

Lasker Award to Joan A. Steitz honors decades of achievements

Award recognizes RNA discoveries and advocacy for women who work in science

Joan A. Steitz, PhD, has received the 2018 Lasker-Koshland Special Achievement Award in Medical Science, one of the highest forms of recognition that a scientist can receive. Steitz is Sterling Professor of Molecular Biophysics and Biochemistry, and a Howard Hughes Medical Institute investigator. In announcing the award, the Albert and Mary Lasker Foundation cited Steitz's pioneering role in expanding the understanding of RNA biology and her lifelong advocacy for inclusion of women in the sciences.

Working as a postdoctoral researcher with such renowned scientists as Francis Crick, PhD, and

Sydney Brenner, PhD, at the University of Cambridge, Steitz showed how bacterial RNA binds to ribosomes and triggers the cells' protein-making machinery. Her lab at Yale discovered in the 1980s that small nuclear ribonucleoproteins (snRNPs) play a central role in splicing, a key step in the expression of genes.

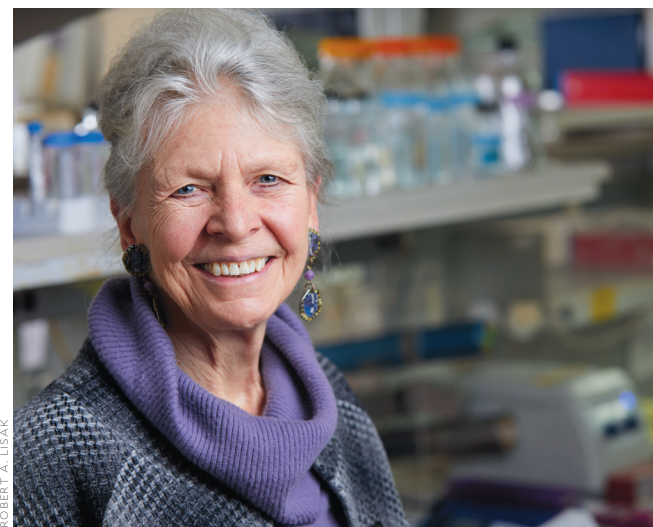
The finding helped explain the complexity of gene-based function in humans, "making the most of every gene," as she has described it. Her work also helped fuel an explosion of knowledge about the key roles played by small non-coding RNAs in a host of biological functions and disease.

"She has generated a cascade of discoveries that have illuminated wide ranging and unanticipated functions for RNA molecules within our cells," said Robert J. Alpern, MD,

dean and Ensign Professor of Medicine, at a Sept. 13 reception in Steitz's honor.

"Joan is miraculous in the way she comes up with new scientific concepts and principles that generate excitement in the field and scientists around the world," added Karla M. Neugebauer, PhD, professor of molecular biophysics and biochemistry, and of cell biology. "Joan clearly views biology as a beautiful wilderness to explore."

Yale President Peter Salovey, PhD '86, expressed the pride of the entire university. "This is such a wonderful // **Lasker Award** (page 5)



ROBERT A. LISAK

Joan Steitz, who has received numerous awards and honors since she arrived at Yale in 1970, has won her most prestigious one yet—the 2018 Lasker-Koshland Special Achievement Award in Medical Science. The honor cites her breakthrough RNA research and advocacy for women in science.

A gift to the place their daughter loved

Parents of late scientist Iva Dostanic pledge their entire estate to School of Medicine

Facing the final stages of ovarian cancer at just 35 years of age, Iva Dostanic asked her mother what the happiest day of her life had been. Without hesitation, Dragana Dostanic answered, "The day you were born."

Dragana asked her daughter the same question. "Match Day 2011—the day I matched at Yale," Iva replied.

"At the end of her life, that's what Iva thought about," says Dragana. "It shows how much she loved her work and being part of the Yale community."

Brilliant young scientist Iva Dostanic, MD, PhD, was a resident and research fellow at the School of Medicine when she succumbed to cancer in December 2011. Her parents have sought ways since then to celebrate her legacy.

"She was our only child," says her father, Predrag Dostanic. "We want



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her to be remembered for her exceptional talents and the joy she found in her work. Together we had the idea to make a gift to Yale, a place she loved, that would benefit young scientists."

To that end, Dragana and Predrag Dostanic have pledged their entire estate to Yale School of Medicine to

(l-r): Dean Robert J. Alpern welcomes Dragana and Predrag Dostanic, who have pledged to leave their full estate to the medical school in memory of their daughter Iva Dostanic, who succumbed to cancer at age 35 while a resident and research fellow.

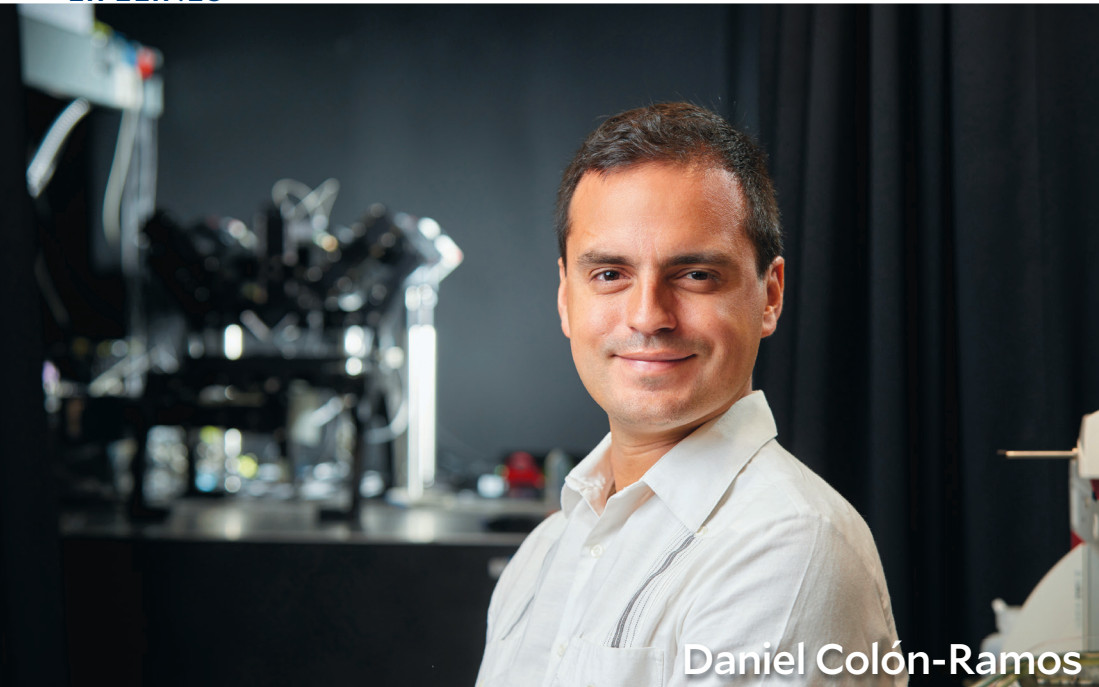
endow the Iva Dostanic, MD, PhD, Physician-Scientist Fund. The income will support physician-scientist career development, // **Estate** (page 4)

Blavatnik foundation increases gift to spur entrepreneurship

Yale University has received a new \$15 million grant from the Blavatnik Family Foundation, headed by global industrialist and philanthropist Len Blavatnik, to expand the Blavatnik Fund for Innovation at Yale. Established in 2016 with a grant of \$10 million, the Blavatnik Fund advances entrepreneurship in the life sciences at Yale and expedites the development, application, and commercialization of breakthrough research.

The added grant will build on the fund's early successes in bolstering translational research and propelling the work of investigators toward the marketplace.

The fund provides strategic resources to departments university-wide through research grants to faculty members and a fellowship program. These resources ensure that commercially relevant research can flourish and move expeditiously to commercialization and application. The fund is structured to // **Innovation** (page 8)



Daniel Colón-Ramos

Daniel Colón-Ramos works with the roundworm *C. elegans* as a means of advancing knowledge of the fundamental building blocks of the nervous system, saying that mastering the basics is essential to answering the bigger questions. He also has dedicated himself to improving opportunities for people in his native Puerto Rico.

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Of worms and a special love of home

Investigating basics of the nervous system and aiding his fellow Puerto Ricans

Daniel Colón-Ramos, PhD, associate professor of cell biology and of neuroscience, is the father of four girls—8-year-old triplets and a 2-year-old. As preschoolers, the triplets laughed when he told them he worked with worms, thinking it was joke. But Colón-Ramos has worked with *Caenorhabditis elegans*, a roundworm or nematode, for the past 15 years to uncover fundamental principles of the cell biology of the synapse (connection between neurons), and how they underpin animal behaviors.

Before studying neuroscience, in college Colón-Ramos conducted research on ethnopharmacology, specifically the use of medicinal plants by indigenous groups in Central America. In these studies, he became curious about the molecular processes behind traditional medicines, and he entered graduate school at Duke University to train in molecular and cellular biology. After earning his PhD, he decided to study the relationship between synapse formation and behavior.

Now in his lab at Yale, Colón-Ramos works with *C. elegans* to advance knowledge about the fundamental building blocks of the nervous system. “If you don’t understand [the basics], you’re not going to be able to get to the big questions,” he says.

From finding cells that promote synapse formation to identifying mechanisms responsible for neuronal communication, his early *C. elegans* work paved the way for his lab’s recent discoveries: how neurons convert sensory information into behavioral responses. His lab is

using those findings to reveal the molecular substrates of *C. elegans* memory. He hopes further discoveries will lead to memory research advances in higher-order animals.

Although Colón-Ramos works with worms, his primary interest is people. Before beginning his career, he wondered whether research science was a selfish career choice. Growing up in Puerto Rico, he attended one of the island’s best schools on a scholarship, cultivating his interest in science through research programs. Aware of his fortunate situation, Colón-Ramos says, “I had a strong sense of social responsibility, I still do, toward where I come from, toward people who haven’t had the opportunities that I’ve had.”

At first, he says, by pursuing research science, “it felt like I was entertaining an interest of mine that wasn’t going to benefit my community [in Puerto Rico]. I completely disagree with that now.”

A transformative experience came when he accepted a position at Duke in the lab of Mariano Garcia-Blanco, MD, PhD, where he studied the architecture of the cellular nucleus and how it changes during organelle biogenesis.

“Working with a Puerto Rican professor, in a sense, gave me permission to pursue my passion,” says Colón-Ramos. “I thought if this person who has my background can belong to this community of scientists, then maybe there’s a space for me too.” Garcia-Blanco also taught him that science didn’t have to be, in Colón-Ramos’s words, “a zero-sum game.” He could make fundamental contributions to science and still serve his community.

After earning his PhD in 2003, Colón-Ramos went to Stanford for his postdoctoral fellowship, studying how neurons

form circuits. There, he began a parallel career of science outreach work. In 2006, he helped launch the nonprofit website CienciaPR.org, which was created to connect Puerto Rican scientists and provide resources for all who are interested in science and Puerto Rico.

In 2008, Colón-Ramos completed his postdoctoral research and began interviewing for a faculty position. He chose Yale because, “they got who I was as a scientist, including the stuff that I do in Puerto Rico.”

While at Yale, Colón-Ramos has won recognition for his work, including the American Association for the Advancement of Science Early Career Award for Public Engagement with Science and the National Institutes of Health Landis Award for Outstanding Mentorship. The Howard Hughes Medical Institute has named him a Faculty Scholar.

He also has expanded his outreach work in Puerto Rico. In 2016, Colón-Ramos, with the late Carolyn W. Slayman, PhD, deputy dean for academic and scientific affairs, Sterling Professor of Genetics, and professor of cellular and molecular physiology, helped start an MD/PhD program between Yale and the University of Puerto Rico (UPR). Students from Puerto Rico earn their medical degrees from UPR and then attend Yale for PhD study. The partnership extends to the Yale Center for Clinical Investigation (YCCI) and the Puerto Rico Consortium for Clinical Investigation.

After 10 years at Yale, Colón-Ramos says he still benefits from the combination of academic rigor and personal support that brought him here. Through conducting research while staying involved in his community, “I found the way I want to be a scientist.”

The School of Medicine welcomes a new director of admissions

Ayaska Fernando, MS, has assumed the position of director of admissions at the School of Medicine.

Prior to arriving at the medical school on August 1, Fernando was associate director of admissions and director



Ayaska Fernando

of STEM recruitment in the Yale Office of Undergraduate Admissions (OUA), a role he had held since 2014. He had done a variety of STEM-related work since joining OUA after earning a BS in mechanical engineering from Yale College in 2008.

Fernando serves on *Yale Scientific Magazine’s* advisory board, and is a resident fellow of Jonathan Edwards

College, where he advises first-year students, many of whom are first-generation or have declared an interest in STEM.

As director of admissions, Fernando succeeds Richard A. Silverman, who retired this year after presiding over the recruitment of 19 consecutive School of Medicine classes, including the just-admitted Class of 2022.

Clinical director named for genomic health center



Michael Murray

Michael F. Murray, MD, has been appointed director for clinical operations at the Center for Genomic Health being

developed jointly by the medical school and Yale New Haven Hospital. The center is dedicated to improving patient treatment through the use of genetic analysis.

Murray will oversee the repository that extracts DNA from select patients who consent, and then catalog the information along with electronic medical records. These data also will be available to investigators, without patient identifiers, to analyze medical history as linked with genetic code.

“Researchers will be able to study very specific cohorts of patients in order to find new risk factors and potentially new treatments based on the changes in DNA that link to medical history,” says Murray.

Murray comes to Yale from Geisinger Health System in Pennsylvania, where he served as director of clinical genomics in the Genomic Medicine Institute and professor at the Geisinger Commonwealth School of Medicine.

“We are very happy to welcome Dr. Murray to our institution and excited about the collaboration with Yale New Haven Hospital to move genetic research forward,” says Robert J. Alpern, MD, dean and Ensign Professor of Medicine. “Yale School of Medicine has been a pioneer in genetics since establishing the first department of genetics in a U.S. medical school in 1972.”

Medicine@Yale

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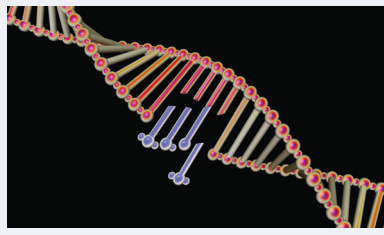
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Gene editing cures anemia in fetal mice



Researchers have used gene editing within mouse fetuses in utero to cure thalassemia, a severe form of anemia, a Yale-led study reports. Humans with thalassemia have low levels of hemoglobin, resulting in fatigue and weakness and, in the worst cases, necessitating lifetimes of blood transfusions and bone-marrow transplants.

Thalassemia stems from mutations in the genes that encode hemoglobin's component proteins, called globins. In the study, published June 26 in *Nature Communications*, the researchers injected specially designed nanoparticles into mouse fetuses to correct an engineered mutation in a gene that acts on globin.

Specifically, the researchers introduced nanoparticles containing both the correct globin DNA sequences and also peptide nucleic acids (PNAs), which mimic DNA, into thalassemic mouse fetuses in utero. When the nanoparticles entered target cells, the PNAs bound to the mutated DNA and stimulated DNA repair pathways, which used the introduced DNA sequences to correct the mutated globin genes.

Mice that received in utero nanoparticle injections had normal lifespans and hemoglobin levels. Mice in the control group, which did not receive the treatment, had lower hemoglobin levels, abnormal red blood cells, and reduced survival.

This groundbreaking work, the first report of gene editing within a fetus, was a collaboration among three Yale laboratories, and represents the PhD thesis project of Adele Ricciardi, an MD/PhD student.

Peter M. Glazer, MD, PhD, chair and Robert E. Hunter Professor of Therapeutic Radiology and professor of genetics, devised the technique of using PNAs and DNAs for gene editing. W. Mark Saltzman, PhD, Goizueta Foundation Professor of Biomedical Engineering, and professor of cellular and molecular physiology and of chemical engineering, engineered the nanoparticles for safe delivery of PNA/DNA. David H. Stitelman, MD, assistant professor of pediatric surgery, and of obstetrics, gynecology, and reproductive sciences, provided expertise on in utero intervention and fetal gene therapies.

Prenatal genetic testing can now detect genetic disorders in utero. This study suggests that, one day, doctors could cure such diseases prior to birth. "We believe this opens the door to thinking about life-prolonging treatments for fetuses during pregnancy, that involve only a single injection in utero," says Saltzman, who notes that the fragility of a fetus demands as few interventions as possible.

Microscopy yields new images and data

Yale leads the way in obtaining advanced devices that extend versatility and range of Center for Cellular and Molecular Imaging

As the technology and capabilities of microscopy continue to advance, an area within the medical school's Center for Cellular and Molecular Imaging (CCMI) is incorporating the latest types of equipment. Known for nearly two decades as the "confocal" facility, it houses microscopes that enable the visualization and imaging of fixed and living tissues that contain fluorescent probes. "More than 1,000 publications have emerged from the facility," says Michael H. Nathanson, MD, PhD, Gladys Phillips Crofoot Professor of Medicine (Digestive Diseases) and professor of cell biology, director of the Yale Liver Center, and director of CCMI. "Seventy to 80 grants cite us as an available resource at any given time." Nathanson anticipates getting even busier, as new devices that incorporate such technologies as swept field, light sheet, Airyscan, PALM/STORM, and STED 3X super resolution take their place at CCMI alongside the original confocal and multi-photon microscopes.

When confocal microscopes became widely available in the second half of the 20th century, Nathanson says, they were "fantastic," far surpassing the resolution that wide field microscopy delivered. "I'd say now we're in the middle of another revolution pushing the limits beyond what you can get just from confocal or even multi-photon microscopy."

The facility's gated (time-interval isolating) STED super-resolution instrument "allows us to see things about five times better than you theoretically can see them based on the diffraction limit," Nathanson says. A swept field device that arrived last fall incorporates confocal technology, but also "can collect images up to 500 or maybe even 1,000 frames per second with good resolution," a revelation when investigators want to follow very rapid processes involving live specimens. "We can see with high spatial resolution very transient events, even in subcellular regions."

An Airyscan device that CCMI acquired early this year offers higher resolutions than standard confocal microscopy with great ease of use. It already is popular among investigators, according to Nathanson, who anticipates that yet another 2018 acquisition—the PALM/STORM super-resolution system—will produce levels of resolution that eclipse those of the now two-year-old gated STED. That is how quickly the field is moving.

Mustafa K. Khokha, MD, associate professor of pediatrics (critical care) and of genetics, studies fundamental questions about what happens in the womb to cause heart malformations that later afflict the babies he treats in his clinical practice. His investigations in frogs focus on processes that include the function of cilia, small projections from the surfaces of certain cells whose rhythmic beating can have an important impact on fluid flow as the fetal heart takes shape. The high-resolution images of live specimens by the Bruker swept field instrument, captured at hundreds of frames per second, contain detail that was unattainable in the past.

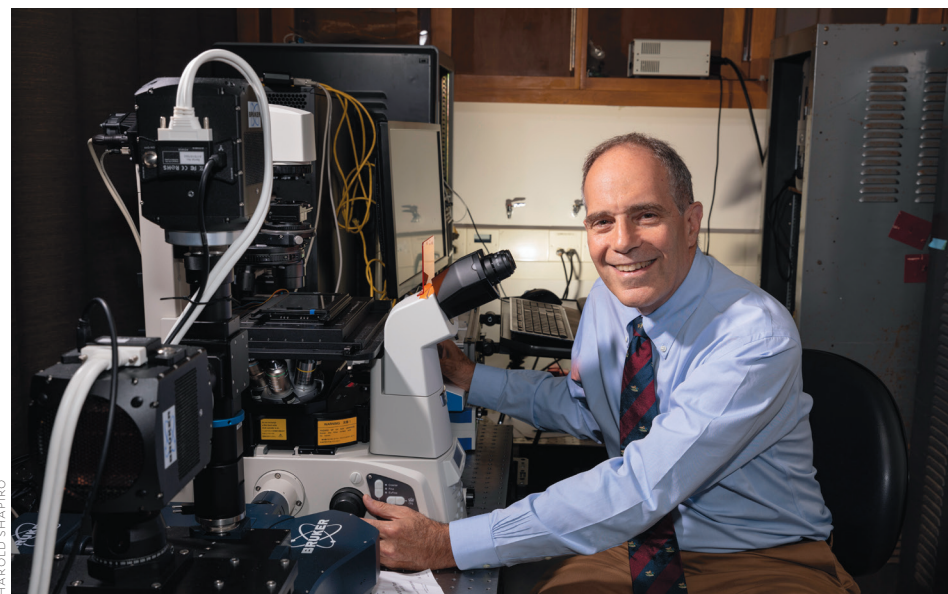
Khokha points to a monitor on his desk. "These are cilia in the frog embryo. We can watch them beating in two colors so we can see the tips. That is nothing we could do before." [See the moving image at medicineatyale.org] Cilia can form and vanish within a day, and a single formation of cilia during gestation may be the difference between a healthy heart and one that is malformed for life. "We are pushing the biology to a point that those kinds of details make a big difference," Khokha says.

Various details call for various microscopes, and Khokha uses the full array of instruments in the CCMI core. At times, he needs speed and sensitivity more than maximum resolution. Or, he may need an instrument that scans rapidly but is not designed for live imaging. Sometimes he waits to figure out the best method. "By having

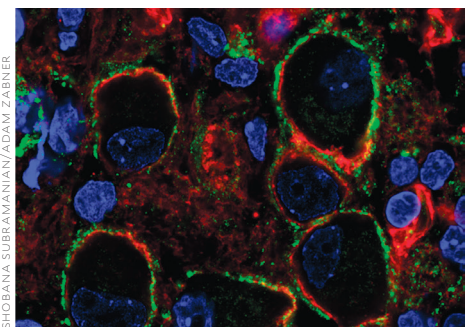
them [all] in a core, my lab can go down there and say, 'Okay, for this experiment, this might be the best scope,' and I'll take an image there," Khokha says.

Elizabeth A. Jonas, MD, professor of internal medicine (endocrinology) and of neuroscience, is preparing for a series of brain investigations at the CCMI core. They involve explaining mechanisms that govern hearing and identifying the sources of sounds, part of a larger project where, she says, "we are asking questions about how the synapse [the interface where signals are passed between neurons] is plastic. In other words, how does it change when you have to learn something."

Up until now, her lab has worked in cell culture, and already the Airyscan 880 has revealed structural detail that was unknown before. "Now, we can see how actin and synaptic vesicles are really positioned in the synapse," Jonas says. "Before, it was just a bunch of fuzz." Jonas anticipates being able to do high-resolution imaging deep within brain slices, and in structures like the basal ganglia that sit in the center of the brain and are not on the top layer or the cortical tissue. "We want to be able to image those deep layers in live animals with dyes or fluorescent markers," Jonas says.



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SHOBANA SUBRAMANIAN/ADAM ZABNER

Above: Michael Nathanson, director of CCMI, at the core facility's recently acquired Airyscan 800 microscope.

Left: The medial nucleus of the trapézoid body of the mammalian brain stem, as captured on an Airyscan 800 by members of a research team led by Elizabeth Jonas.

The vivid images that Yale investigators are starting to see are the products of advanced software, laser technology, high-speed cameras, and massive amounts of data that these microscopes generate and process, according to Joerg Bewersdorf, PhD, professor of cell biology and of biomedical engineering, and one of the world's leading experts in microscope development. Seeing exquisite images, so long the Holy Grail of investigators, is now "just the first step," he says. The data have value far beyond creating the images themselves, essential as the images are, he explains. "Modern biological research has shifted away from pure description or showing an example image. People expect statistics now—quantification." Each, he says, is also a check on the other. A high-resolution image might contradict poorly analyzed or incomplete data, and solid data might show that an image is aberrant.

At the same time, Yale is moving into an emerging field called correlative microscopy, which combines big datasets derived from microscopes that visualize specimens in vastly different ways, in order to bridge inherent knowledge gaps among the varied methods. The timing for that move is exquisite, says Bewersdorf, with Yale's acquisition last year of the Titan Krios cryo-electron microscope representing one set of techniques, and now the CCMI core's advances in the other. "We are in an excellent position now," says Bewersdorf, "because we have instruments from both sides, the latest and greatest to bring these together. You will not find a lot of facilities with this number of high-end instruments at one location."

OUT & ABOUT

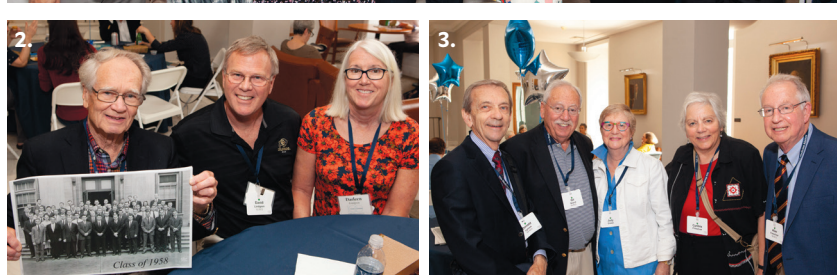
March 16 At the inaugural **Jonathan Lewis MD, PhD, Lectureship on Caring in Medicine**, keynote speaker **Sir Murray F. Brennan, MD**, (right) surgery chair at Memorial Sloan Kettering Cancer Center from 1985 to 2006, reminded attendees of the importance of caring for staff and each other, in addition to patient care.

Nita Ahuja, MD, MBA, (left) chair and William H. Carmalt Professor of Surgery, hosted the lecture and a dinner the day before.

Jonathan J. Lewis, HS '92, MD, PhD, (center, holding photo of his class of residents) established the lectureship in honor of his experiences as chief surgery resident during residency at Yale.



BRIAN ARNOLD



June 1 & 2 More than 150 School of Medicine alumni registered for **Reunion** events held through the weekend.

1. 20th reunion classmates gathered in the dinner tent on Friday night. From left, **Jeong Yoon, MD '98; Naomi Donnelly, MD '98; Ashley Wivel, MD '98;** Dean **Robert J. Alpern, MD**, Ensign Professor of Medicine; **Marjory Alabre, MD '98; Naomi Botkin, MD '98;** and **Steven Jacoby, MD '98.**

2. From left, **Donald Duncan MD '58; David Lindgren, MD '83**, and his wife, Darleen Lindgren, with a Class of 1958 photo. **3.** On a break from activities, from left, **Donald Lyman, MD '68; Gil Grand, MD '68**, and his wife, Judy Grand; and Cynthia Finesilver with her husband, **Alan Finesilver, MD '68.** **4.** An alumni panel on career transitions featured, from left, **Harold P. Kaplan, MD '63, Harold Mancusi-Ungaro Jr., MD '73, Judith A. Melin, MD '83**, and moderator **Robert G. "Rob" Greenly, MBA '83.**



HAROLD SHAPIRO (4)

April 28 At **Neuroscience 2018: Envisioning a Future of Recovery**, a Department of Psychiatry symposium, New York-based writer, director, and composer **Paul Dadio** (center) received the department's Mental Health Research Advocacy Award from psychiatry department chair **John H. Krystal, MD**, Robert L. McNeil, Jr. Professor of Translational Research and professor of psychiatry and of neuroscience, (third from right) for his work on destigmatizing mental illness, including the 2015 film *Touched with Fire*. Symposium speakers were, from left, **Michael D. Holmes**, senior vice president for operations and chief integration officer for the Saint Raphael Campus at Yale New Haven Hospital; **Rajita Sinha, PhD**, Foundations Fund Professor of Psychiatry and professor in the Child Study Center and of neuroscience; **Hilary Blumberg, MD**, John and Hope Furth Professor of Psychiatric Neuroscience and professor of psychiatry, and



CHRISTOPHER GARDNER

in the Child Study Center and of radiology and biomedical imaging; from right, **Godfrey Pearlson, MBBS**, professor of psychiatry and of neuroscience, and **Christopher Pittenger, MD, PhD**, associate professor of psychiatry.



May 7 Participants in the **Aim for Sight** fundraiser and auction event, held at New York's Ten Mile River Preserve in Dover Plains, tried their hand at sporting clays. Proceeds directly benefited research funds at the Yale Eye Center.



KATHY OLSON (2)

1. From left, **Elliott Tuckel, Kathy Olsen, Charles Chiusano, and David Kalman**, all members of the center's advisory board, welcome attendees at the start of the event. **2.** From left, **Lucian V. Del Priore, MD, PhD**, chair and Robert R. Young Professor of Ophthalmology and Visual Science; **Rocco Cingari**, Yale Eye Center Advisory Board chair; and **Marvin Sears, MD**, former department chair and professor emeritus of ophthalmology and visual science.

May 10 At a dinner in Hartford, the World Affairs Council of Connecticut presented its **2018 Luminary Award** to Yale Cancer Center (YCC) for its global leadership in cancer research and innovation. **Charles S. Fuchs, MD, MPH**, Richard Sackler and Jonathan Sackler Professor of Medicine (Medical Oncology) and director of YCC, accepted the award.



J. FIERECK

// **Estate** (page 1) and will continue to fund the annual Iva Dostanic, MD, PhD, Physician-Scientist Trainee Award and Lecture, which the Department of Internal Medicine initiated in 2011, and the Dostanics began supporting financially in 2015.

"It is very moving that Iva formed such a deep commitment to Yale in her short time with us," says Robert J. Alpern, MD, dean and Ensign Professor of Medicine. "We are most appreciative that her parents have honored us with this generous gift in her memory."

Born in Belgrade, in what then was Yugoslavia, Iva grew up in a family that prized education. Her mother is a pulmonologist; her father, an engineer and business executive. As a child Iva often accompanied Dragana to the hospital. "Watching her mother at work in her white coat, Iva was inspired to become a physician too," Predrag recalls.

The family relocated first to Vienna, then to Athens, where Iva thrived in American international



Iva Dostanic

schools and decided to attend college in the United States. She earned her undergraduate degree with high honors from Manhattanville College, then pursued a PhD at the University of Cincinnati College of Medicine, where she did pioneering work using what were then new methods of gene manipulation to examine pulmonary hypertension. She co-authored 12 papers, five as a lead author with more than 100 citations each—an outstanding achievement for any researcher, let alone a graduate student.

Iva earned her PhD in molecular genetics, microbiology, and genetics, then pursued her dream of becoming a physician. Her parents relocated to the U.S. to be closer to her. Iva graduated from the Cleveland Lerner College of Medicine of Case Western Reserve in 2011. This five-year

program combines medicine with a year of research.

Highly recruited, with many residency options on the table, she was accepted to Yale's Physician-Scientist Pathway, with a fellowship in pulmonary and critical care medicine. Overseeing this track was Peter S. Aronson, MD, C.N.H. Long Professor of Medicine (Nephrology) and professor of cellular and molecular physiology.

"Beyond Iva's considerable intellectual gifts, she had wonderful personal qualities. She was charismatic, positive, and enthusiastic," says Aronson. "As an already fully formed scientist with a strong track record, she could have gone straight to a faculty position, but she wanted to be a physician."

Iva was diagnosed with cancer in May 2011, and deferred her residency to undergo surgery and chemotherapy. After her treatment she came to New Haven to begin her research training. "Every day she woke up early, caught up on her reading, ran

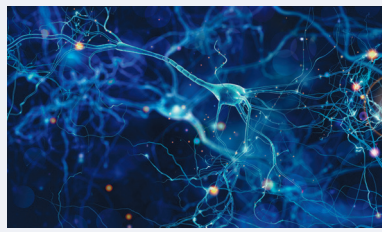
a few miles, then spent hours in the lab," notes Dragana. "This was the life she wanted."

Unfortunately, Iva's cancer returned and her condition deteriorated. A few weeks before she died, she received the very first Iva Dostanic, MD, PhD, Physician-Scientist Trainee Award in a ceremony held in her room at Yale New Haven Hospital.

"We conceived of this award in Iva's name to celebrate her intelligence, creativity, work ethic, and passion," explains Aronson. "These qualities personify the ideals of the physician-scientist. Her parents' gift will have a tremendous impact, allowing us to follow through on a key mission: training physician-scientists and enabling them to flourish as faculty."

"Iva chose Yale for its academic excellence and sense of community," says Predrag. "She is remembered and celebrated here and became part of the Yale family. And through her, we became part of that family too. We are very grateful."

Re-connecting nerves after injury



Deleting a single gene in mice lets nerve cells regenerate their spindly arms—called axons—after injury, Yale researchers have discovered. In spinal cord injuries, nerve cells often remain alive but dysfunctional because of axon damage, and it is hoped that spurring the body to repair those axons can re-establish the transmission of nerve impulses through the body.

A team led by Stephen M. Strittmatter, MD, PhD, Vincent Coates Professor of Neurology and professor of neuroscience, set out to determine which of more than 16,000 mouse genes were linked to axon regrowth. They screened the mouse genome and then found, *in vitro*, an apparent ability to influence axonal growth in approximately 500 genes.

In the gene *Rab27b*, known to transport proteins within cells, they found a significant effect both *in vitro* and *in vivo*. When the team deleted *Rab27* from mice, both cortical and optic nerve cells showed themselves to be especially effective at axonal regeneration after multiple types of trauma and injury.

The finding, published on April 10 in *Cell Reports*, could point toward novel ways of treating human spinal cord injuries.

Smooth muscle cells help to form plaque

When fats, immune cells, connective tissue, and debris build up inside the arteries—forming atherosclerotic plaques—they boost a person's risk of heart attack or stroke. Now, researchers led by Daniel Greif, MD, associate professor of medicine and genetics, have followed the role of smooth muscle cells in forming those plaques.

While multiple smooth muscle cell progenitors give rise to arterial walls during development, the researchers determined in mouse models that rare smooth muscle cell progenitors contribute to plaques. Greif's team found that these "cap cells" made their way to the center of a plaque and altered the nature of the surrounding environment, encouraging inflammation and further plaque growth.

The full chain of events, which the researchers described on May 25 in *Nature Communications*, can initially depend on the presence of a gene known as integrin beta3 (*Itgb3*). When mice lacked *Itgb3*, smooth muscle cells were found to be more likely to move aggressively into plaques.

The research points toward the smooth muscle cell-derived cap cells, and integrin beta3, as potential targets for atherosclerosis therapy that warrant "intense investigation."

Cancer center receives two-pronged gift

Donors are supporting center's new immunology effort while adding to their ongoing commitment to its art therapy program

Christine N. Moog, MFA '03, and her husband Benoit Helluy have experienced cancer's devastation firsthand. "My father died from cancer many years ago," says Moog. "Watching him fight this disease was very difficult."

"I recently lost a good friend to a brain malignancy. He left behind two daughters roughly the same age as our own daughters," adds Helluy. "That hit close to home. Sadly, cancer affects everybody."

With a shared interest in improving the lives of those with cancer, Moog and Helluy have made a generous gift to Yale Cancer Center. Half of their donation will fund research in immunotherapy via the newly launched Yale Center for Immuno-Oncology. The other half supports an art therapy program for cancer patients and families, which was created through a gift the couple made four years ago.

Immunotherapy for cancer treatment—activating the body's own defenses to attack tumors—has emerged as one of the most promising new treatment approaches in decades. The center will focus on developing the next generation of immune-based cancer therapies, with a goal of more quickly transforming discoveries into lifesaving clinical care. Researchers will seek answers to many perplexing questions, including why immunotherapy is effective in some patients, but not in others with the same cancer. Another challenge is identifying patients who will be more likely to respond, and how to overcome resistance.

"We are so grateful to Christine and Benoit for this generous gift," says Charles S. Fuchs, MD, MPH, Richard Sackler and Jonathan Sackler Professor of Medicine (Medical Oncology) and director of Yale Cancer Center. "Their vision will be instrumental in launching the center and supporting the initiatives of its new director."

Moog's father was very interested in the genetics of cancer. "When he was ill he would have tried anything, any cutting-edge therapy, to get well," she says. "Unfortunately he was too early for immuno-oncology. By supporting immunotherapy research I feel I am continuing his legacy." She says she turned to Yale because of its commitment to excellence on all fronts.

The couple's enthusiastic support for the Cancer Center's art therapy program also has very personal origins for Moog, who once considered becoming an art therapist herself before establishing a career as a graphic designer and professor at New York's Parsons School of Design. "I've worked with children who've suffered abuse and was overwhelmed by the emotions that came out in their artwork," she observes. "This side of illness is pretty much

ignored by our culture. I remember my father's physician saying there's plenty of funding for science and technology, but the psychological and emotional aspects of cancer need to be supported too."

Under the direction of Jennifer M. Kapo, MD, associate professor of medicine (geriatrics) and chief of palliative medicine, the art therapy program helps cancer patients and families cope with grief, fear, and anxiety. Guided by art therapist Elizabeth Ferguson, families create art using paint, pencils, pastels, markers, and other media and materials to express feelings for a loved one who is ill.

"Art therapy offers another caring relationship in a multidisciplinary approach to treatment," explains Ferguson. "It supports patients' and families' emotional health, a huge component of grappling with serious illness."



Christine Moog and Benoit Helluy are supporting the new Yale Center for Immuno-Oncology and Yale Cancer Center's art therapy program. They see their gift as a way both to propel the science in an area where exciting new cancer treatments appear ready to emerge, and to make battling cancer a less-stressful challenge for patients and their loved ones.

"This donation allows us to add a part-time art therapist to our staff and extend the number of hours that we are able to provide art therapy," says Kapo. "We can now offer these services in the evening and on weekends, peak times when children visit." Currently art therapy is available just for cancer patients, but Kapo hopes to extend it to patients with other serious illnesses, saying, "As a component of palliative care, it's appropriate for any serious, life-threatening disease." She adds that the medical team has embraced the art therapy program as a powerful way to bring families together at a time of great stress.

The art therapy program also nurtures the nurturers. "We've opened the art studios to nurses, doctors, social workers, and other members of the care team," says Kapo. "With art therapy they find support for the emotional challenges of treating the very sick."

"While art therapy and immunotherapy are worlds apart, what they share is a focus on care that's tailored to the individual," notes Moog. "There is a strong connection between mind and body, and with this gift we're addressing both."

// **Lasker Award** (page 1) accolade," he said. "You bring glory, of course to you and your lab and your students from across the decades, but for me anyway, you bring glory to our university and to each of us within it."

Steitz, in turn, praised the university, whose faculty she joined in 1970. "Good science or great science does not happen in a vacuum. It happens in an environment where one has colleagues, where one has supporters, where one has super trainees in one's lab. And that's really what Yale has provided for me for over four decades. And it's quite remarkable." So, she added, is Yale's sense of collegiality. "What's special about Yale is that people are working together and discovering things together, and not competing with each other or competing with the guy next door. So basically, what I really want to say is it's because of all of you that I find myself in this very nice situation."

Steitz has amassed dozens of awards and honors including the National Medal of Science in 1986; election to the National Academy of Sciences in 1983, and the Institute of Medicine (now the National Academy of Medicine) in 2005; fellowships in the National Association for the Advancement of Science in 1981 and the American Academy of Microbiology in 1992; and the American Society for Cell Biology's highest honor, the E.B. Wilson Medal, in 2005.

Throughout her career, Steitz has advocated for inclusion of more women in the sciences. She co-authored a 2006 report for the National Academy of Sciences outlining barriers to the participation of women in sciences. For a decade she also led the Jane Coffin Childs Fund, which grants postdoctoral fellowships to early career researchers. At Yale, she has mentored young scientists, a number of them women,

serving as a role model for their successful careers.

"[Joan] has campaigned for full inclusion of all members of the scientific community," noted Alpern, "fueled by the conviction that reaching this goal is necessary to ensure a robust and innovative scientific enterprise."

Johanna Withers, PhD, is one of many women who have done postdoctoral work in the Steitz Lab. "As mentees," said Withers, "our development is a direct result of the scientific training environment that Joan has created in her lab. And she promotes our career plans, not hers. And she enables each of us to achieve our professional career goals by implementing and mentoring each of us specifically to our own needs. And she values each of us as a scientist and as a person.

"Thank you, Joan," added Withers, reflecting the spirit of the entire community, "for being such an amazing and inspiring scientist."

Grants and contracts awarded to Yale School of Medicine

July 2017–August 2017

Federal

Chadi Abdallah, NIH, *Glial and Synaptic Functions in Major Depression*, 4.8 years, \$2,493,228 • **Thomas Adams**, NIH, *Enhancement of Extinction Learning Using Transcranial Direct Current Stimulation*, 5.1 years, \$942,402 • **Frederick Altice**, NIH, *Expanding Medication Assisted Therapy in Ukraine (ExMAT)*, 4.9 years, \$3,406,373 • **Sara Blaine**, NIH, *Modal Neuroimaging of Alcohol Cues, Cortisol Response, and Compulsive Motivation*, 2 years, \$147,830 • **Hilary Blumberg**, NIH, *Brain Emotion Circuitry—Targeted Self-Monitoring and Regulation Therapy (BE-SMART)*, 1.9 years, \$1,503,035 • **Hal Blumenfeld**, NIH, *Neuroimaging, Neuronal Firing, and Behavior in Spike-Wave Seizures*, 4.9 years, \$1,898,113 • **Angelique Bordey**, DoD, *Filamin A Contribution to NF1 Social Deficits*, 2 years, \$167,422 • **Alfred Bothwell**, NIH, *Regulation of Pulmonary Inflammation in Asthma by Wnt Antagonist DKK1*, 2 years, \$460,625; NIH, *Thrombocyte Regulation of Anti-Parasite Immunity*, 2 years, \$418,750 • **Cynthia Brandt**, **Michael Krauthammer**, NIH, *Biomedical Informatics and Data Science Training at Yale*, 5 years, \$3,087,723 • **Christopher Burd**, NIH, *Sorting and Trafficking in the Endosomal System*, 5 years, \$2,022,995 • **Jessica Cardin**, **Michael Higley**, NIH, *Role of GABAergic Interneurons in Developmental Dysregulation of Cortical Function*, 4.8 years, \$2,077,214 • **Kelly Cosgrove**, **Robert Pietrzak**, NIH, *Imaging Microglial Activation in PTSD with PET*, 4.8 years, \$3,872,704 • **Andrew Dewan**, **Xiaomei Ma**, NIH, *Identification of microRNA Variants Associated with Acute Lymphoblastic Leukemia*, 2 years, \$167,500 • **Deepak D'Souza**, NIH, *Effects of Cannabis Exposure on Electrophysiological Markers of Brain Function in Adolescents*, 2 years, \$396,165 • **Vince Faustino**, **Philip Spinella**, NIH, *Prevention of Central Venous Catheter-Associated Thrombosis in Critically Ill Children*, 2 years, \$493,724 • **Lauren Ferrante**, NIH, *The PREDICT Study (PRE-ICU Determinants of Post-ICU Functional Outcomes among Older Adults)*, 4.8 years, \$1,151,611 • **Erol Fikrig**, NIH, *The Role of Tick Gut Microbiota in Borrelia burgdorferi Transmission to Mice*, 4 years, \$1,651,375 • **Patrick Gallagher**, NIH, *Regulation of Erythrocyte Volume Homeostasis*, 3.8 years, \$1,673,188 • **Wendy Gilbert**, NIH, *Regulation and Function of snoRNA Genes*, 1.1 years, \$318,590; NIH, *Ribosome Specialization and Regulation*, 1 year, \$72,635 • **Peter Glazer**, NIH, *Novel DNA Repair Inhibitors for Cancer Therapy*, 7 years, \$6,803,292 • **Fred Gorelick**, NIH, *Training Program in Investigative Gastroenterology*, 5 years, \$1,451,574 • **Seth Guller**, **Vikki Abrahams**, NIH, *Role of Hofbauer Cells in Fetal Infection/Inflammation*, 5 years, \$2,069,085 • **David Hafler**, NIH, *Yale Clinical Neuroscientist Training Program*, 5 years, \$222,506 • **David Hafler**, **Ana Anderson**, NIH, *Costimulatory Mechanisms of Autoimmunity*, 5 years, \$5,212,451 • **Jeanne Hendrickson**, NIH, *Responsiveness and Non-responsiveness to Transfused RBCs in Mice and Humans*, 3.8 years, \$1,675,000 • **Marissa Holmbeck**, **Jun Lu**, NIH, *The Role of Mitochondrial Localized Ago2 and miRNAs in Regulating Mitochondrial Function and Aging*, 3 years, \$180,326 • **Kevin Kim**, DoD, *Improving Immunotherapy: Boosting Immune Response and Functional Immune Cell Imaging*, 2 years, \$482,785 • **Steven Kleinstein**, NIH, *Semantic Integration of ImmPort and the Linked Data Cloud for Systems Vaccinology*, 2 years, \$460,625 • **Hedy Kober**, NIH, *Regulation of Craving Under Stress: Neural Mechanisms and Novel Model*, 4.9 years, \$3,164,132 • **David Kovacevic**, NIH, *Inflammation in Rotator Cuff Tear and Repair*, 2 years, \$820,265 • **Patty Lee**, NIH, *TLR4-mediated Epigenetic and Senescence Mechanisms in Emphysema*, 3.8 years, \$1,675,000 • **Becca Levy**, NIH, *Culture-Gene Relationship: A Novel Model of Aging Cognitive Health*, 3.9 years, \$1,675,000 • **Chiang-Shan Li**, NIH, *Aging and Cerebral Regulation of Physiological Responses to Social Emotions*, 1.7 years, \$397,200 • **Brett Lindenbach**, NIH, *The 24th International Symposium on Hepatitis C Virus and Related Viruses*, 1 year, \$5,000; NIH, *Hepatitis C Virus Genome Structure: Dynamic Roles in Replication and Infectivity*, 4 years, \$592,104 • **Jun Lu**, DoD, *The Impact of Somatic Hematopoietic Mutations on Melanoma Tumorigenesis*, 2 years, \$670,000 • **Shuangge Ma**, NIH, *Assisted Network-based Analysis of Cancer Gene Expression Studies*, 2 years, \$167,500 • **Bernadette Marquez-Nostra**, NIH, *Imaging for Assessment and Prediction of Response to Therapy in Triple Negative Breast Cancer*, 3 years, \$821,067 • **Jaimie Meyer**, **Frederick Altice**, NIH, *Prisons, Drug Injection and the*

HIV Risk Environment, 2 years, \$348,294 • **Nelli Mnatsakanyan**, NIH, *Molecular Components of the Mitochondrial Permeability Transition Pore and its Role in Neurodegenerative Diseases*, 4.7 years, \$638,955 • **Garrett Neske**, NIH, *Cortical and Neuromodulatory Mechanisms of State-dependent Visual Detection*, 3 years, \$180,807 • **Linda Niccolai**, NIH, *Effectiveness of HPV Vaccine by Age at Immunization as Used in Clinical Practice*, 4 years, \$1,778,103 • **Marina Picciotto**, NIH, *Cholinergic Contribution to Circuits Underlying Depression*, 4.8 years, \$2,093,750 • **Manoj Pillai**, **Alexander Minella**, NIH, *Deregulation of SF3B1 Function by Recurrent HEAT Domain Mutations*, 3.8 years, \$1,675,000 • **David Pitt**, NIH, *Detection, Characterization and Treatment of Chronic Microglial Inflammation in Established MS Lesions*, 4.8 years, \$1,928,641 • **Jordan Pober**, **W. Mark Saltzman**, **George Tellides**, NIH, *Ex Vivo Nanoparticle Drug Delivery Targeted to Human Renal Allograft Endothelium*, 5 years, \$2,093,748 • **Marc Potenza**, **Stephanie O'Malley**, NIH, *Clinician Scientist Training Program (CSTP)*, 5 years, \$2,749,929 • **Yusuf Ransome**, NIH, *Social Capital and Late HIV Diagnosis in the United States*, 4.8 years, \$732,368 • **Eric Rosenberg**, NIH, *Elucidating the Role of the CXCL13/CXCR5 Signaling Axis in Angioimmunoblastic T-Cell Lymphoma (AITL)*, 3 years, \$87,225 • **Craig Roy**, NIH, *Genetic Analysis of Legionella Phagosome Trafficking*, 5 years, \$2,720,845 • **Albert Shaw**, **Insoo Kang**, NIH, *The Impact of Aging and HIV Infection on Immunologic and Transcriptomic Signatures of Influenza Vaccine response*, 4.7 years, \$4,041,990 • **Patrick Sung**, NIH, *Genome Maintenance via the BRCA-PALB2 Tumor Suppressor Network*, 5 years, \$2,071,931 • **Susumu Tomita**, NIH, *Develop and Validate Novel Chemogenetic Tools to Modulate Synaptic Transmission*, 3 years, \$1,256,250 • **Patrick Worhunsky**, NIH, *Investigation of Neurofunctional Reorganization in Cocaine Addiction Using mGluR5 PET and fMRI*, 5 years, \$900,223 • **Heping Zhang**, NSF, *Collaborative Research: Scalable and Flexible Algorithms to Detect Structural Change in Complex Sequencing Data*, 3 years, \$166,251 • **Yongli Zhang**, NIH, *Common Role of Sec1p/Munc18 Proteins in SNARE Assembly and Membrane Fusion*, 3.7 years, \$1,406,209

Non-federal

Khalid Abbed, AO Spine North America, *AO Spine Fellowship - Neurosurgery 2017/2018 and 2018/2019*, 2 years, \$150,000 • **Kerin Adelson**, Genentech, *Development of "My PATHway," A Shared-Decision Making Interactive Clinical Pathway for Patients with Early Stage Breast Cancer and Their Physicians*, 1 year, \$401,064 • **Jean Adnopo**, Connecticut Children's Medical Center (DHHS), *Ryan White Part D: HRSA-17-039*, 3 years, \$296,552; AREA Cooperative Educational Services, *ACES Service Agreement*, 1.5 years, \$9,000 • **Farhan Ali**, Alzheimer's Association, *Memory Deficits in Alzheimer's Disease: in Vivo Frontal Cortical Mechanisms*, 3 years, \$174,985 • **Frederick Altice**, Merck & Company, *Modeling HCV/HIV Transmission and Treatment as Prevention in U.S. Networks of People Who Inject Drugs*, 2 years, \$143,735; University of Connecticut (NIH), *Connecting People, Places and Barriers: The Effect of these Connections on Adherence and Retention in Care for HIV Infected Drug Users*, 1 year, \$30,709 • **Marc Auerebach**, R Baby Foundation, *Mobile Pediatric Simulation: ImPACTS. "Train the Trainers,"* 1.4 years, \$175,000 • **Dorothy Baker**, State of Conn. Dept. on Aging, *Connecticut Collaboration for Fall Prevention Contract*, 2 years, \$752,046 • **Chyrell Bellamy**, The Connection, *CREST*, 1 year, \$26,729; The Connection, *Park Street Inn*, 1 year, \$27,757 • **Marc Brackett**, Boys & Girls Clubs of America, *Social Emotional Development (SED) Across the Club Day Model*, 2 years, \$35,000 • **Linda Cantley**, Stanford University (NIH), *Disease, Disability and Death in an Aging Workforce*, 1.8 years, \$354,613 • **Laurie Cardona-Wolenski**, **Michele Goyette-Ewing**, Department of Children & Families-State of Conn., *DCF Psychology Training*, 2 years, \$100,000 • **Richard Carson**, Research Foundation of (SUNY) State University of New York (NIH), *Neurobiological Correlates of Auditory Processing in Health and Disease: An RDoC Study*, 1 year, \$499,041 • **Michael Cecchini**, Conquer Cancer Foundation, *A Mutational Signature as a Biomarker for Response to Olaparib and Ramucirumab for Metastatic Gastric Cancer*, 1.5 years, \$50,000 • **Raja Chakraborty**, American Heart Association, *Role of CBP and p300 in Smooth Muscle Cell Plasticity*, 2 years,

\$106,532 • **Sidi Chen**, American Association for Cancer Research, *Versatile Tools for Autochthonous Screening in Liver Cancer*, 3 years, \$450,000; Cancer Research Institute, *Systematic Identification of Druggable Targets for Enhancement of PD-1 Checkpoint Blockade Therapy in Melanoma*, 2 years, \$200,000; The Mary Kay Foundation (formerly the Mary Kay Ash Charitable Foundation), *Identifying Novel Non-Coding Biomarkers for Ovarian Cancer Metastasis*, 2 years, \$100,000 • **Sunny Chung**, Howard Hughes Medical Institute, *Renelase and its Role in the Pathogenesis of Pancreatitis*, 1.9 years, \$38,000 • **Joseph Contessa**, New England Discovery Partners, (NIH), *Targeting STT3A and STT3B to Block Flavivirus Replication*, 1 year, \$90,117 • **Neera Dahl**, CKDopps, *Chronic Kidney Disease Outcomes and Practice Patterns Study*, 1 year, \$57,045 • **James Daley**, Society for Academic Emergency Medicine, *Using Focused Bedside Echocardiography to Evaluate for PE in the Unstable Patient*, 1 year, \$10,000 • **William Damsky**, Dermatology Foundation, *Modeling Immune Checkpoint Inhibitor Therapy in Mice to Optimize Treatment Strategies in Melanoma*, 1 year, \$30,000 • **Alan Dardik**, Society for Vascular Surgery, *The Role of TGF-Beta in Arteriovenous Fistula Maturation and its Implications for Sex-Specific Patient Outcomes*, 2 months, \$3,000 • **Larry Davidson**, State of Conn. Dept. of Mental Health and Addiction Services (SAMHSA), *Connecticut's Targeted Response to the Opioid Crisis*, 1.8 years, \$400,000; State of Conn. Dept. of Mental Health and Addiction Services (SAMHSA), *Connecticut's Targeted Response to the Opioid Crisis - Evaluation of Initiatives*, 1.8 years, \$243,653 • **J. Lucian (Luke) Davis**, Regents University of California, San Francisco (NIH), *Sputum Transcriptomic Expression Profiling in Study 31: Express 31*, 5 years, \$35,904 • **Pietro De Camilli**, Michael J. Fox Foundation for Parkinson's Research, *Role of VPS13C in Parkinson's Disease*, 1 year, \$100,000 • **Nihar Desai**, American College of Cardiology, *Reducing Readmissions after AMI and HF: Determining How and Deciding if it Matters*, 1 year, \$70,000 • **Madhav Dhodapkar**, Multiple Myeloma Research Foundation, *Role of Lipid-mediated Inflammation in Myelomagenesis*, 8 months, \$250,000 • **Eamon Duffy**, American Society of Hematology, *The American Society of Hematology: HONORS Award*, 1 year, \$5,000 • **Marie Egan**, Cystic Fibrosis Foundation (CFF), *Cystic Fibrosis Center*, 1 year, \$72,486 • **Tore Eid**, Citizens United for Research in Epilepsy, *Role of Gut Microbiota in Epilepsy*, 1.5 years, \$50,000; Radiological Society of North America, *Do In Vivo Synaptic Density Changes in the Glutamine Synthetase Inhibition Model of Epilepsy in Rats Mirror Those Seen in Living Human Epilepsy Patients Using the Novel SV2A PET Tracer C11-UCB-?J*, 2 years, \$50,000 • **Stephanie Eisenbarth**, Food Allergy Research & Education, *Role of Dock8 in Maintaining Tolerance to Food Antigens*, 3 years, \$450,000 • **John Encandela**, Association of American Medical Colleges, *Strategy for Assessing Need and Developing a Topical Curricular Thread Addressing Sexual and Gender Minority Health*, 1.4 years, \$3,000 • **Carrie Epstein**, Royal Children's Hospital Melbourne, *RCH Telephone Consultation Agreement*, 2.1 years, \$9,200 • **Lauren Ferrante**, Parker B. Francis Foundation, *Prediction of Post-ICU Disability Among Critically Ill Older Adults*, 1 month, \$156,000 • **Lynn Fiellin**, Schell Games (NIH), *An Accessible Digital Intervention to Promote HIV Testing/Counseling and Prevention Among Adolescents*, 1 year, \$345,130 • **Karin Finberg**, Cooley's Anemia Foundation, *The Role of NCOA4 in the Regulation of Hepatic Iron Stores*, 1 year, \$29,545 • **Elizabeth Flanagan**, Fountain House, *Quality Improvement Evaluation of Fountain House Services*, 1 year, \$18,500 • **Giorgia Foggetti**, American-Italian Cancer Foundation, *Drug Resistance and Metastasis in Lung Adenocarcinoma*, 2 years, \$80,000 • **John Forrest**, Edwards Lifesciences, *Structural Heart Disease Fellowship*, 1 year, \$40,000; Medtronic, *Advanced Interventional Cardiology Fellowship in Structural Heart Disease 2017-2018*, 1 year, \$20,000 • **Liana Fraenkel**, Rheumatology Research Foundation, *Development of a Global Patient-Centered Outcome Measure for Use in Clinical Trials*, 2 years, \$383,615 • **Joel Gelernter**, Boston University (NIH), *Brain microRNA-mRNA Regulatory Networks and Alcohol Use Disorders*, 1.5 years, \$56,314 • **Wendy Gilbert**, American Cancer Society, *Role of snoRNAs in DNA Repair and Cancer*, 9 months, \$122,550 • **Sarah Goldberg**, Astra Zeneca, *Clinical Training/Immersion for Basic Science MSLs*, 3 months, \$50,000 • **Michele Goyette-Ewing**, State of Conn. Dept. of Public Health, *School-Based Health Center*, 1.4 years, \$220,610 • **David Grodberg**, Child Health & Development Inst. of Connecticut, *ADHD Consultation Services*, 1 year, \$8,000 • **Ashima Gulati**, PKD Foundation for Research in Polycystic Kidney Disease, *Genetic Variants Predisposing to Intracranial Aneurysm Formation in Autosomal Dominant Polycystic Kidney Disease*,

2 years, \$100,000 • **Alexandra Hajduk**, University of Massachusetts Medical School (NIH), *Assessing the Benefits and Harms of Triple Anti-thrombotic Therapy in Medically Complex Older Adults with Comorbid Myocardial Infarction and Atrial Fibrillation*, 1 year, \$35,465 • **Kathryn Hawk**, Emergency Medicine Foundation, *The Development of an Emergency Department-Based Intervention for Patients with Opioid Overdose: Listening to Patients*, 1.5 years, \$49,998 • **Thomas Hayman**, Radiological Society of North America, *Targets for Radiosensitization of HPV Negative Head and Neck Squamous Cell Carcinoma*, 1.5 years, \$30,000 • **Roy Herbst**, Oregon Health Sciences University (NIH), *SWOG Network Group Operations Center of the NCTN, Vice Chair of the Lung Cancer Committee*, 1.6 years, \$31,669 • **Fahmeed Hyder**, University of Kentucky (NIH), *Multi-modal MRI to Assess Alzheimer's Disease Prevention in an APOE4 Mouse Model*, 2 years, \$192,539 • **Akiko Iwasaki**, FluGen (NIH), *Phase II: Restimulating Memory T cell Responses in Elderly by a Novel, Live Influenza Vaccine*, 2 years, \$746,327 • **Ryan Jensen**, American Cancer Society, *Elucidating Cancer Risk in Homology-directed Repair Variants*, 4 years, \$792,000 • **Jason Johannesen**, Brain & Behavior Research Foundation (formerly NARSAD), *Cross-Minded Perceptual Integration in Schizophrenia and Clinical High-Risk Adolescents: Relationships with Neurophysiological and Social Cognitive Function*, 2 years, \$70,000 • **Elizabeth Jonas**, Simons Foundation, *Modulation of Mitochondrial Efficiency to Treat Fragile X Disorder*, 2 years, \$292,153 • **Nikhil Joshi**, Cancer Research Institute, *Elucidation of Mechanisms of Acquired Resistance to Immunotherapy in Cancer*, 11 months, \$100,000 • **Amy Justice**, Vanderbilt University Medical Center, *Professional Services Agreement by and between Vanderbilt University Medical Center and Yale University, Farah Kidwai-Khan*, 2 years, \$78,583 • **Kristopher Kahle**, Hydrocephalus Association, *Innate Immunity and CSF Secretion in Post-Infectious Hydrocephalus*, 1.3 years, \$50,000 • **Amanda Kallen**, Milstein Medical Asian American Partnership Foundation, *H19 lncRNA-mediated Regulation of Ovarian Folliculogenesis, Ovarian Aging and Ovarian Hyperstimulation*, 1 year, \$85,000 • **Benjamin Kann**, ECOG-ACRIN Cancer Research Group, *Machine Learning Analysis of Pretreatment Imaging to Predict Lymph Node Metastasis, Extranodal Extension, and Treatment Outcomes in Head and Neck Cancer Patients*, 2 years, \$25,000 • **Brian Kiluk**, Brown University (NIH), *A Meta-Analysis of CBT/PP Efficacy, Moderated Efficacy, and Mediation*, 1 year, \$17,354 • **Tae Kon Kim**, American Society of Hematology, *Overcoming Immune Evasion in Acute Myeloid Leukemia with Antibody Dependent Cell Cytotoxicity by PD-1H Targeting and an Immune Modulator, Anti-4-1BB Antibody*, 2 years, \$100,000 • **Robert King**, New Jersey Center for Tourette Syndrome & Associated Disorders, *Center of Excellence for Tourette Syndrome & Associated Disorders Genetics Repository*, 1 year, \$46,056 • **Albert Ko**, University of California, Berkeley (NIH), *Global Health Program for Fellows and Scholars*, 5 years, \$419,805 • **Brian Letzen**, Radiological Society of North America, *Development of an Automated Liver Imaging Reporting and Data System using Deep Machine Learning*, 2 years, \$30,000 • **Haifan Lin**, Jackson Laboratory (NIH), *RNA Structure in Post-Transcriptional Regulation*, 2 years, \$143,512 • **Anthony Lisi**, NCMIC Foundation, *Innovations in Musculoskeletal Pain Administration, Analytics, and Care Training*, 2 years, \$228,118 • **Amalia Londono Tobon**, American Academy of Child and Adolescent Psychiatry, *Lasting Effects of Minding the Baby Home Visiting Program for Young Families*, 1.3 years, \$15,000 • **Liliana Lucca**, National Multiple Sclerosis Society, *The Role of The Co-Inhibitory Receptor TIGIT in the Immune Deregulation of MS Patients*, 3 years, \$178,467 • **James Macy**, The John B. Pierce Laboratory, *Pierce Service Contract*, 1 year, \$28,111 • **Steven Marans**, Safe Horizon, *Consultation and Training Service Agreement*, 1.5 years, \$20,000 • **Nicole Martinez**, Jane Coffin Childs Memorial Fund, *Defining the Landscape and Function of Pseudouridines in Pre-mRNA*, 2.5 years, \$135,250 • **Carolyn Mazure**, Maximilian E. & Marion O. Hoffman Foundation, *Pilot Project Program - Research*, 1 year, \$50,000 • **Thomas McMahon**, Child Health & Development Inst. of Conn., *CHDI TF-CBT Performance Incentive Contract*, 1 year, \$8,923; West Haven CT Board of Education, *West Haven School Readiness Grant Program*, 1 year, \$8,990 • **Blair McNamara**, Society of Family Planning, *Women's Experiences Traveling to California to Receive Abortion Services from Out of State*, 1 year, \$7,500 • **Ruslan Medzhitov**, Broad Institute (NIH), *Systematic Dissection of Gut Cellular Circuits [at Single Cell Resolution]*, 1.5 years, \$167,500 • **Eric Meffre**, Icahn School of Medicine at Mount Sinai (ISMMS) (NIH), *Cellular and Molecular Defects in Human B Cell Development*, 1.5 years, \$455,600

Cancer Disparities Firewall aims to provide knowledge, access to all

Targeting socioeconomic barriers to prevention, screening, care, research

Rates of cancer are higher in the city of New Haven than for the state of Connecticut overall, according to Beth Anne Jones, PhD, MPH, research scientist at Yale School of Public Health and director of the Smilow Screening & Prevention Program. But many New Haven residents face obstacles to cancer care such as limited access to transportation, minimal experience with health care, and demanding jobs where they may lose pay if they seek care.

The Cancer Disparities Firewall (CDF) project aims to change that, specifically addressing disparities among minorities and people of low socioeconomic status. “Our intention [with this project] is to work across the continuum of cancer care,” says Jones, co-principal investigator of CDF. Minorities and people of low socioeconomic status, she says, are often lost along this continuum of prevention, cancer screening, early detection, treatment, and clinical research.

In New Haven, with 27 percent of the population living below the poverty line and a growing minority population, the task is particularly urgent.

In January of this year, the Bristol-Myers Squibb Foundation awarded Yale Cancer Center (YCC) \$1 million to fund the project. Jones and co-principal investigator Roy S. Herbst, MD, PhD, Ensign Professor of Medicine (Medical Oncology) and chief of medical oncology at Yale Cancer Center and Smilow Cancer Hospital, are heading this intervention effort to reduce socioeconomic and racial disparities in cancer care in New Haven.

“Promoting health equity and providing an innovative standard of care for vulnerable populations is a top priority for the Bristol-Myers Squibb Foundation and Yale Cancer Center,” says John Damonti, president, Bristol-Myers Squibb Foundation.

“We are proud to support the Cancer Disparities Firewall project and to help improve cancer outcomes for the New Haven community.”

CDF specifically targets breast, lung, colorectal, and prostate cancers. These four “heavy hitters,” says Jones, impact Connecticut residents more than other cancers and offer the best opportunities for prevention, early detection, and treatment.

YCC is collaborating with other Yale entities and community groups, including Yale Center for Clinical Investigation, Yale Center for Research Engagement, the Community Alliance for Research and Engagement at Yale, New Haven Department of Public Health, Smilow Cancer Hospital, and Gateway Community College, with additional funding from Yale School of Public Health.

So far, the team has focused on the prevention and cancer screening portion of the continuum. The award has enabled YCC community health educators to run more community outreach programs, providing community members with educational materials and free screening opportunities. YCC has hosted similar events in the past, but the new funding allows it to scale up these services, says Sakinah Carter Suttiratana, PhD, MPH, MBA, project coordinator.

The program also has piloted two new, cancer-focused patient navigation curricula focused on breast and colorectal cancers at Gateway Community College. These curricula aim to teach students how to guide



(l-r): Roy Herbst, Sakinah Carter Suttiratana, and Beth Anne Jones are leaders of Yale Cancer Center's Cancer Disparities Firewall initiative, supported by an award from the Bristol-Myers Squibb Foundation as well as funding from Yale School of Public Health. The project is designed to remove socioeconomic obstacles to cancer prevention, screening, and care that many New Haven-area residents face. Collaborators include Yale Center for Clinical Investigation, Yale Center for Research Engagement, the Community Alliance for Research and Engagement at Yale, New Haven Department of Public Health, Smilow Cancer Hospital, and Gateway Community College.

patients through the cancer health care system as well as managing other aspects of life that can be difficult with a cancer diagnosis or in accessing prevention services. Curricula tailored for two other cancer types, lung and prostate, are planned for the coming academic year.

Even after current funding runs out, Gateway Community College will retain the curricula so that future students can train in cancer-specific patient navigation, too. “It's one way of building sustainability into our initiative,” says Jones.

In the meantime, the Firewall team is developing a “health navigator” program to implement the next phase of the study. The goal is for newly trained patient navigators to step out of the classroom and engage local residents in health promotion and cancer screening activities. “We're going to go out and try to

effect change in our community,” says Herbst.

Further down the line, Herbst and Jones will implement strategies to retain minorities and people with low socioeconomic status throughout the cancer care continuum, hoping ultimately, to involve more of these populations in treatment and clinical trials. According to Jones, clinical trials often provide the best opportunities for treatment, but health providers have a difficult time enrolling some members of minority groups in these programs due to longstanding distrust of medical research.

The leaders of CDF say first results of the project are encouraging. “The team is focused on best cancer care, best science, and outreach to the community,” says Herbst, and even though the project is in its early stages, “I sense we are already making progress.”

Emily Mis, The Hartwell Foundation, *Hartwell*, 2 years, \$100,000 • **Walther Mothes**, University of Utah (NIH), *Center for the Structural Biology of Cellular Host Elements in Egress, Trafficking, and Assembly of HIV (Cheeta Center)*, 2 years, \$295,074 • **Karla Neugebauer, Joan Steitz**, University of California, San Diego (NIH), *The Organizational Hub and Web Portal for the 4D Nucleome Network*, 2.1 years, \$1,263,275 • **Laura Niklason**, Northeastern University (NIH), *Differentiating Embryonic Stem Cells Toward Arterial and Venous Endothelial Cells for Vascular Regeneration*, 1.9 years, \$129,040 • **Kevin O'Connor**, Conquer Myasthenia Gravis (formerly known as Myasthenia Gravis Foundation of Illinois), *Targeting the Pathogenic B Cells in Myasthenia Gravis*, 1 year, \$66,000 • **Ian Odell**, Dermatology Foundation, *Functional Analysis of Dendritic Cells and Development of a Humanized Mouse Model of Scleroderma*, 2 years, \$110,000 • **John Pachankis**, Columbia University (NIH), *Structural Stigma and HIV Risk in a Representative Cohort of Gay and Bisexual Men*, 1.8 years, \$58,412; GLMA Health Professionals Advancing LGBT Equality, *A Unified Intervention for Sexual Minority Women's Minority Stress, Mental Health, and Associated Health Risks*, 11 months, \$19,573; Rutgers, the State University of New Jersey (NIH), *Increasing Provider Competence for Treating Stress-Related Mental Health Conditions in Low Resource Settings*, 2 years, \$74,673 • **Ana Luisa Perdigoto**, Endocrine Fellows Foundation, *Immunological and Pancreatic β Cell Changes in Response to Checkpoint Inhibition*, 1 year, \$5,000 • **John Persing**, Plastic Surgery Foundation, *Functional Connectivity and Brain Architecture in Nonsyndromic Craniosynostosis*, 1 year, \$9,828 • **Robert Pietrzak**, Icahn School of Medicine at Mount Sinai (ISMMS) (NIH), *Neuroimaging of Resilience*

in World Trade Center Responders: A Focus on Emotional Processing, Reward and Social Cognition, 2 years, \$32,304 • **Asghar Rastegar, Onyema Eberchukwu Ogbuagu**, Republic of Liberia, Ministry of Health and Social Welfare, *Yale University Department of Internal Medicine Partnership for Graduate Medical Residency Training and Operations*, 1.4 years, \$1,091, **Carrie Redlich**, American Chemistry Council, *Service Contract—The American Chemistry Council*, 6 months, \$15,000; State of Conn. Dept. of Corrections, *Service Contract - State of Connecticut DOC*, 6 months, \$20,000; State of Conn. Dept. of Labor, *Proposal for the Provision of Occupational Health Clinic*, 1 year, \$78,177 • **Chin Reyes**, Middletown Public Schools, *Child Training - Middletown*, 6 months, \$5,000 • **David Rimm**, Ultivue, *Ultivue Multiplexing Technology in Pathology*, 2 years, \$400,000 • **Manolis Roulis**, Crohn's & Colitis Foundation of America (CCFA), *The Role of PTGER4/EP4 in IBD Pathogenesis*, 3 years, \$270,000 • **David Saunders**, American Academy of Child and Adolescent Psychiatry, *Mindfulness-based ADHD Treatment for Children (MBAT-C): A Pilot Study*, 1.3 years, \$15,000 • **Lokesh Kumar Sharma**, American Lung Association, *Role of Chitotriosidase in Lung Infection with Klebsiella Pneumoniae*, 2 years, \$65,000 • **Jessica Singh**, Emergency Medicine Foundation, *Quality Improvement Study: An Innovative Approach to Improve Pain Measures in Adult Patients Who Present to the Emergency Department with Acute Fractures*, 1.5 years, \$10,000 • **Arietta Slade**, National Society for the Prevention of Cruelty to Children, *NSPCC MTB Training & Consultation*, 1.3 years, \$28,520 • **Megan Smith**, Hemera Regnant, *Collaborative Agreement for "Center of Excellence" for the MOMS Partnership with a Focus on Replication and Scaling*, 2 years,

\$336,990 • **Maximilian Stahl**, American Society of Hematology, *The Use of Immunosuppressive Therapy (IST) in Patients with MDS: Outcomes and Their Clinical and Molecular Predictors in a Large Patient Cohort*, 1 year, \$5,000 • **Derek Steinbacher**, DePuy Synthes, *2017-2018 Yale Craniofacial Surgery Fellowship*, 1 year, \$20,000 • **Dorothy Stubbe**, Department of Children & Families, *Psychiatry Fellows Training Program*, 2 years, \$101,000 • **Patrick Sung, Weixing Zhao**, Abramson Cancer Center of the University of Pennsylvania, *Roles of BRCA1-BARD1 in RAD51-mediated Homologous Recombination and Tumor Suppression*, 1 year, \$100,000 • **William Tamborlone**, Case Western Reserve University (NIH), *Epidemiology of Diabetes Interventions and Complications (EDIC)*, 1 year, \$185,864; Case Western Reserve University (NIH), *EDIC Skeletal Health Study*, 1.5 years, \$39,133; Case Western Reserve University (NIH), *EDIC Hypoglycemia-Arrhythmia Study*, 1.5 years, \$87,151; Case Western Reserve University (NIH), *Effects of Biomedical Risk Factors on Neuro-cognition Using MRI: Long Term Follow-up of the Diabetes Control & Complications Trial/Epidemiology of Diabetes Interventions and Complications Study Cohort*, 2 years, \$46,243 • **Richard Torres**, Applikate Technologies (NIH), *Practical High Resolution Microscopy of Un-cut Un-embedded Lung Biopsies - Phase II*, 2 years, \$358,528 • **Matthew Vesely**, Dermatology Foundation, *PD-1H as a Novel Immune Checkpoint Molecule in Melanoma*, 1 year, \$37,500 • **Merceditas Villanueva**, University of Massachusetts Medical School (DHHS), *AETC National Coordinating Resource Center: Jurisdictional Approach to Curing Hepatitis C Among HIV/HCV Co-infected People of Color*, 1 year, \$28,418 • **Narendra Wajapeyee**, Elsa U. Pardee Foundation, *Epigenetic Vulnerability Pathway in Hepatocellular Carcinoma*,

1.2 years, \$150,000 • **Stephen Waxman, Sulayman Dib-Hajj**, Columbia University, *Sodium Channel Variants as Risk Factors for Chemotherapy Induced Peripheral Neuropathy*, 1 year, \$149,984 • **Carol Weitzman**, Maternal and Child Health Bureau (DHHS), *International Collaborative Office Rounds 2 (iCOR2): Expanding Inter-professional Learning Around Psychosocial, Developmental and Behavioral Health*, 5 years, \$83,627 • **J. Corey Williams**, American Psychiatric Association, *APA/APAF SAMHSA Minority Fellowship*, 1 year, \$25,158 • **Dan Wu**, Just Biotherapeutics Asia, *Treatment of Solid Tumor by Anti-DKK2*, 3 years, \$1,194,001 • **Juliana Xavier Ferruccio**, National Blood Foundation of the American Association of Blood Banks, *Megakaryocyte Erythroid Progenitor Fate Specification Under Iron and Oxygen Deficiency*, 1.5 years, \$75,000 • **Yong Xiong**, University of Pittsburgh (NIH), *Pittsburgh Center for HIV Protein Interactions (PCHPI)*, 2 years, \$762,249 • **Bao-Zhu Yang**, Butler Hospital (NIH), *Early Life Stress: Epigenetic Regulation of Endocrine and Immune Pathways*, 1.7 years, \$33,465 • **Judy Yeh**, American Urogynecologic Society, *Protective Host Defense Mechanisms Against Urinary Tract Infection in Bladder Urothelium with Estrogen Receptor Beta Overexpression*, 2 years, \$25,000 • **Jacky Yeung**, American Association of Neurological Surgeons, *Immunogenetic Profiling and Targeting Novel Immune Check Point Regulators in Meningiomas*, 1 year, \$40,000 • **Hongyu Zhao**, University of California, Davis (NSF), *Misspecified Mixed Model Analysis: Theory and Application*, 3 years, \$113,131 • **Cheryl Zogg**, Emergency Medicine Foundation, *Understanding Emergency Medicine Providers' Perceptions of the ACA in a Renewed Era of Healthcare Reform: National Survey and Qualitative Mixed-Methods Approach*, 1 year, \$5,000

Thomas Steitz, Nobel Laureate for ribosome discoveries, dies at 78

He identified an essential process that creates proteins with genetic information

Thomas A. Steitz, PhD, Sterling Professor of Molecular Biophysics and Biochemistry at Yale and one of three winners of the 2009 Nobel Prize in Chemistry, died Oct. 9 after a battle with pancreatic cancer. Steitz was 78.

Steitz, who was also professor of chemistry at Yale and a Howard Hughes Medical Institute investigator, was recognized by the Royal Swedish Academy for his work describing the structure and function of the ribosome, the cellular protein-making factory essential to life.

“Tom demonstrated to the world the importance of fundamental and cross-disciplinary research,” said



Thomas Steitz

President Peter Salovey, PhD '86. “The Yale community will remember him for his immeasurable contributions to science and education.” The instruction manual for the creation of proteins is DNA, but the ribosome is the machine that translates the encoded information to turn it into proteins. Steitz’s work elucidated the structure and function of the ribosome, an enormously complex ensemble of numerous protein and RNA components.

“I think we were amazed at each stage at the overwhelming complexity of the RNA folding in the ribosome,” Steitz said in an interview. “But I think the most surprising observation was

that the proteins were embedded among the RNA helices, penetrating into the interior of the ribosome like tentacles.”

Working with Yale colleagues Peter Moore, PhD, professor emeritus of chemistry, and Donald Engelman, PhD, Eugene Higgins Professor of Molecular Biophysics and Biochemistry, Steitz helped establish a structural biology center at Yale. By 2000, their use of high-resolution X-ray crystallography enabled the team to resolve the atomic structure of all components of the ribosome.

“He was a very generous and wonderful colleague and had a great ability to find scientific problems to solve,” Moore said. “Many scientists work on one problem all their lives, but he solved many. He was the most accomplished structural biologist of his generation.”

“Professor Steitz deeply valued his relationships with his colleagues, placing great importance on the face-to-face interactions and discussions that helped shape his work,” said Robert J. Alpern, MD, dean and Ensign Professor of Medicine. “His enjoyment of that work was evident, and he will long be remembered as a role model and inspiration to the scores of individuals he mentored.”

Steitz received many awards, including the Gairdner International Award in 2007, the year after his wife of 52 years, Joan A. Steitz, PhD, Sterling Professor of Molecular Biophysics and Biochemistry, won the prestigious award.

Steitz’s death came two weeks after Joan Steitz received the Lasker-Koshland Award for Special Achievement in Medical Science.

// **Innovation** (page 1) be sustainable; over time, revenue from successfully launched technologies will be reinvested to support future projects.

The fund awards pilot grants to support exploratory and proof-of-concept activities, as well as larger development grants for more established projects. In its first award cycle, 2016–2017, the fund made eight awards for projects advancing therapeutics for Alzheimer’s disease, fibrosis, and end-stage tumors, along with promising early-stage research seeking to treat cancer and diabetes. Six recipients of grants in the second award cycle, including four School of Medicine faculty, were announced at the 2018 Yale Innovation Summit, which drew almost 1,000 investors, entrepreneurs, and scientists to the Yale School of Management on May 9.

“These new awards, along with last year’s, reflect how extraordinarily innovative our faculty members are,” says Robert J. Alpern, MD, dean and Ensign Professor of Medicine. “It is a compliment to them, and a boost to the ultimate impact of their work, that the Blavatnik Fund has chosen to support them.”

The new infusion of funds from the Blavatnik Family Foundation will enable the Yale Office of Cooperative Research (OCR), which administers the Blavatnik Fund, to increase the number of awards given in future years. The grant also will expand the Blavatnik Fellowship in Life Science Entrepreneurship, which engages promising early-career scientists and business people who share a passion

for entrepreneurship in the biomedical sciences. The fellows will work in close conjunction with faculty innovators and OCR to develop the commercial potential of discoveries made at Yale.

“Researchers in the life sciences are constantly making novel discoveries that have a tremendous positive impact on our lives, especially in the prevention and treatment of disease,” says Blavatnik, who established and heads the Blavatnik Family Foundation and is founder and chair of Access Industries. “Our hope is that by fostering a robust entrepreneurial ecosystem at Yale, we can significantly accelerate the application of these breakthrough discoveries to benefit those in need.”

“The continued support of the Blavatnik Family Foundation provides vital resources for Yale investigators, who are leading incredible projects to cross the gap between early-stage research and creation of products that improve lives and society,” says President Peter Salovey, PhD '86. “I am deeply grateful for the foundation’s confidence in the valuable research underway across campus.”

The Blavatnik Family Foundation is an active supporter of leading and transformative educational, scientific, cultural, and charitable institutions worldwide. Among the foundation’s programs are the Blavatnik Awards for Young Scientists that support early career scientists and engineers in the United States, the UK, and Israel. To date, the foundation has contributed hundreds of millions of dollars to over 250 institutions worldwide.

2018 awardees and their research projects



From left, after Peter Schiffer, PhD, vice provost for research:

- **Alanna Schepartz, PhD, Sterling Professor of Chemistry:** “Cell permeable miniature proteins: demonstrated platform superiority against third party platforms”
- **Anna Marie Pyle, PhD, Sterling Professor of Molecular, Cellular, and Developmental Biology, and professor of chemistry;** and **Akiko Iwasaki, PhD, Waldemar Von Zedtwitz Professor of Immunobiology and Molecular, Cellular, and Developmental Biology:** “RIG-I agonists as next-gen immunotherapies”
- **Aaron M. Ring, MD, PhD, assistant professor of immunobiology:**

- **Jeffrey R. Bender, MD, Robert I. Levy Professor of Medicine (Cardiology) and professor of immunobiology:** “Novel oligonucleotide strategy to specifically inhibit IL-17A gene expression shows in vivo activity in animal model of multiple sclerosis”
- **Paul E. Turner, PhD, Elihu Professor of Ecology and Evolutionary Biology:** “Phage therapy increases effectiveness of antibiotics for treating multi-drug resistant bacterial infections”

Awards & Honors

Hilary P. Blumberg, MD, John and Hope Furth Professor of Psychiatric Neuroscience and professor of

psychiatry, in the Child Study Center, and of radiology and biomedical imaging, receives the American Psychiatric Association Foundation’s Blanche F. Ittleson Award, for research that has resulted in a significant advance in promoting children’s mental health, or promises to do so.



Akiko Iwasaki, PhD, Waldemar Von Zedtwitz Professor of Immunobiology and Molecular, Cellular, and

Developmental Biology, has received the AAI-Thermo Fisher Meritorious Career Award from the American Association of Immunologists, which recognizes mid-career scientists for outstanding research contributions. The award honors Iwasaki’s work investigating antiviral immunity.



Naftali Kaminski, MD, Boehringer Ingelheim Pharmaceuticals, Inc., Endowed Professor of Medicine (Pulmonary) and

chief of the Section of Pulmonary, Critical Care, and Sleep Medicine, receives the Andy Tager Award for Excellence in Mentoring from the American Thoracic Society’s Assembly on Respiratory Cell & Molecular Biology.



Hesper Rego, assistant professor of microbial pathogenesis, has been named a 2018 Pew Scholar by the Pew

Charitable Trusts. The award funds young investigators of outstanding promise. Rego’s lab investigates how individual bacteria create and maintain non-genetic sources of variability, an apparently important survival mechanism for such bacteria as *Mycobacterium tuberculosis*.



Gerald I. Shulman, MD, PhD, George R. Cowgill Professor of Medicine (Endocrinology), professor of cellular and molecular physiology, and co-director, Yale Diabetes

Research Center, has received the 2018 Banting Medal for Scientific Achievement for what the association calls “paradigm-shifting contributions to our knowledge of diabetes.” It is the American Diabetes Association’s highest honor.