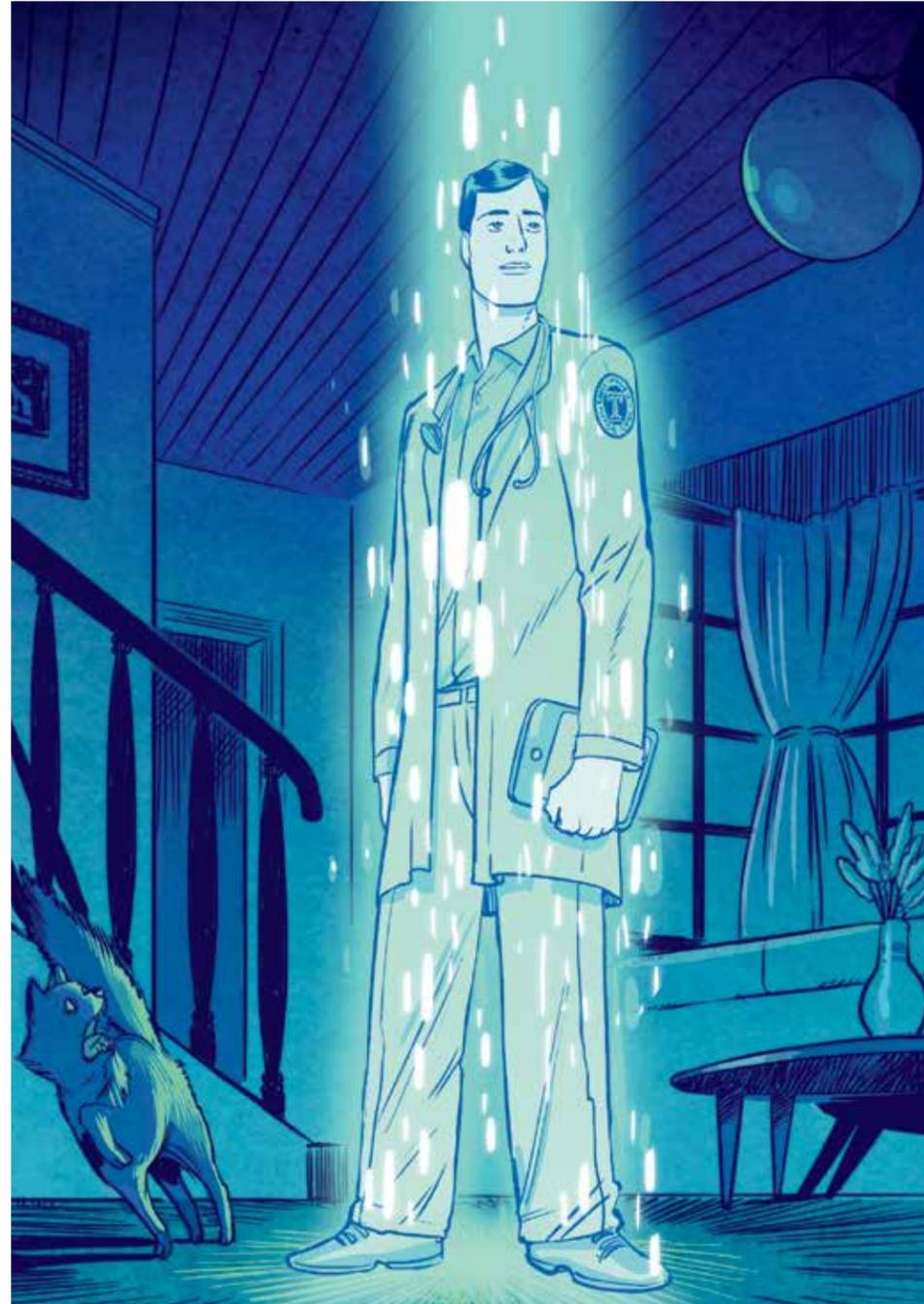


CURRENTS

House Calls c. 2024

In 20 years, the house call will reemerge as the classical heart of medicine — the house call with a twist. Medical students will visit the patient at home the old-fashioned way, in the flesh, while their supervising physician “beams in” from the hospital to supervise the visit and teach. Students will wave high-tech “wands” over the patients to detect and transmit vitals in real time, enabling the attending doctor to adjust care plans accordingly.

This depiction of medical education in the future is the subject of a two-minute video produced by Temple medical students, a video that won a top prize in a national competition sponsored by the Association of American Medical Colleges.



KOREN SHADMI

TEMPLE MEDICAL SCHOOL RECEIVED

11,246

APPLICATIONS FOR THE CLASS OF 2018



Congrats, Class of 2014

Smiles, shout-outs, and “selfies” were the order of the day at Temple University School of Medicine’s 112th commencement, for the Class of 2014, at Philadelphia’s Academy of Music. As the graduates marched down the aisle, hundreds of cell phones sprung from pockets to take videos. Applause broke out. Names were yelled. Someone even sounded a celebratory air horn.

“Your generation will redefine how we deliver care,” Larry Kaiser, MD, FACS, Dean of the School and CEO of the Temple University Health System, told the graduates.

Eric Topol, MD, Director of the Scripps Translational Science Institute in California, gave the keynote. Recently named a “Rock Star in Science” by *GQ* magazine, Topol spoke about the prevalence of technology in medicine. “It’s a very exciting time. I wish I could trade places with you,” he told the graduates. “Back in my day, ‘digital’ only referred to a rectal exam.”

This year’s class consisted of 160 students who earned the MD degree; three a dual MD-PhD degree; 21 the PhD degree; two a dual MD-MA degree; and 11, the MS degree. The physician graduates are now in residency training at institutions such as Johns Hopkins, the University of Pennsylvania, and Stanford.

POPOFF: JOSEPH V. LABOLITO



Steven Popoff, PhD

Body of Law

“I was not grossed-out by human dissection,” says Joseph Bongiovanni, Esq., a medical malpractice defense attorney who took Medicine and Law, a new 8-week certificate program for attorneys who handle personal injury and medical malpractice cases.

Team-taught by Temple medical and law school faculty, the course takes lawyers on a guided tour of the human body. “Every major system is covered, from cardiovascular to musculoskeletal to endocrine,” says Steven Popoff, PhD, Chair of Anatomy. How is the anatomy configured? What constitutes normal and

pathological? How do the systems interrelate? “Lawyers are trained to recognize or defeat theories of liability, but with the multitude of diseases and injuries subject to legal claims, lawyers must have a solid clinical understanding as well,” says course co-director Samuel Hodge, Esq., Chair of Legal Studies at Temple’s Fox School of Business, who co-directs the course with Popoff.

“This course is going to be invaluable to my defense practice,” says Bongiovanni. “Besides, I couldn’t wait to get home to tell my wife how fascinating it was.”

Direct from the Farm

The Mayor’s Office of Philadelphia and Common Market, a nonprofit distributor of local and sustainably produced foods, recognized Jeanes Hospital for providing healthy food and beverage choices through its Farm Stand initiative. The Farm Stand, open once weekly during growing season, gives patients, staff, and community members access to fresh fruits, vegetables, cage-free brown eggs, cheeses, and more.

“Obesity is statistically worse in Jeanes’ service area than in Philadelphia overall,” says Linda Grass, President and CEO of Jeanes. “Bringing farm-fresh produce to campus augments our bariatric surgery and workplace wellness initiatives — plus supports farmers in Pennsylvania, New Jersey, and Delaware.”



Heart Failure Grant Renewed

Temple researchers have received an \$11.5 million grant renewal from the NIH to further their investigation of key molecular mechanisms in heart failure.

The principal investigator, Walter Koch, PhD, Director of the Center for Translational Medicine, will work on the grant with Steven Houser, PhD, Director of the Cardiovascular Research Center, and Arthur Feldman, MD, PhD, Executive Dean and Chief Academic Officer. Each will lead a specific project for the

grant that focuses on signaling pathways implicated in heart failure.

During the previous funding cycle, the scientists identified three signaling pathways centered on the G-protein coupled receptor kinase 5 enzyme, arginine vasopressin type 1A receptor molecules, and transient receptor potential channels. "The new round of funding comes at a key time, as the number of Americans with heart failure is expected to increase to 10 million by 2031," says Koch, noting that the research could lead to the new therapies.

Cord Blood Program

In partnership with the Mason Shaffer Foundation and Community Blood Services, Temple University Hospital has established the City of Philadelphia's first public cord blood donation program — giving parents the chance to donate stem cells from otherwise-discarded umbilical cord blood. In addition to helping patients and advancing researchers' ability to develop new treatments, Temple's participation will also expand the number of African American and Hispanic donations.

"Cord blood is a rich source of stem cells and can be used to treat leukemia, lymphoma, sickle cell anemia, and about 70 other diseases," says Dimitrios Mastrogianis, MD, Director of Obstetrics and Maternal Fetal Medicine.

The new program is named in honor of five-year-old Mason Shaffer, who nearly lost his life to malignant infantile osteopetrosis when he was seven months old. "Thanks to publicly donated cord blood, he was cured," says Sarah Shaffer, Mason's mother. "Donated cord blood can save lives."

TEMPLE'S NEW
MEDICAL SCHOOL
BUILDING CONTAINS
249,000
SQUARE FEET OF
RESEARCH SPACE

CLINT BLOWERS

THE NIH GRANTED
\$90.7
MILLION NEW
MEDICAL RESEARCH
DOLLARS TO
TEMPLE LAST YEAR

Landmark Alzheimer's Study

Typically, patients' brains are riddled with damage by the time Alzheimer's Disease symptoms appear. Existing therapies can limit symptoms, but cannot stop the disease from progressing — perhaps because the drugs come too late.

But this could change. Last spring, a team of researchers made headlines around the world after publishing, in *Nature Medicine*, a study about a new blood test that proved 90% accurate in detecting Alzheimer's prior to symptom onset. The test detects declining levels of 10 chemicals that indicate nerve cell membrane damage — predicting who will develop Alzheimer's.

"Early detection could enable existing or new medications to slow or halt dramatic damage," says Susan Fisher, PhD, Chair of the Department of Clinical Sciences and Director of the Temple Clinical Research Institute, a member of the research team that was led by investigators from Georgetown University and the University of Rochester Medical Center. More studies will be conducted before the test is approved for use in patients.

TOP RIGHT, COURTESY CORMATRIX® CARDIOVASCULAR, INC.

On the Frontline

HEART VALVE REPAIR

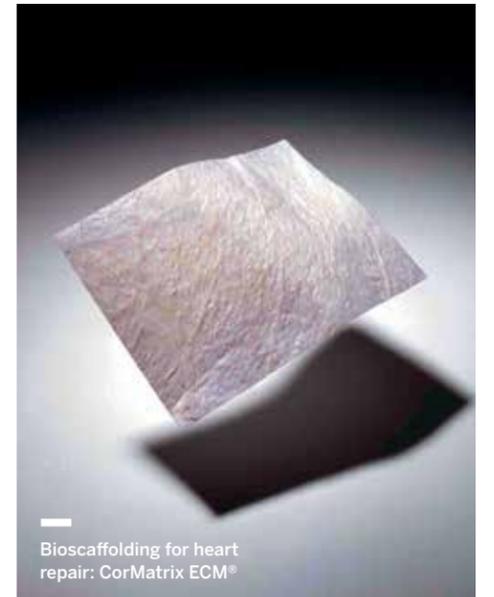
Infective endocarditis can permanently damage the tricuspid heart valve, necessitating surgical reconstruction. T. Sloane Guy, MD, MBA, Chief of Cardiovascular Surgery and Robotic Surgery at Temple, is one of a dozen surgeons in the U.S. to reconstruct the valve with CorMatrix ECM®, a cellular meshwork of fibers that gives patients' own cells a framework on which to rebuild. With no foreign cells or proteins, the mesh is associated with a low likelihood of rejection. Guy performs the surgery endoscopically and robotically — minimizing the size of incisions and maximizing his ability to make high-precision movements — an edge over traditional techniques.

INSIDE FIX ON ANEURYSMS

Approximately 200,000 abdominal aortic aneurysms are diagnosed in the U.S. annually. Surgeons can now repair them from *within* the blood vessels. Grayson Wheatley, III, MD, FACS, Director of Aortic & Endovascular Surgery at Temple, utilizes the Vela™ Proximal Endograft by Endologix, Inc., the only stent FDA-approved for percutaneous endovascular abdominal aortic aneurysm repair. Temple is the first hospital in the Philadelphia region to use the multilayered stent, which ends the risk of rupture by permitting normal blood flow while the aneurysm clots, healing itself.

NEW KNEES & HIPS

Temple is the first hospital in the City of Philadelphia to perform MAKOpasty®



Bioscaffolding for heart repair: CorMatrix ECM®

robot-assisted total hip replacement and partial knee resurfacing surgery using the RIO® Robotic Arm Interactive Orthopedic System. "The technology uses CT scanning to create a 3-D anatomic reconstruction of the joint and surrounding area — creating a customized surgical plan that is then aided by real-time feedback during the actual procedure," says Easwaran Balasubramanian, MD, Director of Joint Replacement & Reconstruction Surgery.

STRICTEST GUIDELINES IN NATION

Last spring, ahead of a new FDA advisory to the same effect, Temple University Hospital voluntarily issued the tightest restrictions to date on morcellation — a procedure used during many hysterectomies that has come under scrutiny due to its potential to spread cancer in rare cases. "Following the old protocols is no longer acceptable," Enrique Hernandez, MD, Chair of the Department of Obstetrics, Gynecology and Reproductive Sciences, told the *Wall Street Journal*.



Promising GI Cancer Drug

A first-of-its-kind drug called MMM-111, which emerged from research at Fox Chase Cancer Center, is now moving into an important new area: gastroesophageal cancer. "This drug could provide new options for a disease that doesn't have many," says Crystal Denlinger, MD, who is leading a worldwide study to test the compound's effectiveness.

Leading Roles

Joseph Cheung, MD, PhD FACP, FAHA, has been appointed Chair of the Department of Medicine at Temple University School of Medicine. Prior to this appointment, he served as Senior Associate Dean for Research at Temple. Before joining Temple in 2012 Cheung was Chief of Nephrology at Jefferson Medical College and had previous appointments at Massachusetts General Hospital and Penn State Hershey. Cheung is an expert on phospholemman, a cardiac stress protein.

Gerard Criner, MD, FACP, FCCP, Director of the Temple Lung Center, has been named to the Board of Directors for the Global Initiative for Chronic Obstructive Lung Disease (GOLD). He is one of only two American physicians to serve on the Board of this international organization.

John M. Daly, MD, FACS, FRCSI (Hon), Emeritus Dean of the Temple University School of Medicine and Harry C. Donahoo Professor of Surgery, has been elected Vice President of the American Surgical Association, the oldest surgical association in the United States.

Steven Houser, PhD, has been named Senior Associate Dean for Research at the School of Medicine. He will retain his roles as Chair of Physiology and Director of Temple's Cardiovascular Research Center. The newly installed inaugural Goodfriend Chair of Cardiovascular Medicine (see p. 40), Houser earned two national American Heart Association honors this year:

the Basic Cardiovascular Science Council's Distinguished Achievement Award and the Thomas W. Smith Memorial Lecture Award.

Larry Kaiser, MD, FACS, Dean of the School of Medicine and Health System President and CEO, has been appointed to

the Governing Council of the American Hospital Association's Constituency Section for Health Care Systems. The Council develops public policy on behalf of hospital and health systems nationwide. Appointed leaders represent premier health systems throughout the country.

Darilyn Moyer, MD, FACP, Professor of Medicine and Assistant Dean for Graduate Medical Education at Temple, has been named Chair of the Board of Governors of the American College of Physicians, the nation's largest medical specialty organization, with more than 141,000 members.



Joseph Cheung, MD, PhD

ED CUNICELLI



Paul F. Engstrom, MD

National Honors

Paul Engstrom, MD, Senior Vice President of Extramural Research Programs at Fox Chase Cancer Center, received the Clinical Care Achievement Award of the Association of Community Cancer Centers, which honors individuals who have made outstanding contributions to community cancer care.

Michael Levy, MD, PhD, Vice Chair of Medical Oncology and Director of the Pain and Palliative Care Program at Fox Chase, received the American Society of Clinical Oncology's inaugural Excellence in Teaching Award. Recipients are recognized for inspiring and shaping the practice of cancer medicine.

Sergei Grivennikov, PhD, Assistant Professor, Fox Chase Cancer Center, received the 2014 Landon Foundation-American Association for Cancer Research Innovator Award, recognizing his potential as a future leader in cancer research (see p. 34).

ENGSTROM: JOSEPH HURLEY; BUILDING: RYAN S. BRANDENBERG

Catchy Numbers

• *U.S. News & World Report* named Temple one of the nation's top research-oriented medical schools in its "Best Graduate Schools 2015" rankings, giving Temple the number two spot in Philadelphia and the number three spot in the state. *U.S. News* also named Temple the fourth most applied-to medical school in the nation.

• In *U.S. News & World Report's* 2014-15 "Best Hospitals" rankings, Fox Chase Cancer Center ranks 19th best in the nation in cancer, 10 specialties of Fox Chase and Temple University Hospital rank as "high performing," and Temple University Hospital is listed among the best in the Philadelphia region.

• Three Temple medical school departments rank among the nation's top 25 for federal research funding, according to the Blue Ridge Institute for Medical Research. Neuroscience ranks 18th nationally and second in Pennsylvania. Physiology ranks 20th nationally and first in Pennsylvania. Pharmacology ranks 24th nationally — one ahead of Johns



Temple University School of Medicine

Hopkins — and third in the state. The School attracted nearly \$91 million in National Institutes of Health funding in 2013.

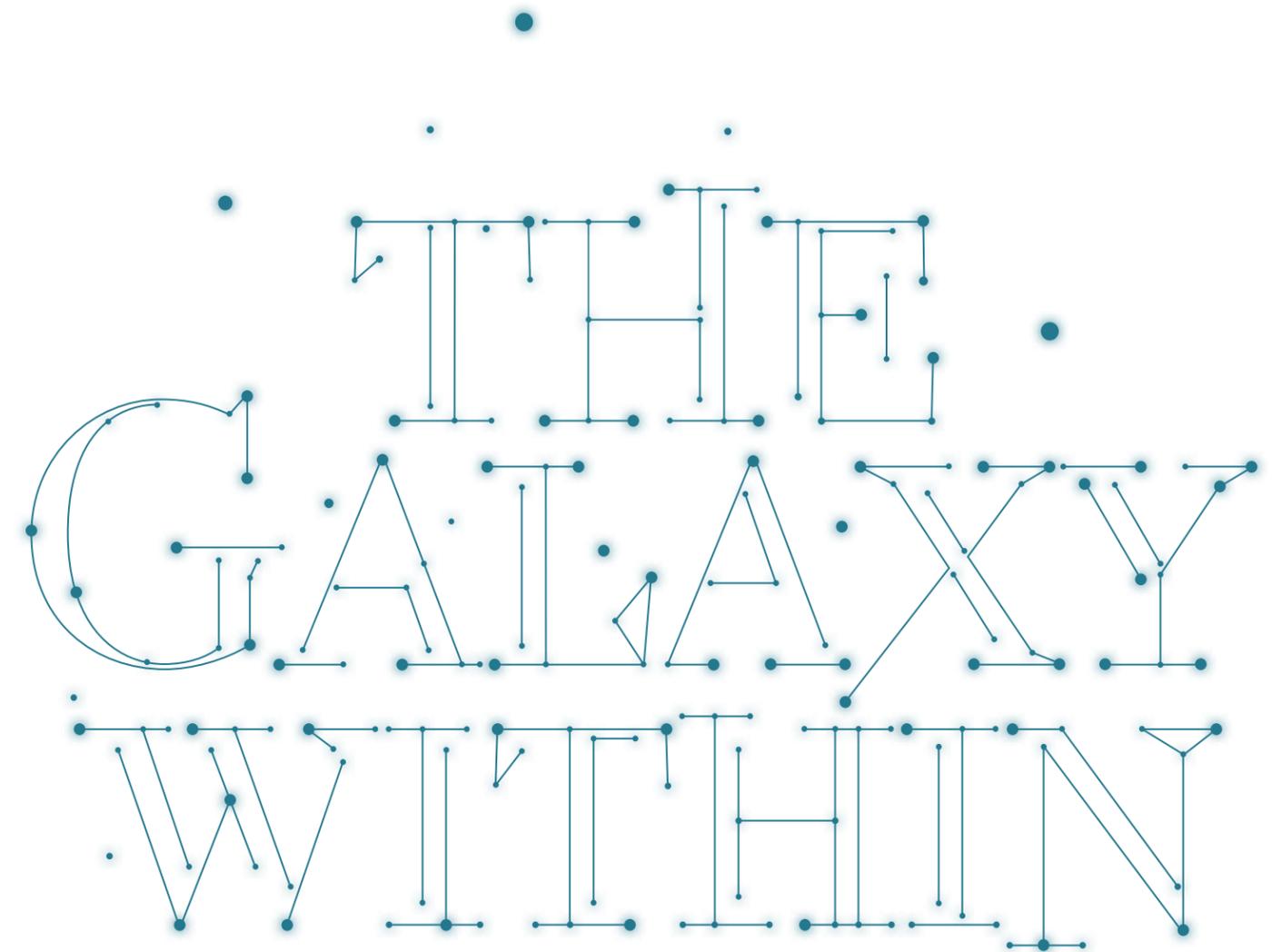
• The American Nurses Credentialing Center has presented the Fox Chase Nursing Program with its fourth-consecutive Magnet designation, the nation's highest recognition for nursing excellence. Only three percent of hospitals in the country have received the designation four times.

• Eighty-three Temple physicians have earned a spot on the 2014 Best Doctors in America® List. Only five percent of physicians in the nation earn a spot on this Gallup®-certified roster.

Making Headlines

Dozens of Temple faculty members edit leading scientific journals, including:

Gilbert D'Alonzo, Jr., DO	Editor-in-Chief, <i>Journal of the American Osteopathic Association</i>
Mary Daly, MD, PhD	Editor-in-Chief, <i>Cancer Genetics</i>
Verdi DiSesa MD, MBA	Deputy Editor, <i>Annals of Thoracic Surgery</i>
Toby Eisenstein, PhD	Associate Editor, <i>Life Sciences</i>
Arthur Feldman, MD, PhD	Editor-in-Chief, <i>Clinical and Translational Science</i>
Wenzhe Ho, MD, MPH	Editor-in-Chief, <i>Virology: Research and Treatment</i>
Kamel Khalili, PhD	Editor-in-Chief, <i>Journal of Neurovirology</i>
John Krouse, MD, PhD	Editor-in-Chief, <i>Otolaryngology – Head and Neck Surgery</i>
Scott Rawls, PhD	Associate Editor, <i>Life Sciences</i>
Allen Reitz, PhD	Editor-in-Chief, <i>Current Topics in Medicinal Chemistry</i>
Irma Russo, MD	Editor-in-Chief, <i>Journal of Women's Cancer</i>
Michael Selzer, MD, PhD	Senior Editor, <i>Brain Research</i>
Ellen Walker, PhD	Assoc. Editor, <i>Journal of Pharmacology & Experimental Therapeutics</i>
Hong Wang, MD, PhD	Editor-in-Chief, <i>Biomarker Research</i>



Conquering New Constellations In Neuroscience

For more than 25 years Kamel Khalili, PhD, has been focused on finding better treatments for viral infections of the nervous system, including HIV-1. This summer, he and his colleagues at Temple University School of Medicine announced a game-changing discovery. They had, for the first time, successfully eradicated the HIV-1 virus from cultured human cells.

Their study, published in July in the *Proceedings of the National Academy of Sciences*, was lauded internationally as an important step on the path toward a permanent cure for AIDS. Or, as Khalili, Chair of Temple's Department of

By GISELLE ZAYON
Illustrations by ED GABEL

Neuroscience, put it: “If you want to cure a viral-based disease, get rid of the virus.”

Equally impressive, the researchers’ viral genome-cutting approach may also provide therapeutic protection against the HIV-1 virus. “Although we’re years removed from applying the approach in the clinic, our findings prove that we are moving in the right direction,” Khalili says.

PIONEERING EXPLORATION



Khalili’s breakthrough development is illustrative of Temple’s century-long leadership in neuroscience research and patient care. It’s masterful work that seeks to puzzle out the myriad secrets of the brain — the delicate,

intricate instrument that rests comfortably between our ears and serves as command central in a vast internal universe. Throughout our bodies, billions of neural cells flash with electrochemical messages that govern our senses, movements, and autonomic physiological functions.

“The difficult problems of neuroscience inspire us,” says Khalili. How, for instance, can we restore the Parkinson’s brain, not simply quiet its symptoms? What can be done to coax a severed nerve into growing, so that movement can be regained? How, exactly, does the brain lose its way, creating the confusion, the loss of identity, associated with Alzheimer’s? How can we repair the injuries caused by brain infection, restoring patients to normal life?

Kamel Khalili, co-founder of the International Society for Neurovirology, heads basic neuroscience research at Temple University School of Medicine.



It’s masterful work that seeks to puzzle out the myriad secrets of the brain — the delicate, intricate instrument that rests comfortably between our ears and serves as command central in a vast internal universe.

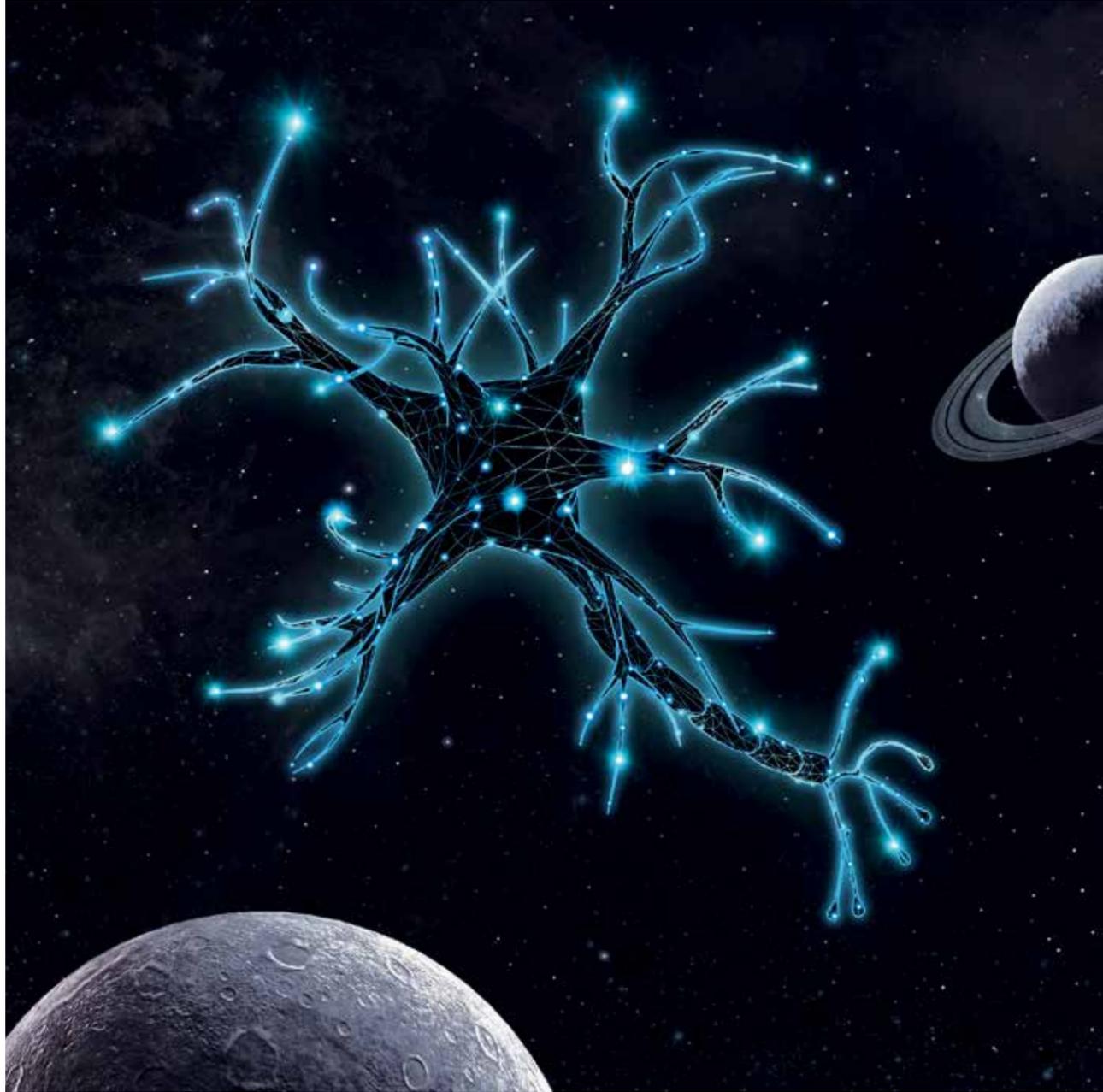
Temple researchers are devoted to finding solutions. In fact, the University ranks 18th in the nation for neuroscience research funding from the National Institutes of Health. When it comes to neuro-infection research, Khalili says, Temple may well be the most prolific center in the world.

Today, in addition to bold, bench-side discoveries, Temple’s clinical care in neurosurgery and neurology is recognized by many independent observers, including *U.S. News & World Report*, as among the best in Philadelphia and the nation. “Our patients have access to very sophisticated options,” says S. Ausim Azizi, MD, PhD, Chair of Neurology.

Whether pinpointing complex biochemical processes in the lab or treating a potpourri of neurological symptoms in patients, Temple’s work has always proceeded with the utmost respect for the intricate and delicate human brain. In 1947, that foundational understanding led to the development of stereotactic neurosurgery by Temple physicians Ernest Spiegel, MD, and Henry Wycis, MD. They devised a system for brain surgery that uses specific three-dimensional coordinates to target the surgical site with pinpoint accuracy, in conjunction with a frame to stabilize the patient’s head. “Historically an institution of second chances, Temple allowed Dr. Spiegel, an exiled Viennese physician and friend of Albert Einstein, to use his creative abilities to initiate novel technologies,” Azizi says.

“The Spiegel-Wycis concept was the beginning of tissue-sparing neurosurgery,” says Michael Weaver, MD, Chair of Neurosurgery, “and it’s come a long way since then.” Today, Temple is a recognized center of excellence in minimally invasive, image-guided bladeless neurosurgical techniques — which help to eliminate collateral damage, reduce post-surgical pain, and speed recovery. Minimal intervention with

KATHLEEN DUFFY



maximum results. That is what Temple neurosurgery is all about, with advanced, specialized procedures like minimally invasive spine surgery and endovascular repair.

NEW CONSTELLATIONS OF CARE

She couldn’t lift the coffee cup. It was the strangest thing, watching her arm ignore this simple desire. When she tried to tell her husband, words wouldn’t come. Twenty minutes later, an ambulance crew wheeled her through the doors of Temple University Hospital’s emergency department. Ten minutes after that, she lay still as a CT scanner hummed overhead, taking pictures of her suddenly recalcitrant brain. Before the next half-hour was up, Guillermo

Linares, MD, Director of Neuro-Interventional Services, was using a new, minimally invasive procedure to deftly pluck a blood clot from her brain. Later, she would go on to make a full recovery.

Linares offers stroke patients enhanced therapy with the stentriever, a new tool designed to literally scoop out blood clots from inside vessels to restore blood flow. “We used to be able to open blocked vessels in 50% of stroke cases. Now, with this new tool, we may be able to open 90%,” says Linares. To achieve such results, Linares and other specially trained physicians carefully thread the tiny cylindrical stentriever through a catheter — starting at the femoral artery in the groin — and slowly move up into the brain. When deployed in the brain at the site of the blockage, the device captures the blood clot in its architecture, restoring blood flow, removing the blockage permanently. “We can do things we never thought possible,” Linares says, noting that stroke is the fourth-leading cause of death in the United States.

Neurological disorders are one of the top threats to global public health — a threat that will increase steeply and soon. Some sources predict a doubling of the neurological disease burden in the United States by 2025.

Immediate stroke treatment not only saves lives but reduces the consequences caused by a sustained loss of blood to the brain. “Working fast is essential,” says Paul Katz, MD, Director of Temple’s University Hospital’s Stroke Program — which, for four years running, has been recognized by the American Heart and American Stroke Association “Stroke Gold-Plus Quality Achievement Award.” It’s a commendation that Jeanes Hospital, Temple’s affiliate, holds as well.

Temple is also attacking stroke at the front-end, by trying to prevent it. “In our Stroke Prevention Clinic, we work with patients to control established risk factors for stroke, such as diabetes and high blood pressure. For all the miracle technology available, prevention is the ideal strategy,” Katz says.

BREAKTHROUGH FOR HIV/AIDS

This summer, Temple announced news of the world’s first successful attempt to eliminate latent HIV-1 virus from cultured human cells. As detailed in the July 21 edition of the *Proceedings of the National Academy of Sciences*, the breakthrough “is an important step toward a permanent cure for AIDS,” says Kamel Khalili, PhD, who led the National Institutes of Health-supported research.

The HIV-1 virus is tenacious. It inserts its genome permanently into its victims’ DNA, always ready to mount a fresh attack. Patients must adhere to a lifelong drug regimen to keep it at bay. With any interruption in treatment, the virus can rage again. “Even when HIV-1 is well controlled, its lingering presence makes patients more likely to suffer from cardiomyopathy, bone disease, kidney disease, and neurocognitive disorders — problems often exacerbated by the drugs that must be taken to control the virus,” Khalili says.

But now, in the laboratory, in cultured human cells infected with HIV-1, Khalili and team, including Wenhui Hu, MD, PhD,

Several floors away from the Stroke Prevention Clinic, a woman is walking while her physician watches. Her footsteps are ever so tiny, inching her forward. Tiny footsteps tell a story. Along with tremor and stiffness, they are one of the signature symptoms of Parkinson’s disease. Elizabeth Haberfeld, MD, Director of Movement Disorders at Temple University Hospital, is assessing whether this patient is a suitable candidate for deep-brain stimulation.

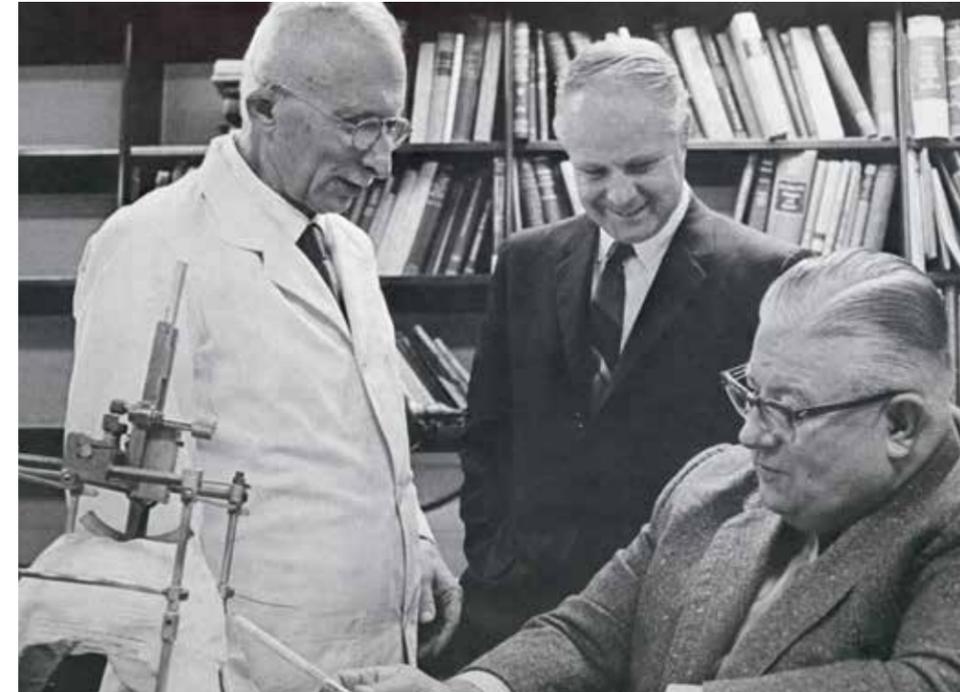
In this exacting procedure, a team composed of a neurosurgeon and a neurologist insert a needle-thin electrode into the region of the brain where the troubles originate. A neurologist specializing in movement disorders then programs the device by remote control. Continuous electrical pulses are emitted at the site, subduing the tremulous symptoms. “Results can be life-changing, and careful patient selection is the key to success,” Haberfeld says.

Deep-brain stimulation is also used for a condition called essential tremor — the most common movement disorder involving tremor (picture Katherine Hepburn in her later years). Its third major indication is for dystonia, which involves sustained involuntary twisting of all or part of the body. While deep-brain stimulation is a treatment, not a cure, studies are showing its merit for a growing list of conditions, including Tourette’s syndrome, chronic pain, depression, and epilepsy.

Stem cells are another focus of research in neurologic disease. Wenhui Hu, MD, PhD, a major contributor to Khalili’s HIV-1 eradication research, leads a robust stem cell research program utilizing neural progenitor cells to initiate brain-injury repair. Azizi and Barbara Krynska, PhD, Assistant Professor of Neurology in the Temple-based Shriners Hospitals Pediatric Research Center, have worked on bone marrow stem cells for 15 years. They were the first to induce bone marrow cells and fibroblasts to become stem cells, and then convert them into neural cells that were tested in animal models. “The idea is to use stem cells produced from a patient’s own marrow to facilitate repair of an injured brain due to a stroke or Parkinson’s disease,” Azizi says.

Rafal Kaminsky, PhD, and Yonggang Zhang, PhD, have designed a way to snip out the integrated HIV-1 genes for good. They created molecular tools to delete the HIV-1 proviral DNA, using a combination of a DNA-snipping enzyme (nuclease) and a targeting strand of RNA (guide RNA) to hunt down the viral genome and excise its DNA. From there, the cell’s own gene repair machinery takes over, soldering the loose ends of the genome back together — resulting in virus-free cells. The molecular procedure also holds promise as a therapeutic vaccine for HIV-1. Cells armed with the nuclease-RNA combination proved impervious to HIV-1 infection. Khalili says the technique could theoretically be used against a variety of viruses.

“Although the HIV-1 eradication approach faces significant challenges before it is ready for patients, it is an exciting discovery,” says Khalili, whose team is working on a number of strategies to deliver the gene-editing complex. “We want to eradicate every single copy of HIV-1 from the patient. That will cure AIDS. I think this technology is the way we can do it,” he says.



Frame-based neurosurgery, which revolutionized brain surgery around the world, was developed at Temple in the 1940s by Drs. Ernest Spiegel (left) and Henry Wycis (right), shown here with Dr. Al Henderson of the Smithsonian Institution, where an early prototype of the invention is held.

In the Temple-based Shriners Pediatric Research Center, many investigators enlist stem cells in their research. This Center, directed by Michael Selzer, MD, PhD, strives to find ways to restore function to children with a variety of neurological diseases and injuries, including cerebral palsy and other abnormalities of brain development, brachial plexus birth injury, brain trauma, and spinal cord injury.

“Many of the brain disorders cause epileptic seizures,” says Selzer, noting the seizure disorder expert Peter Crino, MD, PhD, the Center’s team leader for brain-repair research, uses stem cells to improve the treatment of epilepsy. To do so, he takes a tiny sample of a patient’s skin, induces its cells to become stem cells, and then persuades them to become neuronal cells. Next he tests various medications on them to see how they respond.

“One could envision a world where patients with epilepsy come to the doctor, get a skin biopsy, and we grow neurons to develop individually tailored treatments,” says Crino, who also directs Temple’s Comprehensive Epilepsy Center — a facility holding the National Association of Epilepsy Centers’ premier designation.

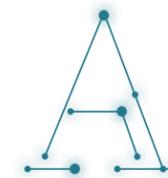
Neurological cancer is another pressing priority. Weaver and Khalili collaborate on cutting-edge brain cancer research. In the clinic, Weaver has three brain tumor trials underway, all utilizing vaccines. In addition, Jennifer Gordon, PhD, studies the pathogenesis of central nervous system tumors — specifically the link between neurologic cancer and the JC virus, which about 80% of all people carry and which can become active when the immune system is suppressed. Traces of it have been found in human brain tumors. Gordon’s research could lead to new ways to halt tumor-cell growth.

At Fox Chase Cancer Center, one of America’s top 20 cancer hospitals, according to *U.S. News & World Report*, the neuro-oncology program is “perfectly positioned to fill a regional gap in caring for brain tumor patients,” says Stephanie Weiss, MD, the program leader. A radiation oncologist, Weiss is an expert in the treatment of meningioma, metastases, acoustic neuroma, and glioma. She’s also specially trained in frameless radiosurgery for brain tumors, “which is non-invasive, painless, and more flexible than frame-based procedures, with equal or superior localization,” she says.

Fox Chase is focused on developing national brain tumor trials. One, for recurrent glioma, is a Phase I trial using

ultra low-dose radiation to activate porphyrins that target tumors, yet spare normal tissue. Fox Chase will be the sole center in the United States to enroll patients in this trial, Weiss says.

AN EXPANDING MISSION



According to the World Health Organization, neurological disorders are one of the top threats to global public health — a threat that will increase steeply, and soon. The world population is aging. Older people have a higher incidence of neurological disorders. Some sources predict a doubling of the neurological disease burden in the United States by 2025.

More than 100 neuroscience experts work at Temple today. Physicians, scientists, caregivers, postdoctoral fellows, and educators. The team continues to grow, in numbers and in proficiency. Six additional neurosurgeons with world-class know-how joined the team just this summer, among them, Philip Villeneuve, MD, who is nationally known in neurotrauma and neurocritical care. “It’s essential that we nurture our institutional expertise and maintain a vanguard position,” Weaver says.

Weaver says that Temple is on its way to becoming the most comprehensive neuroscience center in Philadelphia. “The challenges we face are daunting,” he says. “But we are innovators. We are pioneers. We are ready.”

To learn more about team-based care for patients with neurological conditions, visit www.neuro.templehealth.org, or, to make an appointment at Temple’s Neurosciences Center, call 1-800-TEMPLE MED. To watch a short video about the HIV-1 genome-snipping research, go to <http://news.temple.edu/news/2014-07-22/temple-university-researchers-successfully-eliminate-hiv-virus-cultured-human-cells>.

Data-Driven Medicine

Informing the Cure

BY GISELLE ZAYON - ILLUSTRATION BY KELLY HUME



It's counter-intuitive. Here you are, right in front of us. Yet medicine wants to look at millions of *other* people in order to determine how best to help you. This idea, looking broadly to focus narrowly, is central to a paradigm shift moving medical decision-making away from the ad hoc and toward the evidence-based.

Evidence is about following pathways scientifically tested and proven to work. At first blush, it seems like nothing new. Clinical studies have been producing the evidence behind today's treatment protocols for decades.

"But here's the problem," says Anuradha Paranjape, MD, MPH, FACP, Professor of Medicine and Chief of General Internal Medicine at Temple. "What works for people in studies does not always work across all settings. Medicine is not one-size-fits-all. People have real differences."

Most of the data that informs treatment options today, Paranjape explains, came from studies called randomized controlled trials. After this model of study rolled out in 1948, it became a gold standard for conducting clinical research. It's still an excellent model in many ways, but its limitations have been revealed over time.

"Historically, patients in randomized controlled trials have not adequately represented the diversity of patients in the real world," Paranjape says. "Elderly patients were not usually included. Patients from rural areas, women, and people of minority descent were often underrepresented — and might have real differences in how they respond to interventions."

Randomized controlled trials typically enroll relatively small numbers of patients from a limited number of study sites. Now, however, today's supercharged, interconnected information technology lets us supersize the number of patients involved, ensuring much broader diversity and inclusivity.

Further, whereas patients with co-existing conditions were typically excluded from clinical studies (because co-morbidities might obfuscate results), we now have study methodologies designed to cull meaning from real-life complexity. One of the most powerful study methods is called comparative effectiveness research.

"Comparative effectiveness research determines which medical approaches, used in real-world clinical settings — with vast numbers of very different kinds of patients — produce the best results," Paranjape says.

Regional to National

Getting a firm handle on what's best for whom is a pressing quest of national healthcare reform — and Temple is working at its leading edge. Paranjape is Temple's lead investigator within a four-university consortium awarded a \$7 million grant to build the mid-Atlantic portion of what will ultimately become an on-line national clinical data network called PCORnet.

The funding comes from PCORI, the Patient-Centered Outcomes Research Institute, established by Congress in 2010 as part of the Patient Protection and Affordable Care Act. To date, the agency has awarded \$464.4 million in grants to build the country's comparative effectiveness research engine. Twenty-nine consortia have been funded to build regional networks. These regional networks will eventually link up to form a national network — transforming the nation's ability to interpret an unprecedented magnitude of data.

Temple's group, the mid-Atlantic network, includes Johns Hopkins University, the University of Pittsburgh, and Pennsylvania State University. Both Rachel Hess, MD, the group's Principal Investigator (at the University of Pittsburgh), and Cynthia Chuang, MD (the principal site investigator at Penn State), are former Temple University Hospital residents. To build the mid-Atlantic network, the four academic medical centers will aggregate data from more than 2.5 million patients who use their hospitals and healthcare facilities throughout seven states and the District of Columbia. The patients are urban, suburban, and rural. They are young, old, and in-between. They represent nearly every ethnic and socioeconomic background imaginable. Just what the data doctor ordered.

Size and diversity are key goals. According to Mark Weiner, MD, FACP, FACMI, Temple University Health System's Chief Medical Information Officer, the point of research fed by "big data" is to determine how different types of medical interventions work for patients who have the same disease, but vary widely in terms of other clinical and demographic characteristics.

"What works for people in studies does not always work across all settings. Medicine is not one-size-fits-all. People have real differences."

Weiner says the data abstracted from the universities' electronic medical records will include medical history, diagnoses, prior hospitalizations and procedures, family history, test results, information on family support systems, personal and cultural preferences, and much, much more. The consortium will also pull patient data from insurers, enabling researchers to track patient visits and outcomes outside the network.

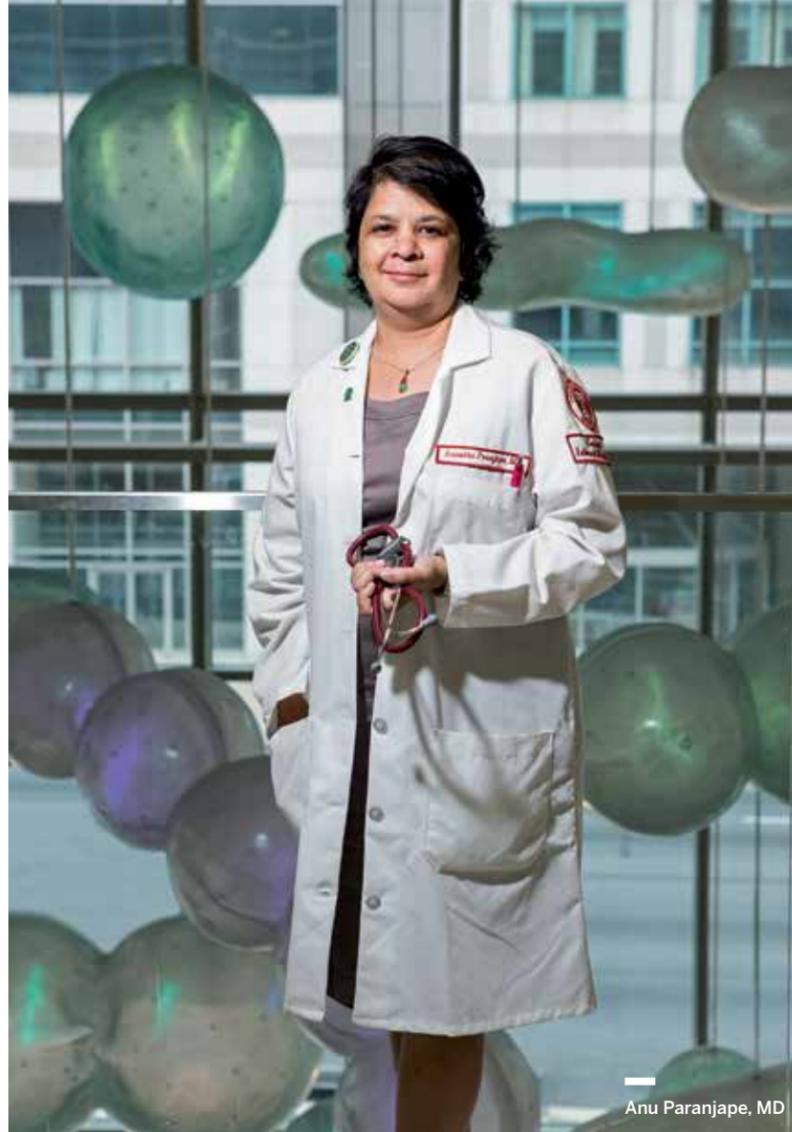
In addition to requiring a massive amount of digital capacity and computing power, a host of technical and security considerations must be upheld. "We will ensure that private patient information remains secure, confidential, and HIPAA-compliant, using state-of-the-art authentication and firewall protection," Weiner says. "All data will be de-identified. Only characteristics and patterns remain."

Three Test Cases

Ultimately, the network will support the study of any disease or condition. But, initially, to test-drive the new system, the mid-Atlantic network will focus on three conditions: one rare (idiopathic pulmonary fibrosis) and two common (obesity and atrial fibrillation).

Because idiopathic pulmonary fibrosis is a relatively rare condition, historically it has been difficult to assemble enough study patients to represent true diversity. "Linking our health systems will improve our ability to systematically study the outcomes that are relevant to patients with this condition," Paranjape says.

"On the other hand, obesity and atrial fibrillation affect significant numbers of people and have multiple options for



Anu Paranjape, MD

management. We will find out which approaches work best for whom, and why."

To illustrate, Paranjape uses atrial fibrillation (AFib). This heart condition, characterized by abnormal heart rate, affects about 2.2 million people in the U.S.

When it is diagnosed, the physician must decide whether to attempt to restore normal heart rate and rhythm — and, if so, how. There are three basic options: pharmacologic, ablative, and surgical. Many factors must be considered to determine which approach is best. Further, because AFib puts patients at heightened risk for stroke, patients also need to be watched for clots. Anti-coagulant medications are generally effective here.

"But what if the patient has a balance disorder, or uses alcohol excessively? Giving an anticoagulant to someone at risk for falling and bleeding is not a good idea," Paranjape says. "But let's say that the patient is not in that risk category. Then the anticoagulant would be okay, correct? Not necessarily," says Paranjape. Patients on certain anticoagulants require frequent blood draws to monitor how well the medicine is working. What if your patient does not drive and lives miles from public transportation? How will she get to the laboratory?

"The moral of the story is that the best therapy for AFib varies from patient to patient," Paranjape says. "Experienced clinicians know this. They draw upon years of experience to formulate the approach likely to work best for their patients. But now we have

the opportunity to move beyond the anecdotal, to produce evidence-based, customized roadmaps for medical decision-making."

This is what comparative effectiveness research aims to do: produce very clear, nuanced pictures of how options A, B, or C are likely to affect patients within varying constellations of circumstance. It's called predictive modeling. The end goal is to enable physicians and patients to compare choices head-to-head, to understand how each option is likely to impact survival, symptoms, and quality of life.

Another plus of comparative effectiveness research is that "studies" become part and parcel of the actual healthcare process. Every point of contact between the patient and the healthcare system produces data. That data can be folded in, continuously increasing what can be observed, analyzed, applied, and refined.

Delivering Value

Providing the right care to the right patient at the right time is the right thing to do. "And with \$3 trillion spent annually on healthcare in the United States, it is about money too," says Robert Lux, CPA, FHFMA, Senior Vice President and Chief Financial Officer of Temple University Health System. According to a recent Institute of Medicine report, 30 cents of every dollar spent on healthcare (\$750 billion every year) leads to little or no improvement in health.

Although expense control models have been evolving for many years, Lux says the healthcare industry is still being "rewarded" for treatment

volume and provision of acute care. Hospitals and physicians are paid on a fee-for-service basis. But accountable care, he says, will turn this model on its head. In the future, providers will have a new financial incentive. They will be paid to keep people healthy.

"We are moving toward a value-based healthcare system — value as *patients* define it," Lux says. "We must look beyond episodic acute care and instead focus on prevention and disease management. Re-orienting our approach toward wellness will help reduce the need for expensive interventions."

When medical interventions are required, big data networks like PCORnet can offer the most meaningful value of all: insight to help physicians and patients choose the treatments most likely to work best for *them*.

In the minds of visionary thinkers, metadata-based empirical research heralds untold possibility. At Temple, Arthur Feldman, MD, PhD, Executive Dean and Chief Academic Officer, poses an interesting question: when you think about the advancement of medicine — about pivotal inventions and breakthroughs — do you think of things like vaccinations, antibiotics, organ transplantation, or life-saving medical devices?

"Someday," he says, "big data will be a precedent-setting transformation that comes to mind." ■

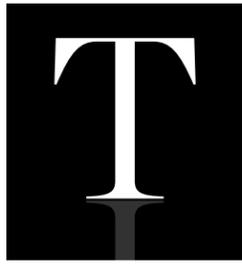
To learn more about the Patient Centered Outcomes Research Institute, visit www.pcori.org.

Untangling Addiction's Mysteries

Hooked

By Giselle Zayon • Photography by Clint Blowers





THE BRAIN IS FULL OF GATEWAYS that open with surprising keys. Alcohol, heroin, cocaine, marijuana, and other substances unlock pathways established for such basic drives as food and sex. They flip switches in circuits that moderate stress. They monkey with motivation and learning. And thus substances that can do enormous harm slip into the driver's seat of a system built to serve our basic biological needs. Once they grasp the throttle, nothing is ever the same.

"Drugs produce myriad biological effects — some with permanent impact," says Ellen Unterwald, PhD, Director of the Center for Substance Abuse Research at Temple University School of Medicine.

The Center, one of 14 in the United States to be designated a "Core Center of Excellence" by the National Institute on Drug Abuse, brings together 32 experts in disciplines as diverse as pharmacology, microbiology, and immunology to get to the nitty-gritty of how drugs of abuse work. More than \$62 million in grants support the Center's study of opioids, alcohol, cannabinoids, nicotine, and psychostimulants, such as cocaine and bath salts. The results thus far include tantalizing clues about addiction and its treatment, evidence for why relapse is so common, as well as insights into the dance of biology itself: most notably, the continual conversation between the neurons in the brain and the cells of the immune system.

"Addiction has been around since ancient times, but was only recently acknowledged as a brain disease," says Unterwald. "Therefore, its organized study got a later start, compared to other disorders like heart disease and cancer. Much about the biological basis of addiction remains unknown."

"Society needs help as fast as science can supply it," says Toby Eisenstein, PhD, Center Co-Director. "But without first studying basic biology — determining how drugs of abuse affect the brain — tackling the problem of addiction would be like working on a car without knowing how it runs. Therefore, we are going at it molecule by molecule."

Cycles & Triggers

SINCE ITS FOUNDING 16 YEARS AGO BY MARTIN ADLER, PHD, the Center has identified hundreds of cellular and molecular mechanisms that drugs of abuse can alter. These alterations both lead to addictive behavior and reinforce it. They also render the addict vulnerable to relapse after getting clean.

"Addiction is a learned behavior that is reinforced by biology. Repetitive behavior creates biochemical changes in the brain, like a line etched more deeply with each redrawing. The addicted state feels normal to the addict — a state requiring replenishment by drugs to be maintained," Unterwald says.

"Therefore, relapse is a huge problem in treating addiction. It is also an excellent target of study because it tells us so much about the entire process of addiction."

Relapse has long been considered a sign of weakness, a failure of will. But Unterwald's mice say it isn't. In study after study, they prove that relapse is egged on by a powerful neurochemical response.

"There are three basic things that can trigger relapse: stress, ready access to one's drug of choice, and exposure to drug-related cues," says Unterwald. "You can be clean — then run into an old drinking buddy, visit an old drug-using haunt, or undergo stress — and those neurochemical pathways that scream 'need' will rev up again."

To study place cues that trigger relapse, Temple researchers used a technique called place conditioning — teaching mice to associate drug use with a specific location. Every other day for eight days, mice were taken out of their cages, given cocaine, and then immediately put into one of two adjoining rooms in the test chamber, the same room each time. Experimenters noted how much time the mice spent in each room. They clearly liked the room they associated with the drug best.

Then the researchers tried to change their place preference. They gave half the addicted mice a drug that inhibits a protein called GSK-3. The result? They forgot their preference. A week later, they still showed no place preference. The mice that did not get the GSK-3 inhibitor, however, still preferred the room they associated with the drug. "It's early days for this discovery, but it opens up a new treatment possibility for addicts who need to break old associations," Unterwald says.

Another study looked at how stress triggers relapse. The mice in this study were opiate junkies, continually pressing a lever that supplied them with their drug. First the investigators removed the drug. Then, no matter how often the mice pressed the lever, no opiate followed. Before long, the mice ignored the lever. They were getting clean.

But next the scientists added stress to the equation. They made the mice swim. Mice don't like swimming. It's stressful. So when the mice were returned to their cages, they ran to the levers and started pressing like crazy, looking for the drugs again. Stress triggered relapse.

The issue here, Unterwald explains, is what opiates do to the brain's serotonin system. Serotonin is the "happy" neurotransmitter. It helps keep us calm. But in opiate and cocaine addiction, the serotonin system routinely underperforms, leaving the addict vulnerable to the tiniest irritation. Since drugs can "correct" how bad this feels, relapse is likely to follow. The take-home lesson of this research by Lynn Kirby, PhD, is that a treatment targeting the addict's serotonin function might help ease withdrawal and prevent relapse.

"We have to get rid of the mentality that everybody can just stop when they want to stop. That's not true," says Adler. "In addiction, a very complex series of events has occurred, including



Ellen Unterwald, PhD



biological changes in the brain. People need help, whether that help is psychological, pharmacological, behavioral, or more likely a combination of all."

Addiction & Beyond

ALTHOUGH ADDICTION IS THE FOCUS OF THE RESEARCH, some discoveries made by the group have implications that go far beyond. One of the most famous, made in 1991, points to the intimate conversations between the brain and the immune system. "There is a much more robust neuronal-immune connection than most people know," says Eisenstein. "In fact, immune cells and neurons are in constant contact — and these liaisons have benefits as well as drawbacks."

Among the drawbacks documented by the Center relating to the connection between the immune system and drugs of abuse: methamphetamine suppresses immunity by damaging T cells, as demonstrated by Raghava Potula, PhD. Both "meth" and alcohol weaken the blood-brain barrier, making it easier for viruses like HIV to slip in, as shown by Yuri Persidsky, MD, PhD.

"Opiates also increase susceptibility to bacteria and viruses, including salmonella and HIV," Eisenstein says.

With drugs like codeine, Vicodin, OxyContin, and Percocet prescribed for hundreds of millions of patients every year, opiates' dampening effect on the immune system is a real problem. Of course, the addictive nature of opiates is an even bigger one.

"This is about physiology, not morality. Anyone can end up becoming physically dependent," says Temple medical school alumnus Andrew Kolodny, MD, founder and president of Physicians for Responsible Opioid Prescribing, a national organization working to contain these problems.

One of Temple's findings portends good news on this front. Blocking the function of small proteins in the brain called chemokines makes lower doses of morphine work more effectively. This

means better pain control at lower doses — and lower doses mean fewer dangerous side effects, including reduced risk of addiction.

It was Adler who first discovered that chemokines, well-known for their role in injury and inflammation throughout the body, act much like neurotransmitters in the brain. Neuro-immune liaison research at Temple has also identified possible breakthroughs for treating infection, modulating inflammation, and treating diseases like multiple sclerosis. For example, THC, the active ingredient in marijuana, acts on cannabinoid receptors in the brain and in the immune system. In the brain, THC produces its psychoactive response, but in the immune system, it suppresses the immune response.

In autoimmune diseases like multiple sclerosis and rheumatoid arthritis, an overactive immune system attacks the body's own tissues. "THC's immunosuppressive action could be an avenue of treatment," Eisenstein says.

Organ and tissue transplantation is another area that might benefit from immune system suppression. In fact, Eisenstein has a patent pending for use of a new class of drugs designed to help prevent the body's rejection of tissue grafts and transplants, drugs that

bind exclusively to cannabinoid receptors on immune cells, drugs that are not psychoactive. "This could be a real game-changer for certain types of transplants," says Adler, noting that cross-discipline research makes such insights possible. "No system in the body acts independently. Everything interacts with everything else. Examining things across multiple perspectives opens us to speculate, to think unconventional thoughts," he says.

A happily surprising result even came from an antibiotic when it was given to rats that were addicted to cocaine or opiates. When given the antibiotic ceftriaxone, addicted mice lost interest in their drugs. "These mice previously went to great lengths to get drugs, pressing a lever 50 times or more for a single dose," said researcher Scott Rawls, PhD. "But after ceftriaxone, they were no longer willing to work that hard for the drug."

Ceftriaxone also produced a promising result for mice in withdrawal, Rawls says. When given the antibiotic, the mice failed to respond to place cues that would have once triggered relapse.

It's not the antibiotic's *bacteria*-fighting property that's important, he says, but its ability to interfere with the brain's No. 1 excitatory neurotransmitter, glutamate. During opiate use, glutamate levels increase, which contributes to its addictive properties. These results point to a possible treatment that would reduce glutamate, preventing the neurochemical response that leads to dependence. "We are on our way to engineering a glutamate-reducing drug that is not an antibiotic," Rawls notes.

Who knew that the study of substance abuse would unearth something like this about an antibiotic — or point to possible advances for transplantation, autoimmune diseases, and other things seemingly far afield? "If it weren't for cross-discipline research, we would not have uncovered many of these things," says Adler. "Cross-discipline research is really the only way. The possibilities are quite exciting." ■

For more information on the Center for Substance Abuse Research, visit www.temple.edu/medicine/departments_centers/research/substance_abuse.htm.

Lewis Katz

A Great Benefactor, Remembered

By GISELLE ZAYON

ON MAY 31, just two weeks after Temple University announced that its School of Medicine would be named for its great friend and benefactor Lewis Katz, the unthinkable happened. A fatal accident took his life, along with six other people who'd flown to Boston with him that fateful day.

"Plans for the school-naming celebration abruptly shifted gears," said Larry Kaiser, MD, FACS, Dean of the School and CEO of Temple's health enterprise. "Suddenly we had a memorial service to plan."

On June 4, a standing-room-only crowd packed the Temple Performing Arts Center to honor the philanthropist and business leader, a trustee of Temple University and its health enterprise since 1998. Regional and national media were on hand to document the event. One by one, 15 speakers extolled Katz's generosity and zest for life.

Philadelphia Inquirer editor William K. Marimow called Katz "a man in motion," always working for others' betterment. The historian and author Doris Kearns Goodwin called him a man of "vitality, enthusiasm, joy, playfulness." Comcast-Spectacor Chair and Philadelphia Flyers owner Ed Snider said he'd asked

Katz to be best man at his wedding simply because he was "the best man I've ever known."

Former President William J. Clinton spoke about playing Nerf basketball in the Oval Office with Katz and former Pennsylvania Gov. Edward G. Rendell. "I lost," Clinton said. Then Clinton told a story about the time Katz asked for a favor during a fund-raising event. "If you whisper in my ear, they'll think we're close and I can raise more money," Clinton recalled Katz saying. "Lew, you're a putz," Clinton said he whispered back, explaining that Katz then reacted like someone who'd just learned 'the nuclear code.'"

More laughter erupted when U.S. Sen. Cory A. Booker repeated what Katz had said the day Booker won his Senate seat. "Any idiot" can win an election, Katz admonished. "In fact most idiots do." But the fun-loving Katz gravitated to the struggling, too. "Whether it was a child born to difficult circumstances in Camden or someone he met in a grocery store checkout line, he saw their dignity and their worth, and he elevated it even higher," Booker said.

Katz was there in a big way for the people and organizations he loved — Temple, charter schools in his native Camden, NJ, the Boys & Girls Clubs of America, his family and many friends, politicians, athletes, authors, coffee-shop cashiers. His recent commitment of \$25 million for Temple's medical school turned out to be his final act of philanthropy.

Katz's relationship with Temple spanned more than 50 years. He graduated from Temple in 1963, and then went on to earn a law degree from Dickinson School of Law. Just two weeks before his death, Katz was awarded an honorary doctorate from Temple and delivered the University's spring Commencement address. The rousing speech earned him posthumous recognition as the nation's best graduation speaker this year. He spoke about growing up without a father; working to put himself through college; and what he learned in his career. After serving as partner in his own law firm, Katz led several high-profile enterprises, including Kinney Parking Systems, the New Jersey Nets, and Philadelphia Media Network. But business, he said, is not as important as family and friends.

William H. Cosby Jr., Katz's classmate and fellow trustee, also spoke at the memorial service, as did Patrick J. O'Connor, chair of Temple's board of trustees; Rabbi Aaron Krupnick of the Congregation Beth El, in Vorhees, NJ; Pennsylvania Gov. Thomas W. Corbett; Philadelphia Mayor Michael Nutter; and, finally, Katz's son Drew, daughter Melissa, and grandson Ethan.

Temple University President Neil D. Theobald called Katz's death "an incalculable loss for Temple, for Philadelphia, and for all those who knew and cherished their relationship with Lewis Katz."

Plans for the event to rename the School of Medicine for Katz will be announced at a later date. 



Top: Former President William J. Clinton. Bottom, L-R: Neil Theobald, Temple University President; Edward Snider, Chair, Comcast Spectacor; Doris Kearns Goodwin, author

TOP ROW: ELIZABETH MANNING; BOTTOM ROW: JOSEPH V. LABOLITO. KATZ: RYAN S. BRANDENBERG



Fulbrights & Farmhands

HAND-PICKING THE NEW AMERICAN DOCTOR

BY GISELLE ZAYON PHOTOGRAPHY BY JARED CASTALDI

John St. Angelo
FARMER

John St. Angelo of the Class of 2017 worked on his family's farm in rural Maryland before setting his sights on medicine. People-oriented medicine, anyway. Having shadowed the farm veterinarian from the time he was a kid, St. Angelo was already a "doctor" for cows, horses, goats, and pigs.

"I did the vast majority of the vet work," said St. Angelo, who had every intention of devoting his life to the family farm, but when he left home for college, a few things began to cast doubt on that assumption — most notably an emergency responder medical training course he took and his first volunteer ride with the crew.

"That ambulance ride changed my life," St. Angelo says, recalling the urgency to reach the patient, a high-ranking Pentagon employee in cardiac arrest. Until then, St. Angelo, a George Washington University graduate, had veterinary school in mind, but now he knew any doctoring he would do had to be for *people*.

Traditionally Nontraditional

John St. Angelo, Lindsay Davis, Steven Stanek, and William Junior are unique — and so too the company they keep. Their medical school classmates include three Fulbright scholars, a former Israeli football league player, an algal biofuels engineer, a Wall Street stockbroker, even an Olympic alpine ski racer who represented Armenia in the 2014 Sochi games.

Then there's the student who sailed the Caribbean for two years with his family before medical school; an internationally ranked Rubik's cube competitor (recently, the fastest female Square-1 solver in the world); an architect; an opera singer; and a guy who filmed a documentary on former Liberian child soldiers in Tanzania.

Lindsay Davis

BALLET DANCER

Lindsay Davis loved studying history, but the *ballet* was where she really wanted to be. She'd dreamt of it from the time she was a three-year old in a tutu. So, when she graduated from Duke University in 2006, she decided to go for it. She auditioned for 18 companies, knowing that her chances were slim, "old" as she was by ballet's standards. And because she'd spent every spare moment of college training to perfect her technique, she made it. She was accepted by the Cincinnati Ballet.

"Dance was a goal I had to fulfill. I loved every minute of it, yet began to feel I had more to do — and medicine was it," Davis explains.

So she left the troupe, worked for two years at the Cleveland Clinic, and enrolled in a post-baccalaureate program to sharpen her science in anticipation of applying to medical school. Again, she made it — gaining acceptance at Temple. She graduated last spring and is now making good on her medicine dream.

"Dance and medicine — especially my area, emergency medicine — have a lot in common," says Dr. Davis, a first-year resident at Temple. "Both require an intense work ethic, great stamina, and the ability to think on your feet. In ballet, you move with fellow dancers as a unit. It's about the team, not the solo performer. Medicine is exactly the same."



"Students with diverse, fascinating backgrounds are something of a novelty at many American medical schools, but the nontraditional student *is* the tradition here," says Audrey Uknis, MD, Senior Associate Dean for Admissions and Strategy.

Temple University School of Medicine opened in 1901 as a co-educational night school for working adults, Uknis explains. From the get-go, it embraced students from every walk of life. Meanwhile, for decades, high science aptitude prevailed as the predominating focus of medical school admissions. Even today, many medical schools still focus nearly exclusively on high science GPA and MCAT® scores.

"Exceptional strength in science *is* a must," Uknis says, "but not to the exclusion of exceptional interpersonal skills, too."

Steven Stanek

JOURNALIST

In 2007, after earning a master's degree from Northwestern University's Medill School of Journalism, Steven Stanek moved to Cairo. No job in hand, knowing not a soul, he took a risk, because good jobs in his field were hard to come by. Once there, he started freelancing. He learned Arabic. The next thing you know, he's writing for *National Geographic News*, covering breaking archaeological stories, including the revelation, through modern forensics, that a hunting accident killed King Tut.

An accomplished journalist, Stanek covered the 2008 presidential election for the *National* and has also reported for the *San Francisco Chronicle* and the *Baltimore Sun*. In 2010, he was the only journalist in the nation named a Congressional Fellow of the American Political Science Association, which sent him to Capitol Hill.

"Journalism was great, but I needed a different challenge," Stanek says. "My mom is a physician. My late father and grandfather were, too — Temple grads, in fact. That I'm here now seems fitting."

Now a third-year medical student, Stanek feels right at home. "Medicine and journalism *both* mean meeting new people every day, doing research, getting to the bottom of a story."



"Students with diverse, fascinating backgrounds are something of a novelty at many American medical schools, but the nontraditional student *is* the tradition here," says Audrey Uknis.

Doctoring is about people. Physicians must be clinically and culturally literate."

In 2007, to help the nation's medical schools get a new breed of candidate into the physician pipeline, the Association of American Medical Colleges launched a program called Holistic Review. Its goal is to help medical schools establish applicant

evaluation processes that target attributes beyond science strength alone. Fifty-four of the country's 141 allopathic medical schools had enrolled in the program as of February 2014.

"American medical schools must cultivate physicians who can work expertly with other members of the healthcare team to care for the American public," says Larry Kaiser, MD, FACS, Dean of Temple University School of Medicine and CEO of Temple University Health System.

"Admitting students with widely ranging backgrounds and talents brings fresh, original thinking to vexing health and social welfare issues," Kaiser says. "We must look for physician candidates who are integrative thinkers and effective communicators. The nation's healthcare problems are not going to be solved in the wheelhouse of traditional medicine alone."



William Junior, MD

JAZZ GUITARIST

Medicine's call sounds different to different people. It sounded very musical to William Junior, MD, an anesthesiology resident at Yale who graduated from Berklee College of Music in 2007 and from Temple University School of Medicine last spring.

A jazz guitarist, Junior has had the chance to play with many professional musicians, including Esperanza Spalding, Johnathan Baptiste, and members of Aero-

smith and the Saturday Night Live Band. He had attended Berklee on a full scholarship, intent on a life in music ... until *science* began singing in his ear.

"Medicine just kept coming up," he says. "Then I had an epiphany in a Boston bookstore one Saturday afternoon. I was in the music section when suddenly I felt compelled to walk the aisles until something inside said 'pull this book.' It was

called *Gifted Hands*. The story of a surgeon named Ben Carson, an African-American guy from a modest background, like me. I had never heard of him before, but his story spoke to me."

Junior wrote to the extremely busy, world-famous pediatric neurosurgeon at Johns Hopkins University. When Carson wrote back, it pretty much sealed the deal. Junior *had* to go to medical school.

To these ends, many medical schools have drastically overhauled their admissions practices. A handful, like Temple, have made relatively few changes. "Thanks to the forward-thinking Russell Conwell, Temple University's founder, we attained our social accountability wings more than a century ago," Uknis says.

Temple's medical admissions process is built for volume *and* individualized evaluation. Each year the school receives more than 10,000 applications. According to *U.S. News & World Report*, Temple is the fourth-most applied-to medical school in the nation.

The first priority is to find the 1,000 best applicants to interview. "This determination is made on the basis of many factors, such as academic record, recommendations, extracurricular

with strong academic acumen, presage a student's capacity to become the kind of physician Temple prizes: clinically and humanistically astute."

Not surprisingly, older students are well-represented at Temple. More than half have real-world life and work experience. Many have spouses and children. Older students bring perspective and discipline. They are more comfortable dealing with people, more grounded, better at dealing with stress.

Once you've been out of college for a while, and especially if you're switching to medicine from another field, it's not easy qualifying for medical school. Most people enroll in a post-baccalaureate preparatory program to enhance their credentials before applying — and since 2008, 270 students have done their post-baccalaureate education at Temple, including Junior and Stanek.

Temple's post-baccalaureate pre-medical school program offers two tracks: a basic core for people with no or little science in their backgrounds, and an advanced core for science-savvy applicants who want to brush up.

Other institutions offer similar programs, but Temple is the only program in the country to offer conditional acceptance to medical school.

A seat in medical school is reserved for every student who successfully completes the program. Little wonder the program attracts more than 2300 applicants annually for 55 spots. Its selection process, too, is a highly personalized one.

"These are important decisions. There's no way to automate them," Uknis says. "We do it the way medicine is practiced: with our hearts and with our heads."

Larry Kaiser, Temple's Dean, says that selecting which Fulbrights and farmhands to transform into the next generation of physicians is ultimately about pleasing one final arbiter.

"The patient is the ultimate judge of a physician's quality," he says. "That is our responsibility here: to hand-pick exceptional people who are going to practice exceptional medicine to benefit society, day after day." 📖

"Admitting students with widely ranging backgrounds and talents brings fresh, original thinking to vexing health and social welfare issues," Kaiser says.

activities, work experience, leadership experience, race, age, gender, socioeconomic status, languages spoken — and more. While there is no academic cutoff for consideration, the class most recently admitted boasts an average overall GPA of 3.68 and MCAT score of 32.

The 1,000 personal interviews are held over a seven-month timespan, a responsibility shared by the 28 members of the admissions committee. Every Friday, the committee meets to decide which applicants to accept.

"We discuss each candidate carefully," says Uknis. "Does she listen well? Demonstrate the ability to take another's point of view? Display appropriate self-confidence? Speak articulately? What about her sense of social consciousness, her drive to benefit society? Could we envision this person as *our* physician someday?"

"We look for keen intellect, compassion, integrity, and adaptability," Uknis says. "We look at ethical decision-making and critical thinking skills. We look for signs that she'll be able to work with a team. All of these attributes, combined

For information on the MD program, visit www.temple.edu/medicine/education/index.htm. For information on the Post-Baccalaureate program, go to www.temple.edu/medicine/ppp/index.htm.

Ellen Tedaldi, MD DIRECTOR, COMPREHENSIVE HIV PROGRAM

Q
&
A

You met your first AIDS patient, a young mother with a three-year old, before AIDS was even called AIDS.

It was the mid-1980s, New York City. This young woman would not get well. I suspected HTLV III, which is what HIV used to be called — but there was no test for the virus then. Though I did not realize it at the time, she was my sentinel patient. Soon we were losing scores. There were no antiviral meds.

Q: Sounds frightening. Did you want to make an exit from AIDS care?

A: The Centers for Disease Control estimates that more than 1.1 million people are living with HIV in the U.S., with about 56,000 new cases diagnosed every year. You can't run from HIV/AIDS anyway, and, I, in fact, have spent years running toward it. In 1986, when I came to Temple, I treated the parents of infected children and took care of pregnant women with HIV.

In 1996, I received Ryan White funding to start Temple's comprehensive HIV program. Today we have more than 1,100 patients. Nationwide, the average rate of patient retention is about 50% — meaning, of the new patients who seek HIV care at a particular practice, 50% still use it a year later. At Temple we retain 89% of our patients, a rate that far exceeds the national average. I attribute this to our excellent staff. We provide high-end HIV care in a context of total health and wellness promotion.

Q: Do AIDS clinics still have awful stigmas?

A: Our service is integrated into Temple's General Internal Medicine practice. There's no separate unit, no sign that says HIV/AIDS. Even so, we have patients who travel a long way to see us, fearful of being "found out" near home. Stigmas and myths persist.

Q: You do a lot of outreach and education. For instance, you've been on the faculty of the Mid-Atlantic AIDS Education and Training Center for 23 years.

A: Prevention, testing, and treatment must be promoted. We can't just wait for people to show up at our doors. We educate physicians, nurses, caregivers, high school students, prisoners, and church groups throughout the region. We organize HIV testing days. Philadelphia's infection rate is five times the national average. That's unacceptable. HIV/AIDS is not the death sentence it once was — but, left undiagnosed and untreated, it remains an equal-opportunity destroyer.

If we can get enough people tested — and on therapy — we can potentially reduce the risk for the entire community.

Q: You also participated in some of the earliest NIH-sponsored trials.

A: Medicine cannot advance without research. My team and I have participated in many federally funded studies, including INSIGHT, the International Network for Strategic Global HIV Trials. I am also involved with Temple's Comprehensive NeuroAIDS Center. As people are living longer with the virus, we're seeing more AIDS-related neurocognitive decline. Research needs to address how we can diagnose and treat the complications of aging and HIV.

Q: You volunteer with a needle exchange program. Do you worry about supporting IV drug abuse?

A: Needle exchange programs help curb transmission rates for HIV, hepatitis, and other infectious diseases, but do not increase IV drug use. I've been a volunteer with Prevention Point Philadelphia since 1998. We work in an unmarked van, but the clients know us. We provide street-side medical care — basic care such as vaccinations and assessments. The program makes a difference, clinically and financially. A new needle costs less than a dollar. Caring for an uninsured person with hepatitis or HIV could cost hundreds of thousands of dollars over a lifetime.

Q: What sustains your commitment to this work?

A: As far back as I can remember, I felt compelled to make a difference for vulnerable people. In fact, I was ready to volunteer with the Peace Corps when my medical school acceptance letter came. AIDS, medically and socially, remains a compelling challenge, a personal and a public crusade.



Ellen Tedaldi, MD, FACP

Inflammation & Cancer

Sergei Grivennikov, PhD, investigates a dark side of the immune system: the link between cancer and inflammation. Fifteen years ago, the field was virtually nonexistent. “Now it’s one of the hottest areas of cancer research,” the Fox Chase Cancer Center scientist says.

In 2012, when Grivennikov was a postdoctoral fellow at the University of California-San Diego, he and his mentor published an important finding: cancerous tumors can exploit microflora and immune cells, inciting an inflammatory response that fuels cancer growth. The scientists called the phenomenon tumor-elicited inflammation (TEI).

“Rather than always protecting us against cancer, our immune system can also spark an inflammatory response that helps tumors progress,” he says.

Now Assistant Professor in the Cancer Prevention & Control Program at Fox Chase, Grivennikov is mapping out TEI’s details. How is it induced and regulated? How does it influence tumor growth? These details could reveal new therapeutic, preventive, and prognostic targets.

As a child, the Russian-born Grivennikov was torn. Should he be a garbage truck driver or an astronaut? Biological science – the exploration of inner space – lets him be a bit of both. It’s even turned up a role for the “garbage” part.

Grivennikov discovered that, in colorectal cancer, normal intestinal microflora and their byproducts slip into tumor cells – where they are recognized by the immune system as invading garbage, launching the TEI response. Microflora cannot get into normal cells. But tumor cells lack the protein that acts as a

barrier. Therefore, bacteria wriggle in, and are recognized as intruders, triggering the production of immune system foot soldiers called cytokines, to come in and attack. One cytokine, Interleukin-23, triggers the synthesis of other cytokines that actually help the tumor develop. What is believed to be part of a normal body response to infection and wounding can be usurped by cancer for its own benefit.

Only about 15-20% of cancers develop in the context of *preceding* chronic inflammation. Chronic hepatitis, for example, can lead to hepatocellular carcinoma. “But even when underlying chronic inflammation is absent, there’s an inflammatory micro-environment that spurs cancer on,” Grivennikov says.

There’s a lot of crosstalk going on between cancer cells, immune cells, and host microbiota. Grivennikov wants to capture and document the conversation, manipulating it to cancer’s disadvantage.

As proof-of-principle, it is possible to reduce colorectal tumor growth in mice with broad-spectrum antibiotics. But since antibiotics kill *all* types of bacteria, including the healthy kind we need, there are clear drawbacks to this approach. Inhibiting inflammation is another possible angle. Studies show that long-term use of aspirin and other non-steroidal anti-inflammatory drugs reduce the risk of cancer death by up to 45% for certain types of cancer. “But

the question is how to do it safely and effectively,” Grivennikov says. Supported by funding from the Pew Charitable Trusts, the National Institutes of Health, and the Landon Foundation and American Association for Cancer Research, Grivennikov’s lab is working on five different lines of investigation related to TEI. “Much about this field is counter-intuitive,” he says.

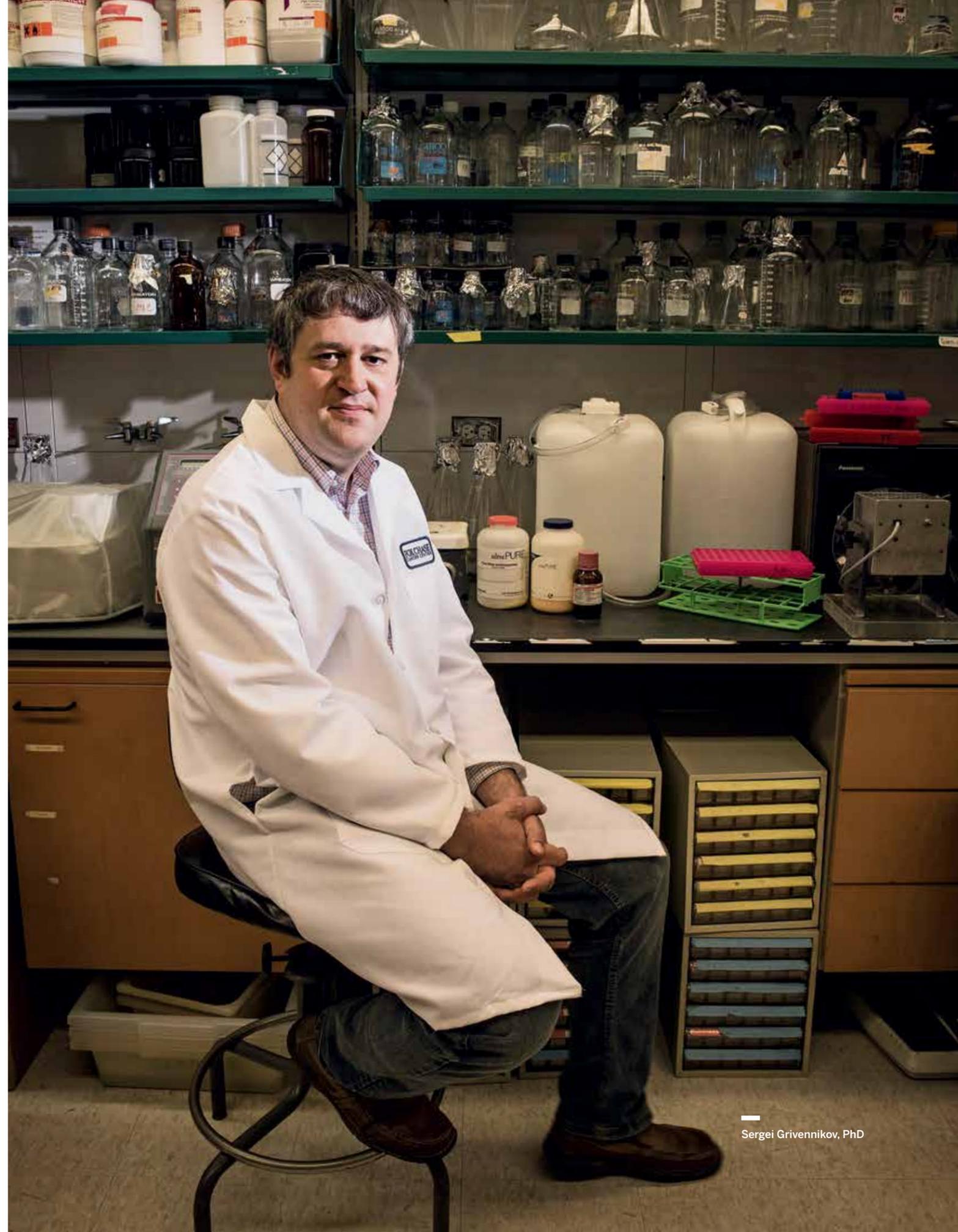
For Grivennikov, the more surprises the better. Last year, in recognition of his creativity, he was one of 22 scientists nationwide named a Biomedical Sciences Scholar by the Pew Charitable Trusts. As such, he joins the ranks of researchers who have gone on to become Nobel laureates, MacArthur fellows, and the like. Grivennikov has accrued other honors as well, and travels the globe to lecture.

Does all this attention portend a significant breakthrough? “Only time will tell,” he says, modestly. “I remind everyone: The link between chronic inflammation and cancer is not new. It was observed 150 years ago by Rudolph Virchow.”

“Until recently, these observations were overshadowed by our desire to study only the *anti*-cancer potential of our immune system,” Grivennikov says. “Science has focused on the basic idea of inhibiting something in cancer cells that fuels their growth, but not much appreciation was given to the notion of inhibiting the tumor-promotion function of inflammation and immunity.”

TEI could bear fruit for future preventive and therapeutic measures.

“I would love to discover something important,” says the scientist, “But even if I don’t, I’m having a good time. Science is just plain fun.”



Sergei Grivennikov, PhD

LUNG DISEASE: New Options

Renowned for superior outcomes for patients with serious lung disease, the Temple Lung Center is frequently listed among the top in the nation and region for pulmonology by *U.S. News & World Report*. It is also one of the most active pulmonary research centers in the country. “We are continuously investigating new approaches,” says Gerard Criner, MD, FCCP, FACP, Director.

The Temple Lung Center has led and participated in major studies in pursuit of better treatments for chronic obstructive pulmonary disease (COPD), the third-leading cause of death in the United States. COPD includes emphysema, chronic bronchitis, and other debilitating diseases that leave patients feeling starved for air. One study, the National Emphysema Treatment Trial, resulted in the nationwide approval of lung volume reduction surgery. In this procedure, diseased portions of the lung are removed, giving healthier tissue more room to function. Temple was the first hospital in the City of Philadelphia and one of the first in the nation certified to perform the surgery.

Now, in two separate clinical trials, the Lung Center is evaluating two *nonsurgical* approaches for lung volume reduction. Both involve investigational devices that are deployed in the lung with the patient under conscious sedation or general anesthesia. One device is a valve. The other is a coil. Both are novel, minimally invasive approaches to reducing the volume of diseased tissue. Temple is one of only a few hospitals in the nation approved to test both devices.

Clinical trials are underway for patients with a variety of pulmonary conditions. For more information, e-mail breathe@temple.edu or call 215-707-1359. To learn more about the Lung Center, visit pulmonary.templehealth.org.



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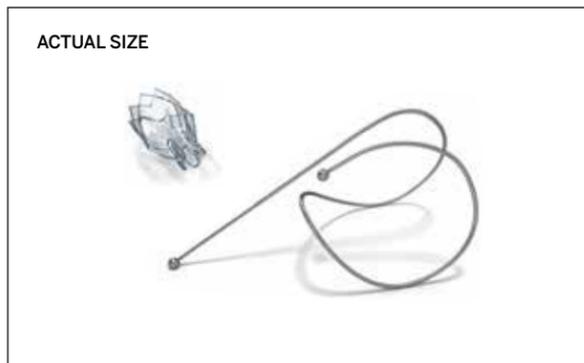
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CENTIMETERS



ACTUAL SIZE

PNEUMRX, INC. (COIL AND PULMONX (VALVE))

1. THE ENDOBRONCHIAL VALVE

The Zephyr® Endobronchial Valve, developed by Pulmonx, is designed to cause the diseased part of the lung to gently collapse, enabling the healthier parts to expand, relieving the patient’s symptoms. It is a one-way valve that blocks off the diseased lung section to inhaled air, yet allows trapped air to escape. With a concentric, flexible design that enables a custom fit in the airway, the valve is made of nitinol, a flexible synthetic material used in many medical devices. It is coated in medical-grade silicone for

a smooth seal against the bronchial wall. A specially designed flexible catheter is used to deliver the valves to the target sites in the lung during bronchoscopy. Inside the catheter, the valves are compressed to a diameter no wider than a pencil point. Once it is positioned, the physician presses an actuator switch that retracts a sheath, allowing the valve to expand against the bronchial wall. A typical procedure involves placing about three to four valves to isolate the target lobe, and takes approximately 10 to 30 minutes to complete.

2. THE ENDOBRONCHIAL COIL

The RePneu® Coil, developed by PneumRx, Inc., is designed to gently hold small airways of the lung open and to restore tension to adjacent lung tissue — preventing diseased airways from collapsing on themselves and reducing the air-trapping that causes breathlessness. By simultaneously compressing adjacent diseased tissue in the lung, the coils also provide more room for the diaphragm and healthier lung issue to function. The coils, which come in three sizes (the largest is depicted at left), are made of nitinol,

a synthetic material commonly used in medical implants, and are programmed with “shape memory” to retain their double-looped shape. The coils are straightened for insertion into the lungs with a specially designed delivery device used in conjunction with a standard bronchoscope. When deployed by the physician, the coils recover their double-loop shape, gathering up loose, inelastic lung tissue and increasing elasticity in the lung. Most patients receive about 10 coils during a procedure that takes approximately 20 to 30 minutes to complete.

TIMELINE

SKIN CITY: Temple Dermatology

At the turn of the 20th century, Philadelphia became a mecca of American dermatology under the aegis of Louis Duhring, MD (1845-1913), the City's first professor of dermatology, a charter member of the American Dermatologic Association.

At Temple University School of Medicine, founded in 1901, Jay Schamberg, MD, a Duhring protégé, built a strong foundation for dermatologic patient care, research, and physician training. Luminaries to join the faculty over the years included Albert Strickler, MD (Skin & Cancer Hospital organizer); James Graham, MD, and Wayne Johnson, MD (famous dermatopathologists); Eugene Van Scott, MD (Lasker Award winner and alpha hydroxy developer, with Ruey Yu, PhD); and Fred Urbach, MD, and Eric Vonderheid, MD (renowned photobiologists).

A banner year came in 1966, when the Philadelphia Skin and Cancer Hospital relocated to the Temple campus. The enterprise prospered for nearly two decades before a constellation of factors contributed to its demise, leaving Temple dermatology to languish for years.

Then, in 2013, Larry Kaiser, MD, recruited the internationally renowned dermatologist Gil Yosipovitch, MD, to chair dermatology at Temple and to lead the dermatologic program at Fox Chase. Yosipovitch is building programs and recruiting faculty to return dermatology to full-service, premier status. Founder and past president of the International Forum for the Study of Itch (IFSI), Yosipovitch has established the Temple Itch Center, one of only two such centers in the United States — an institutional hub for patient-focused care and education, as well as for research collaborations among investigative dermatologists, neuroscientists, and other experts dedicated to advancing treatment for this common affliction.

2013 Renowned dermatologist **Gil Yosipovitch, MD**, founder of the International Forum for the Study of Itch, is recruited to re-establish Temple as a full-service academic hub for treatment, research, and education in dermatology.

1993 At Fox Chase Cancer Center, **Beatrice Mintz, PhD**, develops a transgenic mouse model to study melanoma.

1966 **The Skin and Cancer Hospital of Philadelphia** moves to a new building on Temple's health science campus.

1957 **James Graham, MD** (1921–2012) joins the faculty. The Skin and Cancer Hospital of Philadelphia becomes Temple's Dermatology Department. Graham later becomes President of the American Board of Dermatology.

1931 **Carroll Wright, MD** (1895–1967), succeeds Strickler as head of Temple dermatology.

1928 Strickler opens the famed **Skin and Cancer Hospital of Philadelphia**. Edgar B. Moore (Benjamin Moore Paint Co.) serves as Board president for nearly two decades.

1918 **Albert Strickler, MD** (1882–1963) joins the Temple dermatology faculty, serving until 1931.

1912 **John Kolmer, MD** (1886–1962) works with Schamberg and George Raiziss, MD (University of PA) to establish the institute that became the Research Institute of Cutaneous Medicine. Kolmer invented neosarsphenamine, a treatment for syphilis (1915) and one of the first blood tests for the disease (The Kolmer Test, 1922).

1910 **Jay Schamberg, MD** (1870–1934), the prolific physician-scientist, succeeds Fink. Schamberg is namesake of three skin diseases.

1904 **Edward Finck, MD** (1856–1934), becomes Temple's first professor of dermatology, serving until 1910.

HISTORICAL PHOTOS: SPECIAL COLLECTIONS, TEMPLE UNIVERSITY LIBRARIES; MINTZ: TOMMY LEONARDI; YOSIPOVITCH: DANIEL BURKE.

ALUMNI NEWS

Temple's 10,000+ medical school graduates are advancing health and social welfare across the globe.

Will Power

Is *Your* Legacy Planned?

In the 1960s, Vera Goodfriend, a 1940 graduate of Temple University's College of Education, received a modest inheritance. The Washington, D.C. resident worked as a mathematician for the federal government. She lived frugally, but was a savvy investor. In fact she turned that inheritance into a \$6.9 million bequest that is now transforming Temple's potential to break new ground in the study of cancer, heart disease, arthritis, or geriatrics. The gift came to the school last year upon her passing at the age of 93.

"We are tremendously grateful for Ms. Goodfriend's largesse," said Larry Kaiser, MD, FACS, Dean of Temple University School of Medicine and Health System CEO. "Planned giving creates legacies. It is extremely important philanthropy."

Goodfriend's gift will be used in three ways. It has established an endowed chair in Cardiovascular Research at the School of Medicine.

Steven Houser, PhD, Senior Associate Dean for Research, has been installed as its inaugural holder. It will also endow a chair in a new Genetics Department — a position to focus on the genetic bases of cardiovascular disease and cancer. Finally, it will endow a postdoctoral fellowship in genetics.

Houser, the new Goodfriend Chair in Cardiovascular Research, has gained international recognition for answering fundamental questions about heart cell function. "He's been on the cutting edge of this field for over 25 years — guiding a generation of scientists," said Walter J. Koch, PhD, the William Wikoff Smith Chair of Cardiovascular Medicine at Temple. Well-known for his leadership of professional affairs, Houser chairs the Research Committee of the American Heart Association and serves on its Board of Directors.

The medical school and health system received bequests totaling more than \$14 million last year. Goodfriend's was the largest. Another generous gift — a charitable remainder unitrust establishing the Lucien L. Trigliano, MD, Scholarship Fund, came from Lucien Trigliano, MD, a graduate of the class of 1952 who passed away in March at the age of 88.

Born in Easton, PA, to parents who ran a small grocery store, Trigliano excelled athletically and academically. He

attended Texas Christian University, playing in the 1945 Cotton Bowl, served two years in the Navy, and then put himself through medical school by driving a cab, painting houses, and selling cars. Trigliano went on to launch a spinal cord injury rehabilitation center, three rehabilitation departments at San Francisco hospitals, and a medical-legal consulting practice for brain and spinal cord injury cases. A licensed pilot, he flew all over the country in his own plane to visit patients. "My years in medicine were a tremendous journey," Trigliano once said. "It was the people and the quality of education at Temple that carried me through all these years."

Other recent planned gifts came from dedicated alumni, patients, and friends. Alumnus Alex P. Von Schlichten, MD '61, endowed a scholarship fund at the School of Medicine through his bequest, and provided unrestricted operating funds through

Goodfriend's bequest establishes endowed chairs in Cardiovascular Research and Genetics, and a postdoctoral fellowship in genetics. Another generous gift — a charitable remainder unitrust establishing the Lucien L. Trigliano, MD, Scholarship Fund — came from Lucien Trigliano, MD, a graduate of the class of 1952.

his IRA gift. Robert A. Ritter of Newtown, PA, left \$1 million to Fox Chase Cancer Center to be used at the institution's discretion. The World War II veteran, who passed away last year at the age of 95, had never been a Fox Chase patient, but had supported the institution since 1984. Another donor left a bequest for Alzheimer's disease research.

"Through their thoughtful planning, these individuals have created legacies of lasting impact for medical research, education, and patient care," says Kaiser. "We extend our gratitude and appreciation in their memory."

Want to consider including Temple Health in your estate plans? Need information about life-income gifts? Contact the Advancement Office: (215) 707-4868 or supportmed@temple.edu.



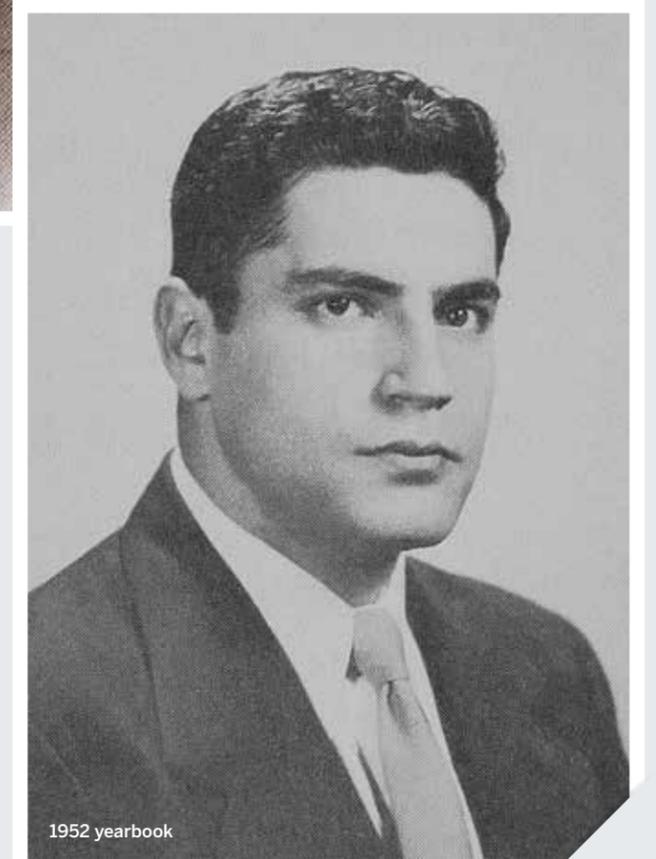
1940 yearbook

VERA JEAN GOODFRIEND

PHILADELPHIA, PA

Secondary Education

Kappa Delta Epsilon 4
Women's League 1
Mathematics Society 2, 3, 4, Secretary 4
French Club 1, 2, 3, Treasurer 3



1952 yearbook

LUCIEN L. TRIGIANO

EASTON, PA

Doctorate of Medicine

Ohio University
Babcock Surgical Society

Internship:

Conemaugh Valley Memorial Hospital
Johnstown, Pennsylvania

Artful Tributes to Two Teachers

Last spring, in two separate ceremonies, two Temple greats were honored with the presentation of their portraits to Temple University School of Medicine: Wallace Ritchie, Jr., MD, PhD, who chaired the Department of Surgery from 1984 to 1994, and Ronald Tallarida, PhD, Emeritus Professor of Pharmacology, who has taught at the School for 50 years.

Dozens of colleagues and former students congregated in Philadelphia for the events. Some added their voices to the praises sung of each honoree before their portraits were unveiled.

“To have one’s portrait commissioned means your impact has been significant,” said Larry Kaiser, MD, FACS, Dean of the School

of Medicine, who gave the introductory remarks at both events.

Michael Grabowski, MD ’90, FACS, a general surgeon, came in from Ft. Wayne, Indiana, to honor his surgical mentor, Wallace Ritchie. “I wasn’t even planning on becoming a surgeon — but after meeting Dr. Ritchie when I was a medical student, I was sold,” he said.

Another surgeon traveled from Massachusetts to honor his mentor. “I’m not sure I was Dr. Ritchie’s favorite resident, but he was most assuredly my favorite chair — and I’ve had a few,” said James Fingleton, MD ’85, FACS, Chief of Cardiovascular Surgery at Southcoast Health System.

At Tallarida’s ceremony, Mark Watson, PhD ’82, a former student and New York-based consultant, noted that had his mentor’s portrait presentation “been held on the moon, I would have made a point of being there.” Internationally regaled for his unique expertise in theoretical and quantitative pharmacology, Tallarida’s work is represented by more than 250 articles, eight textbooks, and three U.S. patents. Colleagues say that he may know more about drug interaction than anyone else on the planet. Ritchie, too, has had international influence — having led such organizations as the American Board of Surgery and the Association for Academic Surgery for many years.

While big-picture accomplishments were lauded, each man’s contributions to Temple and its students remained the focus of the day. Ritchie was credited with shepherding the development of Temple’s surgery program — presiding, for example, over the creation of its cardiac transplant program, Philadelphia’s first.

Tallarida, it was noted, educated students who are responsible for at least 20 patents, more than \$50 million in research grants, 1,000-plus scientific articles, and 30 marketed drugs. One accomplished former student spoke at the event, Leonard Jacob, MD, PhD ’75, Chair of Antares Pharmaceuticals. In 2003, Jacob created a pharmacology fellowship at Temple to honor his mentor and friend.

What’s it like to be present at such an event, to know that your likeness on canvas will be added to the pantheon of an institution’s greats? “I am overwhelmed by the gesture, the turnout, the expressions of gratitude,” said Ritchie, who came in from Minnesota for the honor. “My tenure at Temple was absolutely wonderful.”

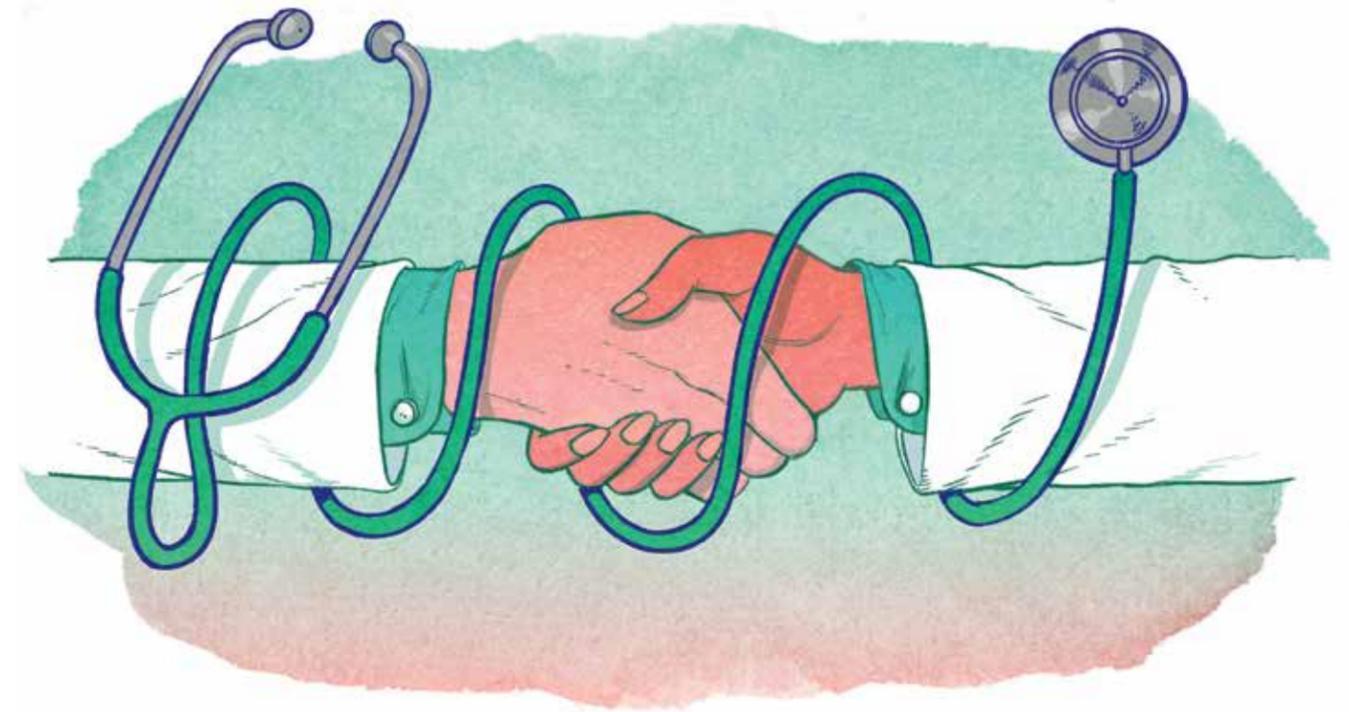
Clearly moved by his portrait ceremony, too, Tallarida reminded everyone that in 1967 he earned his PhD in pharmacology at Temple, was offered a faculty position, and never left. “I have been so very fortunate,” he said. “I keep asking myself the same question I asked nearly 50 years ago. How could a job be *this* good?”

To contribute to the Tallarida Fellowship Fund or to make a gift in honor of your favorite Temple faculty member, contact the Advancement Office: (215) 707-4868 or supportmed@temple.edu.

DANIEL BURKE



Top: Wallace Ritchie, MD, PhD, with Larry Kaiser, MD, and his portrait, painted by Joseph Routon. Bottom: Ronald Tallarida, PhD, with his portrait, painted by Ellen Cooper, a graduate of Temple’s Tyler School of Art.



Scope of Meaning

Few objects are more coveted by brand-new medical students than the stethoscope. To wear one signifies your membership in a grand profession, a profession based on the handing down of knowledge from one generation of physicians to the next. Perhaps that’s why the stethoscope that a *physician* has given to a new student is really an object of envy, doubly imbued with the meaning of “medical family.”

Kristin Sterrett, MD, remembers the stethoscope buzz all too well. “It began the very first day of medical school,” recalls the 2011 alumna of Temple medical school, an internist in Denver, Colorado. “Many of my classmates already had one. One got hers from her father, a cardiologist. Another got his from a surgeon, a family friend. And there I was, scopeless, the only one in my family to go into medicine, feeling like an unbelonger.”

With no one to embrace her in the tradition, Sterrett had no choice but to buy her own. “The acquisition felt decidedly unmagical,” she recalls.

But whether an incoming medical student knows it or not, they are already part of an extended medical family by virtue of their becoming part of Temple. And a grassroots movement from alumni, faculty, and friends aims to present them, on arrival, with a physical reminder that they are now a member of that Temple family.

KOREN SHADMI

Working with the School of Medicine’s Alumni Office, alumni like Sterrett and Alyssa Schaffer, MD ’03, now a faculty member at Temple, have taken part in a campaign to provide every first-year medical student with a stethoscope of their own. For a gift of \$250, alumni and friends (\$175 if from alumni of the last decade) can purchase a stethoscope to be presented to an incoming student at their White Coat Ceremony in August. Every stethoscope is paired with a note from the donor, letting the student know who sponsored theirs, encouraging both the student and the donor to foster a relationship that goes beyond a simple gift.

The effort has already proven wildly successful. This August, every single member of the class of 2018 received a stethoscope of their own, donated by alumni as well as by faculty and staff, with nearly unanimous participation from the school’s Board of Visitors.

“It’s a great way of letting new students know, right off the bat, that they are part of something,” says Schaffer. “And that whoever they are, there are generations of other Temple University School of Medicine physicians and friends behind them every step of the way.”

“I think we’re starting a real Temple tradition,” Schaffer says. “The students getting stethoscopes today will be the alumni giving them tomorrow.”

To learn more about this campaign, go to <http://giving.temple.edu/stethoscope> or contact the Alumni Office at (215) 707-4868 or supportmed@temple.edu.

SO NOTED

“HEALTHCARE INSTITUTIONS OF VALUE MUST OFFER THE MOST ADVANCED CARE WHILE REMAINING BED-ROCK SOURCES OF COMMUNITY SERVICE.”

—JOHN KASTANIS, FACHE
(PRESIDENT & CEO, TEMPLE
UNIVERSITY HOSPITAL)

“The good physician is culturally, not just clinically, literate.”

—AUDREY UKNIS, MD (SENIOR ASSOCIATE DEAN)

“Seemingly incompatible pursuits are possible and necessary. Modern medicine demands both innovative thinking and evidence-based routinization.”

—LARRY KAISER, MD, FACS (DEAN & CEO)

“THE MASTERY OF THE ART OF MEDICINE GOES ABOVE AND BEYOND THE MASTERY OF SCIENCE.”

—DENIS CORTESE, MD (ALUMNUS/FORMER PRESIDENT, MAYO CLINIC)

“Sadly, we have become so accustomed to gun violence in Philadelphia that we celebrate when only

247

residents a year are murdered, and when only

1,128

are shot. I’m honestly not sure what it takes to get our backs up.”

—SCOTT CHARLES
(TRAUMA OUTREACH
COORDINATOR)

“With federal research funding cuts threatening the trajectory of healthcare improvement, we must provide the highest quality scholarship, mentoring, and grantsmanship training for new investigators. No matter how the funding pendulum swings, we must be ready.”

—SUSAN FISHER, PHD, DIRECTOR,
TEMPLE CLINICAL RESEARCH
INSTITUTE

“I have been so very fortunate. I keep asking myself the same question I asked nearly 50 years ago: How could a job be this good?”

—RONALD TALLARIDA, PHD
(PROFESSOR, PHARMACOLOGY)

“WE MUST SERVE THE RICH AND THE POOR WITH EQUAL LEVELS OF SKILL AND COMPASSION.”

—SELWYN ROGERS, MD, MPH, FACS (CHAIR, DEPARTMENT OF SURGERY)

“Research has a very clear end goal: better human health. That’s what drives us.”

—ARTHUR FELDMAN, MD, PHD (EXECUTIVE DEAN & CHIEF ACADEMIC OFFICER)

98,993

Temple University
Hospital emergency
room visits last year

225

Clinical trials underway
at Fox Chase
Cancer Center

19TH

Fox Chase’s national
ranking for cancer care by
U.S. News & World Report

10

Temple and Fox Chase
specialties ranked
high performing by
U.S. News & World Report

<10%

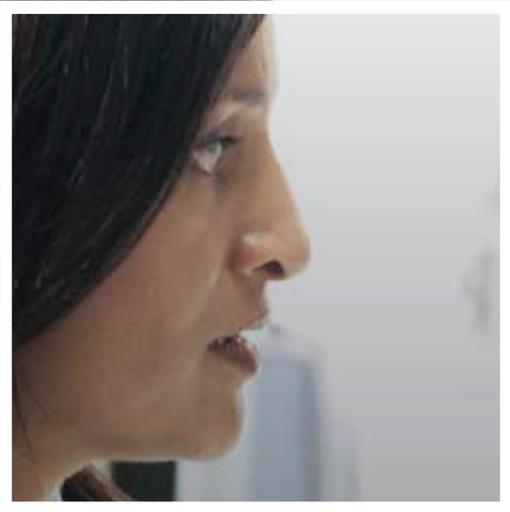
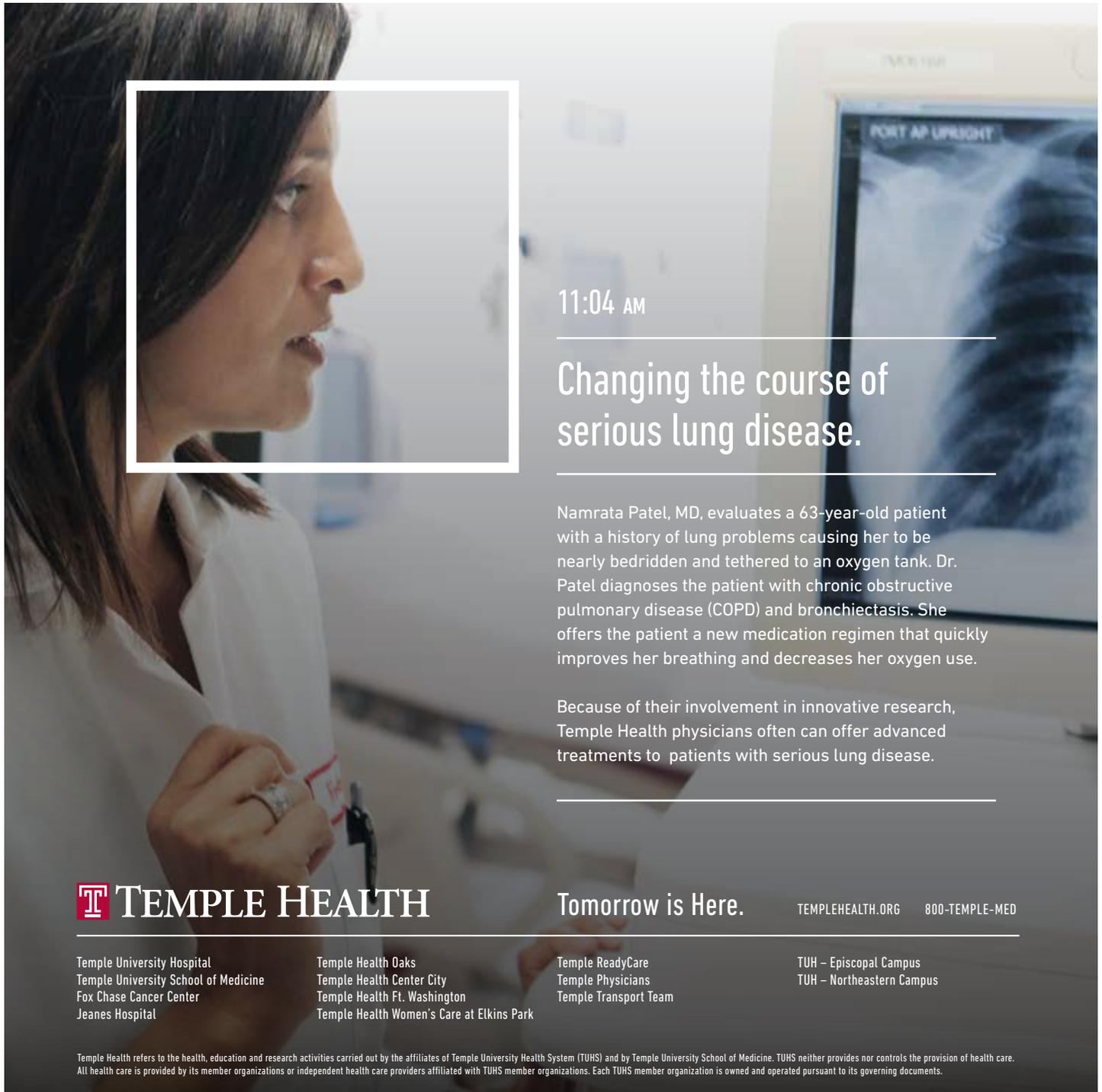
Hospitals nationwide
earn high performance
ratings from
U.S. News & World Report

ARTFUL ENDING

Shape-Shifting Engines

They are the powerhouses of the cell: the mitochondria (from the Greek *mitos*, “thread,” and *chondrion*, “granule”), shown here (in green) in both their thread-like and granular forms, surrounding the nuclei of cells (blue). Signal-processing organelles that regulate essential aspects of cellular growth and function, mitochondria are constantly shifting their shapes and roles in response to changes in the cellular environment. “We are only just beginning to decipher their complexity,” says Madesh Muniswamy, PhD, the Temple cardiovascular researcher who discovered that ongoing calcium shuttling is fundamental to mitochondrial function and that the MCU supercomplex regulates calcium influx.

MADESH MUNISWAMY, PHD



11:04 AM

Changing the course of serious lung disease.

Namrata Patel, MD, evaluates a 63-year-old patient with a history of lung problems causing her to be nearly bedridden and tethered to an oxygen tank. Dr. Patel diagnoses the patient with chronic obstructive pulmonary disease (COPD) and bronchiectasis. She offers the patient a new medication regimen that quickly improves her breathing and decreases her oxygen use.

Because of their involvement in innovative research, Temple Health physicians often can offer advanced treatments to patients with serious lung disease.

 **TEMPLE HEALTH**

Tomorrow is Here.

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Temple University Hospital
Temple University School of Medicine
Fox Chase Cancer Center
Jeanes Hospital

Temple Health Oaks
Temple Health Center City
Temple Health Ft. Washington
Temple Health Women's Care at Elkins Park

Temple ReadyCare
Temple Physicians
Temple Transport Team

TUH – Episcopal Campus
TUH – Northeastern Campus