Medicine@Yale

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Advancing Biomedical Science, Education, and Health Care

Chair of biomedical engineering joins Institute of Medicine

Pioneering nanobiologist, department founder, is elected to prestigious corps

W. Mark Saltzman, PH.D., Goizueta Foundation Professor of Chemical and Biomedical Engineering at the School of Medicine, has been elected to the Institute of Medicine (IOM), one of the most prestigious bodies in health and medicine.

Saltzman's research at the intersection of basic science and translational research aims to promote new methods for drug delivery and develop new biotechnologies to combat human disease. A pioneer in the fields of biomaterials, nanobiotechnology, and tissue engineering, Saltzman has contributed to the design and implementation of a number of clinical technologies that have become essential to medical practice today.

As a graduate student at the Massachusetts Institute of Technology (MIT), Saltzman built scaffolds that could be seeded with cells to sculpt new replacement tissues. He also created drug-impregnated implants from polymers that slowly and steadily release medicines for long periods—work that now helps patients in the form of GLIADEL®, a chemotherapy-loaded polymer wafer that neurosurgeons implant in the brain to combat glioblastoma multiforme (GBM), one of the most aggressive types of malignant brain tumors.

Saltzman has miniaturized his slow-release polymers into spherical nanoparticles that can be taken up directly by cells. In 2013, Saltzman was part of an interdisciplinary Yale collaborative team whose work led to a new treatment for GBM that has shown great promise in // IOM *(page 4)*

TERRY DAGRADI

W. Mark Saltzman, founding chair of the Department of Biomedical Engineering, is Yale's newest member of the Institute of Medicine.

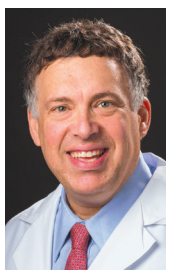
Taking a productive alliance further

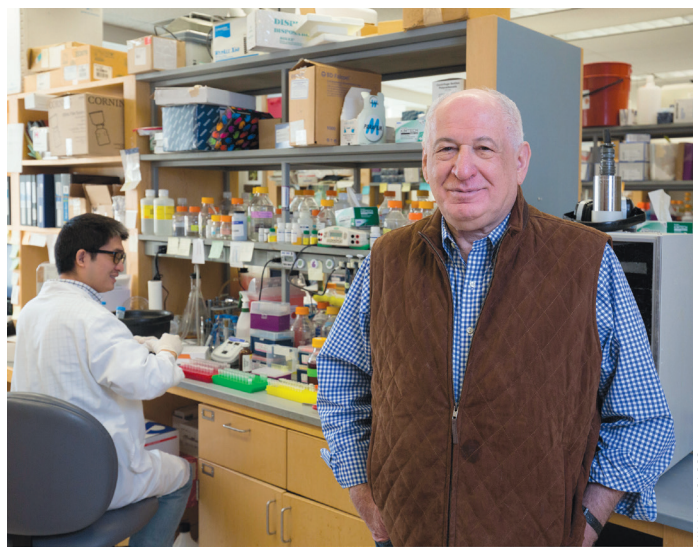
Renewing its commitment to collaboration, an industry leader bets on Yale science

In 2011 the School of Medicine formed a research alliance with the biopharmaceutical company Gilead Sciences, Inc. to accelerate the discovery and development of new drugs to treat cancer. Called "transformative" by then-Yale President Richard C. Levin, the collaboration included an initial commitment of up to $40 million to support research at the medical school over four years.

Now, almost four years into the collaboration, the commitment has been renewed for an additional three years and supplemented with an additional $30 million.

"Gilead is pleased to be continuing this important collaboration with Yale," said William Lee, PH.D., senior vice president of research at Gilead. "Significant progress has been made in this first phase of our research partnership, and we will continue to work closely with the team from Yale in an effort to identify novel cancer therapies with the potential to help patients."





WILLIAM SACCO

(Clockwise, from top left) Yale scientists Roy Herbst, Joseph Schlessinger, and Richard Lifton are three of six members of the Yale-Gilead collaboration's joint steering committee. The collaboration's aim is to identify new molecular targets in order to develop new therapies for cancer.

Since the collaboration's inception, scientists from Gilead and Yale have engaged in a multidisciplinary research program to search for the genetic basis and underlying molecular mechanisms of many forms of cancer. The goal—to identify new molecular targets in order to enable development of novel targeted therapies, including therapies that overcome drug resistance—has fostered substantial and promising research.

In one part of the collaboration, tumor samples are analyzed to identify gene mutations that disrupt normal cellular functions and promote the uncontrolled cell growth and metastasis seen in cancer. Thousands of genes from a diverse set of cancer types have been // Alliance *(page 5)*

Neurosurgeon, a pioneer in genomic studies, is new chair

Murat Günel

Murat Günel, M.D., an accomplished neurosurgeon and geneticist, has been named chair of the School of Medicine's Department of Neurosurgery and chief of neurosurgery at Yale-New Haven Hospital (YNHH).

Günel's clinical expertise is in treating complex brain aneurysms and vascular malformations, and brain tumors. His landmark genomic research has revealed the genetic risks for brain aneurysms, the mutational landscape of brain tumors, and a multitude of genes fundamental in cortical development. He succeeds Dennis D. Spencer, M.D., the Harvey and Kate Cushing Professor of Neurosurgery, who led the department for 27 years and is a longtime mentor to Günel.

"Murat is an exceptionally creative scientist," said Dean and Ensign Professor of Medicine Robert J. Alpern, M.D. "I am confident he'll be a terrific department chair. I am // Chair *(page 5)*

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HAROLD SHAPIRO

A passion for solving problems has fueled Michele Johnson's career as a diagnostic radiologist. In 2014 she became the first African-American woman named a full professor at the School of Medicine.

The mystery of medicine

Pursuing a passion for problem solving, while quietly making history

As a college chemistry student in the 1970s, Michele H. Johnson, M.D., found herself intrigued by the television show "Quincy, M.E.," about a crime-solving forensic pathologist. In one episode "they found a femur, and in a television hour, they came up with the drawing of the person. This is so hokey," Johnson says, but the show led her to an idea: "Could I use chemistry to solve medical problems?"

Since then, problem-solving has formed the backbone of Johnson's own narrative. She has also followed in the footsteps of her mother, a chemist, and her father, a neurochemist and the first African-American to receive a PH.D. in chemistry from the University of Delaware. After earning her B.A. in chemistry at the same institution, she entered medical school at Temple University, where a medical "mystery" on a rotation struck a familiar chord.

At St. Christopher's Hospital for Children in Philadelphia, Johnson watched Marie Capitanio, M.D., chief of radiology, use a single chest X-ray to diagnose both cystic fibrosis and sickle-cell disease in a teenager. She immediately saw the value in pairing X-ray clues with clinical knowledge to diagnose patients: "I learned very early that the more clinical information you know and can apply, the stronger diagnostician you are," she says.

After her internship and residency in diagnostic radiology at Temple University and fellowship in neuroradiology at the University of Pennsylvania, Johnson returned to Temple to join the diagnostic radiology faculty. It was an exciting time to be in radiology, she says. Bolstered by the appearance of non-invasive technologies like computerized tomography (CT) and magnetic resonance imaging (MRI), the field blossomed in the late 1970s and 1980s.

In 1999 Johnson came to Yale School of Medicine (YSM), where today she confronts medical mysteries routinely. As professor of diagnostic radiology, neurosurgery, and surgery, like any good detective, she throws herself into every case. "We're not just sitting in a dark room looking at films," says Johnson. "We're part of the patient care team, and I'm very proud that that's an important part of what I do."

Johnson shows off photos on her ever-buzzing phone of one of the latest advances in neuroradiology, a clot retrieval tool no wider than a blood vessel that resembles a Chinese finger trap. To restore blood flow in the brain after an acute stroke, she uses the contraption to snake through vessels, latch onto blood clots, and pull them out the same way she went in.

One of the field's biggest challenges, Johnson says, is training new radiologists to apply established fundamentals in using newer, non-invasive technologies. Trainees need to develop the ability to take two-dimensional images and make them three-dimensional in their heads. "Our challenge as faculty is to teach that effectively," she says.

In 2012 Johnson completed a fellowship in medical education through the medical school's Teaching and Learning Center, to stay abreast of pedagogical trends. She challenges students and residents to think creatively and cooperatively when faced with novel situations. "I try to teach trainees that it's more effective to be collaborative than confrontational," says Johnson. "You might even have fun in the process."

In 2014, Johnson became the first African-American woman named a full professor at YSM, but she doesn't dwell on the subject. "I can teach technique and anatomy," she says. "Can I teach students to work together successfully for the patient's benefit? That would be the real legacy I'd aspire to."

New pilot aims to help bridge gaps for new physicians

The School of Medicine has been named by the Association of American Medical Colleges (AAMC) as one of 10 medical schools that will make up a pilot cohort to test the implementation of the Core Entrustable Professional Activities (EPAs) for Entering Residency. These are new guidelines intended to help bridge the gap between patient care activities that new physicians should be able to perform on day one of residency training and those they feel ready to perform without direct supervision.

The AAMC released the new guidelines in June in response to feedback from residency program directors about the clinical preparedness of entering residents, and from emerging literature documenting a performance gap at the transition point between medical school and residency training.

The School of Medicine was one of more than 70 AAMC member schools to apply for a spot in the pilot. The high number of applications "demonstrates the significant energy and commitment within academic medicine toward closing the gap between expectations and performance for residents on day one," said Darrell G. Kirch, M.D., AAMC president and CEO.

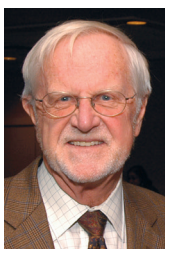
The AAMC is a not-for-profit association representing all 141 accredited U.S. and 17 accredited Canadian medical schools; nearly 400 major teaching hospitals and health systems, including 51 Department of Veterans Affairs medical centers; and nearly 90 academic and scientific societies. It represents 128,000 faculty members, 83,000 medical students, and 110,000 resident physicians.

For Yale's renowned M.D./PH.D. Program, a changing of the guard

The School of Medicine's Medical Scientist Training Program (MSTP), known on campus as the M.D./PH.D. Program, has undergone a change in leadership for only the fifth time in its 45-year history. James D. Jamieson, M.D., PH.D., professor of cell biology and the program's director for more than 30 years, stepped down this past summer. His successor is Barbara Kazmierczak, M.D., PH.D.

Kazmierczak, associate professor of medicine and microbial pathogenesis, earned her bachelor's and master's degrees at the University of Chicago, and her M.D./PH.D. at the Weill Cornell/Rockefeller/Sloan-Kettering Tri-Institutional Program. She completed residency and fellowship training at the University of California–San Francisco.

Barbara Kazmierczak



James Jamieson

Kazmierczak has studied the pathogen *Pseudomonas aeruginosa* extensively, focusing on bacterial factors important for establishment of disease and on host responses to infection. She came to Yale in 2001 and has served as director of graduate admissions for the microbiology track and as associate director for basic science of the M.D./PH.D. Program.

Established in 1969, the M.D./PH.D. Program graduated its first students in 1971. Jamieson led the program from 1974 to the present, with the exception of the years 1983 to 1992, when he chaired the Department of Cell Biology. The program's extraordinary success under Jamieson is reflected by its 40 years of continuous support by the National Institutes of Health.

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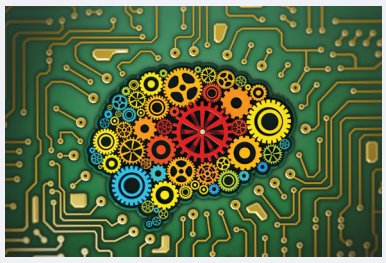
ADVANCES
Health & Science News

Better predicting a tumor's treatability



ISTOCKPHOTO

Predicting whether a patient's tumor will shrink in response to a treatment has often been a bit of a guessing game. But this may be changing: Yale researchers have identified a way to determine ahead of time whether a wide range of cancers will respond to MPDL3280A, an experimental drug which blocks the protein PD-L1, a critical "checkpoint" for the body's immune response to cancer.

Roy S. Herbst, M.D., PH.D., Ensign Professor of Medicine, and colleagues monitored 175 patients before and after treatment with MPDL3280A. Across patients with a variety of tumors—including melanomas and cancers of the lungs, kidneys, and colon—those with higher levels of PD-L1 in their immune cells at the study's start responded better to treatment.

The findings, published Nov. 27 in *Nature*, suggest a way of selecting patients for whom the new drug will work best and highlight the role of immune cells in the drug's mechanism. The research "could help us design new combination therapies," Herbst says.

To end brain tumor growth: a switch?

Glioblastomas are among the most deadly cancers: fewer than 5 percent of those diagnosed with the brain tumors will survive more than five years. Researchers know that multiple different molecular pathways work in concert to help the tumors grow, and they've struggled to find drugs that block these cancer-enabling factors all at once.

Now, a team of School of Medicine scientists has discovered a single protein that can simultaneously weaken glioblastomas and make the environment around the tumors less welcoming to the cancer.

Sourav Ghosh, PH.D., assistant professor of neurology, Carla V. Rothlin, PH.D., assistant professor of immunobiology, and colleagues showed that blocking the protein—called atypical protein kinase (aPKC)—inactivated growth pathways in glioblastomas and reduced inflammation in the surrounding tissue. In mice with glioblastomas, they discovered, administering a drug targeting aPKC shrunk tumors by more than half in just a week. And in people with glioblastomas, higher levels of aPKC were correlated with poorer prognosis, they reported in the Aug. 12 issue of *Science Signaling*.

The findings suggest that drugs blocking aPKC in humans could be an effective treatment for glioblastomas.

Tackling cancer with a new paradigm

Designed to guide the immune system in fighting cancer, a new class of drugs is altering the landscape of cancer treatment

In the 1980s, immunotherapy researcher Lieping Chen, M.D., PH.D., embraced the career goal of curing one cancer. That lofty-seeming goal is beginning to look more modest today. Recent clinical trials have shown that one cancer after another is vulnerable to immune modulation therapy, a cancer-fighting strategy Chen pioneered that for years was considered marginal.

"Now it seems like I should retire, because I think these drugs can probably cure multiple cancers," says Chen, the United Technologies Corporation Professor in Cancer Research at the School of Medicine. "This is way beyond my expectations already. I'm very happy."

The drugs Chen refers to are a group of immune modulation agents called PD-1/PD-L1 inhibitors. These are antibodies that allow the immune system to attack tumors by blocking a pathway that paralyzes the immune response, and they've achieved dramatic clinical trial results for melanoma. In September the FDA approved pembrolizumab (marketed as Keytruda) for advanced melanoma, while Japan approved nivolumab for the cancer in July. These drugs have also shown startling effects in kidney and lung cancer—the latter result a game-changer, since lung cancer is responsible for more deaths than any other cancer.

These advances appear to be just the start. Alone and in combination with many other agents, PD-1/PD-L1 inhibitors are currently under intense scrutiny in hundreds of studies around the world, showing promise for treating Hodgkin's lymphoma, bladder, stomach, ovarian, and head and neck cancers. At Yale, researchers are building on groundbreaking results from the last several years to study these agents in a wide variety of solid and hematologic tumors.

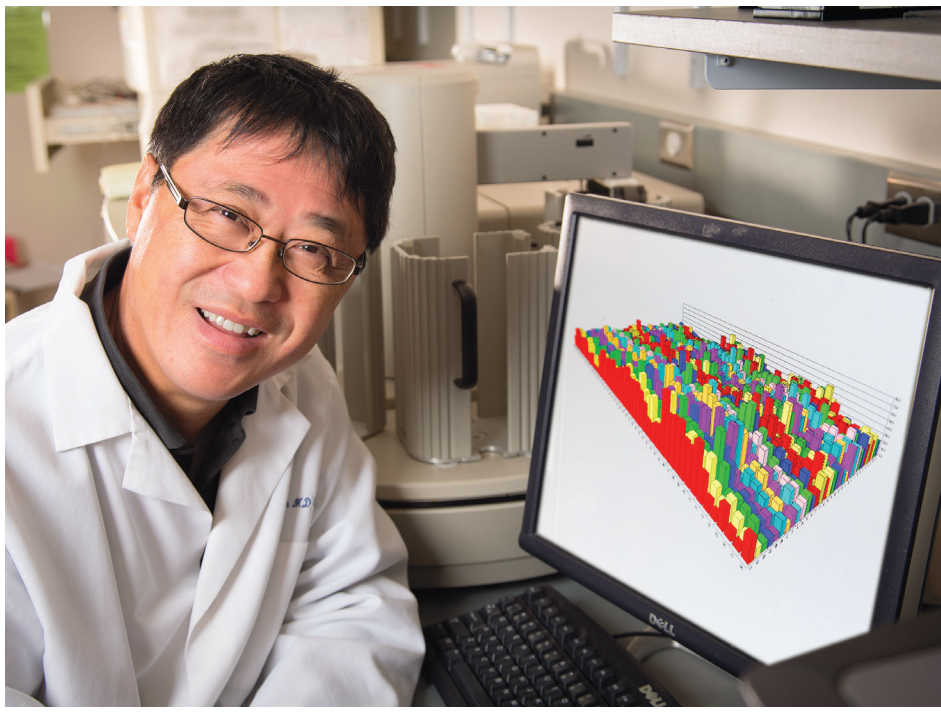
In July, Mario Sznol, M.D., professor of medicine, updated colleagues at the annual conference of the American Society of Clinical Oncology (ASCO) on a remarkable Phase I melanoma trial. It combines nivolumab and another antibody, ipilimumab, in advanced melanoma patients. While ipilimumab acts on the unrelated CTLA-4 checkpoint, together the drugs affect the immune system synergistically. Nivolumab produces an already impressive 63 to 73 percent one-year survival rate, but when combined with ipilimumab the rates rose to 85 percent at one year and 79 percent at two years. (By comparison, chemotherapy offers this population of patients a two-year survival rate of around 20 percent.) Early results appeared in 2013 in the *New England Journal of Medicine*. If confirmed in Phase III trials, Sznol says, "this would be the most active combination that we've ever developed for melanoma."

Another PD-1/PD-L1 inhibitor, MPDL3280A, is in trial as well. Half of a group of patients with advanced bladder cancer—who haven't responded to standard therapy—have responded to MPDL3280A, says investigator Daniel P. Petrylak, M.D., professor of medicine and urology. That, he says, "has been pretty much unheard of," since no chemotherapeutic agent currently exceeds a 20 percent response rate. Some patients' tumors have become radiologically undetectable, and responses have lasted more than 18 months. Similarly, in 2013, Roy S. Herbst, M.D., PH.D., Ensign Professor of Medicine, professor of pharmacology, and chief of medical oncology at Yale Cancer Center and Smilow Cancer Hospital at Yale-New Haven, reported at ASCO that MPDL3280A was durably shrinking advanced solid and hematologic tumors in 21 percent of patients.

Such results are prompting oncologists to rethink the role of chemotherapy, which damages the immune system as it targets fast-dividing cancer cells. Immunotherapy, by contrast, relies on intact immunity. That difference makes it problematic to design trials that combine immunotherapeutic and chemotherapeutic agents. But it also means researchers like Chen foresee a day when immunotherapy will replace chemo as a first-line treatment for cancer. "The direction is very clear," says Chen, also professor of immunobiology, dermatology, and medicine.

Studies that place the burden of a cure solely on immunotherapeutic agents are already under way. Scott N. Gettinger, M.D., associate professor of medicine, for example, is studying nivolumab alone or in combination with other agents in advanced lung cancer, with promising early results.

PD-1/PD-L1 inhibitors work by disrupting an immune "shutdown" caused by tumors. Typically, when the immune system's T-cells arrive at cancer sites, they secrete cytokines, which causes tumors and related tissues to make the protein PD-L1. The PD-L1 then binds to PD-1, a receptor on the arriving T-cells, paralyzing the immune response at the tumor site. PD-1/PD-L1 inhibitors come in two types: drugs that consist of antibodies to PD-1, such as nivolumab, and drugs that consist of antibodies to PD-L1, such as MPDL3280A. Both types counteract this immune shutdown, allowing T-cells to proceed with the destruction of cancer cells. (Incidentally, Chen discovered PD-L1 in 1999 at the Mayo Clinic.)



HAROLD SHAPIRO

Lieping Chen, the United Technologies Corporation Professor in Cancer Research, is a pioneer of immune modulation therapy, a cancer-fighting strategy that employs antibodies to guide the immune system in fighting tumors. Research by Chen and School of Medicine colleagues has led to a new class of drugs that are proving to be more effective and better tolerated than chemotherapy.

The PD-1/PD-L1 inhibitors offer multiple and distinct advantages. Not only do they halt and shrink so many advanced cancers, their effects also last much longer than those of chemotherapy, since the inhibitors bolster the patient's immune system against his own cancer. And because the immune boost happens at tumor sites, most side effects are minor or readily manageable, so the drugs are better tolerated than chemotherapy. "Patients don't even have to be hospitalized," Chen says. "They walk in, sit for a half-hour or one hour, and then leave."

Yale researchers hope to develop biomarkers to identify the patients most likely to benefit from immunotherapeutic agents from those less likely, so they're taking biopsies from responders and non-responders to look for key differences (see related story, "Better predicting a tumor's treatability," at left.). Some tumors, for example, express more PD-L1 than others, and so are more apt to respond to an anti-PD-1/PD-L1 agent.

Researchers also plan to develop effective combinations with other immune modulatory agents as yet undeveloped and with other immunotherapy strategies. From here, the possibilities seem nearly limitless.

"We used to have a paradigm in oncology that the amount of excitement is inversely correlated to the amount of clinical data that you have," Sznol says. "Here, the excitement is actually driven by very good clinical data. We're just at the beginning of what we can do with these drugs."

OUT & ABOUT

May 30–June 1 **Reunion Weekend** drew more than 320 alumni and friends to campus. **1.** (From left) **Christiane Nockels Fabbri**, P.A. '84, PH.D. '06; **Remo Fabbri**, M.D. '64, **David Leof**, M.D. '64, and **Colleen Leof** reconnect at their 50th reunion dinner. **2.** (Back, from left) **Forrester A. "Woody" Lee**, M.D. '79, professor of medicine and assistant dean for multicultural affairs, with **Dana Ugwonali**, her husband **Obi Ugwonali**, M.D. '79, **Donald Moore**, M.D. '80, **Sherri Sandifer**, M.D. '99, and **Dannie Liggans**. Front, from left: **Gabriella**, **Alex**, and **Nate Ugwonali**.

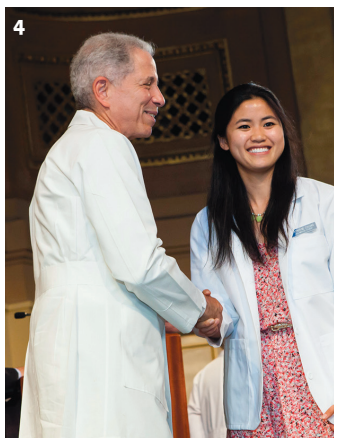
MIKE ROSS

JOHN CURTIS

September 3 More than 100 people attended **'Just Blue It Up'**, an event organized by members of the Section of Pulmonary, Critical Care and Sleep Medicine (PCCSM) to raise money for the Pulmonary Fibrosis Foundation. **1.** (From left) **Erica L. Herzog**, M.D., PH.D., associate professor of medicine; **Danielle E. Antin-Ozerkis**, M.D., associate professor of medicine; **Naftali Kaminski**, M.D., the Boehringer-Ingelheim Professor of Medicine and chief of PCCSM; **Diane Reichert**, creator of the Just Blue It Up campaign; **Mridu Gulati**, M.D., assistant professor of medicine; and **Issahar Ben-Dov**, M.D., clinician. **2. Jennifer Novicki** (left) and **Rochelle Goodwin**, both senior administrative assistants. **3. Chad R. Marion**, D.O., clinical fellow in medicine (left), with his son, **Myles**, and **Lauren Ferrante**, M.D., clinical fellow in medicine.

JOHN CURTIS (3)

August 15 At the **White Coat Ceremony**, an annual event at which incoming medical students receive physicians' jackets, the School of Medicine formally welcomed the 104 members of the Class of 2018. **1.** The ceremony was held for the first time at Yale's Woolsey Hall. Pictured in the front row (from left) are **Amber Anders** '18, **Prince Antwi** '18, **Wardah Athar** '18, **Daniel Barson** '18, and **William Biche** '18. **2. Nidharshan Anandasivam** '18 receives his white coat from **Barbara I. Kazmierczak**, M.D., PH.D., associate professor of medicine and microbial pathogenesis and director of the M.D./PH.D. Program. **3. Sarah Amalraj** '18 (center) with her parents, **Rajam** and **David Amalraj**. **4. Robert J. Alpern**, M.D., dean and Ensign Professor of Medicine, with **Katherine Chuang** '18. **5. Jonathan Marquez** '18 (second from right) with (from left) his grandmother **Maria Zavala**, aunt **Natalia Ehlert**, and mother, **Maria Marquez**.



TERRY DAGRADI (5)

JOHN CURTIS

September 5 A friendly **therapy dog** named **Finn** receives some attention from **Katie Hart**, senior administrative assistant at the Cushing/Whitney Medical Historical Library. Finn, a three-year old rescue and certified therapy dog, makes frequent visits around campus. Finn's owner is Krista Knudson, R.N., a doctoral student at the School of Nursing.

// IOM *(from page 1)* animal studies. The treatment method involved delivering the fungicide dithiazanine iodide via nanoparticle "carriers" infused directly at the tumor site. Saltzman and his colleagues Joseph M. Piepmeier, M.D., Nixdorff-German Professor of Neurosurgery, and Jiangbing Zhou, PH.D., assistant professor of neurosurgery and biomedical engineering, reported in the *Proceedings of the National Academy of Sciences* that the technology had cured eight of 12 rats with tumors—an unprecedented rate of success. The team is now exploring the use of the technology in humans with GBM. In other projects with medical colleagues, Saltzman is synthesizing and testing nanoparticles to deliver gene-editing agents, novel anti-cancer agents that block microRNAs, microbicides for preventing infectious disease, and targeted approaches for treating vascular disease.

"Mark Saltzman embodies the spirit of collaboration and innovation that we prize at the School of Medicine, which is so essential to the development of novel treatments for disease in today's scientific climate," says Dean and Ensign Professor of Medicine Robert J. Alpern, M.D. "Mark is not only a dynamic leader, but a resourceful and innovative collaborator. We are very proud of his election to the IOM, an honor he has truly earned."

Saltzman received his B.S. in chemical engineering from Iowa State University and earned an M.S. in chemical engineering and PH.D. in medical engineering from MIT. In 2002, after serving on the faculties at The Johns Hopkins University and Cornell University, Saltzman came to Yale, where he was named founding chair of the Department of Biomedical Engineering in 2003.

Saltzman's achievements in the classroom have been recognized throughout his career, with teaching awards from Johns Hopkins, Cornell, and Yale, as well as the Distinguished Lecturer Award from the Biomedical Engineering Society.

The IOM is an honorific membership body that also advises lawmakers, health professionals, and the public on health care and health policy. Saltzman is one of 37 School of Medicine scientists who are members. He is among 70 new members and 10 foreign associates elected to the IOM.

ADVANCES
Health & Science News

A new piece of the diabetes puzzle

ISTOCKPHOTO

Since the 1990s, researchers have struggled to explain how leptin, an enzyme that monitors how much energy our bodies generate, lowers high blood glucose in diabetic mice. Understanding this mechanism, they've known, could pave the way for new therapies for patients with type 1 and type 2 diabetes (T1D and T2D).

In the July 2014 issue of *Nature Medicine*, members of the lab of Gerald I. Shulman, M.D., PH.D., George R. Cowgill Professor of Medicine, reported on a mechanism by which leptin mediates its action. The team observed that fasting T1D and T2D mice had low levels of leptin, and increasing leptin levels reversed hyperglycemia. They found that leptin inhibits the hypothalamic-pituitary-adrenal (HPA) axis, a critical neuroendocrine pathway that regulates body processes such as stress response.

The results suggest "leptin could be an additional therapy [with insulin] that could vastly improve blood glucose control" in diabetics, says lead author Rachel J. Perry, PH.D., postdoctoral fellow in medicine.

A STEP forward in treating Alzheimer's

Researchers have known that STriatal-Enriched protein tyrosine Phosphatase (STEP), an enzyme key to regulating learning and memory in the brain, also plays a role in diseases marked by cognitive defects: in people with Alzheimer's, Parkinson's, schizophrenia, and other diseases, high levels of STEP disrupt the normal development and strengthening of the brain's neurons.

Now, a team led by Paul J. Lombroso, M.D., the Elizabeth Mears and House Jameson Professor in the Child Study Center, has developed a drug that inhibits STEP's negative effects.

For five years, Lombroso's team screened more than 150,000 compounds in search of one that blocks STEP activity. Eventually they landed on a drug called TC-2153. In the Aug. 5 issue of *PLoS Biology*, Lombroso's team reported that TC-2153 reversed memory deficits in mice with an animal version of Alzheimer's disease. By entering the brain and effectively binding to and inhibiting STEP, the drug prevented the protein from disrupting synaptic activity in neurons.

The researchers are now testing the compound in other animals with cognitive defects. "Successful results will bring us a step closer to testing a drug that improves cognition in humans," says Lombroso, also professor of neurobiology and psychiatry.

Yale stem cell research boosted by state

With seven grants, Connecticut's commitment to innovative research strengthens Yale stem cell biology

Although a young and sometimes controversial field, stem cell research has been hailed for its medical importance: increasingly, medicine has turned to stem cell biology in treating a variety of human diseases—ranging from the treatment of neuromuscular and liver diseases to the generation of skin grafts for burn victims.

Weimin Zhong, PH.D., associate professor of molecular, cellular, and developmental biology, is getting at the root of what makes stem cells so medically valuable, studying how they balance their abilities to self-regenerate indefinitely, on one hand, and to develop into any kind of bodily cell or tissue, on the other. To better understand stem cell regulation, the team is inducing mouse nerve stem cells to deviate from their normal patterns of replication.

Zhong's research is being supported by a new grant from the state of Connecticut, which this past June awarded $3.6 million to Yale stem cell researchers. While the federal government has not always been fully supportive of stem cell research (between 2001 and 2009, federal funding for human embryonic stem cell research was restricted to a group of four cell lines), the state—partly in reaction to the federal restrictions—has staunchly supported stem cell research for nearly a decade.

The grants are part of a 10-year $100 million commitment to stem cell research begun in 2006. Connecticut's program aims "to foster an environment in our state where scientists can pursue innovative research–work that is already promising new therapies for debilitating diseases," said Gov. Dannel P. Malloy.

The grants will fund seven projects at the Yale Stem Cell Center (YSCC). Among these, the YSCC received one of only two "core" grants of approximately $500,000 each, for continued support and technological development of the YSCC's shared facilities, including its five core labs. Some of the grants are funding research into understanding fundamental stem cell biology, such as Zhong's project. Others are funding work targeted at specific disease states.

Lawrence J. Rizzolo, PH.D., for instance, is using stem cells to research the retinal pigment epithelium (RPE), a layer of cells in the human eye that protects the retina from stray light, nourishes it, and maintains the light-sensitive cells. His eventual goal is to use stem cells to bioengineer a 3-D culture model of the retina, which would enable scientists "to test new drugs, and could be transplanted into diseased eyes to treat age-related macular degeneration," says Rizzolo, associate professor of surgery and of ophthalmology and visual science.

Funding from the state, federal sources, and private donors, such as the Li Ka Shing Foundation and the G. Harold and Leila Y. Mathers Charitable Foundation, "has been integral in the growth of stem cell research at Yale from our beginning almost a decade ago," says Haifan Lin, PH.D., professor of cell biology and genetics and YSCC director. "The state of Connecticut has been a critical partner, enabling research that will help us better understand basic biology and treat human disease."

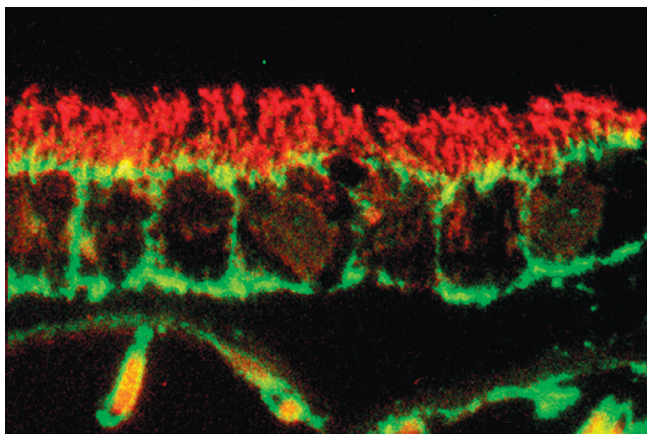


PHOTO COURTESY OF LAWRENCE RIZZOLO

Lawrence Rizzolo (left) aims to use stem cells to create a three-dimensional culture model of the human retina. (Above) The retinal pigment epithelium (RPE) sits on a bed of leaky capillaries (bottom of image). To form a blood-retinal barrier, the RPE is polarized. One protein (red) anchors other proteins in the microvillar pole, to interact with photoreceptors. In the basal pole, the green protein converts signals secreted by the capillaries.

// Alliance *(from page 1)* sequenced as a direct result of projects undertaken as part of the collaboration. Rigorous analysis of these sequences has revealed several recurring mutations, believed to underlie the development of drug resistance in cancer, providing key insights into the processes driving cancer progression. The findings serve as an important catapult for further scientific discovery aimed at finding potential cures.

The renewal agreement allows the collaboration to continue growing on several fronts. In addition to the sequencing initiative, Yale has also launched biochemical and pharmacological studies to identify compounds that may lead to therapeutic candidates for certain cancers. These efforts have yielded promising results, which will be further expanded in this new phase of the collaboration. Greater focus will also be placed on finding a single therapy that could be used in multiple cancers.

"We could not have asked for a better start to our partnership with Gilead," says Joseph Schlessinger, PH.D., chair and the William H. Prusoff Professor of Pharmacology, director of the Cancer Biology Institute on Yale's West Campus, and chair of the collaboration's six-member joint steering committee (JSC).

Yale's JSC members also include Roy S. Herbst, M.D., PH.D., Ensign Professor of Medicine, professor of pharmacology, and chief of medical oncology at Yale Cancer Center and Smilow Cancer Hospital at Yale-New Haven; and Richard P. Lifton, M.D., PH.D., chair and Sterling Professor of Genetics, professor of medicine, and a Howard Hughes Medical Institute investigator. Also on the JSC are Gilead scientists Howard S. Jaffe, M.D., a 1982 alumnus of the School of Medicine and president and chair of the board of the Gilead Foundation; William A. Lee, PH.D., senior vice president, research; and Linda Slanec Higgins, PH.D., vice president, biology.

Under the terms of the initial agreement, the collaboration may be renewed for up to 10 years and funded with a total of up to $100 million, the largest corporate commitment in Yale's history. Yale maintains ownership of all intellectual property generated by School of Medicine research, and Gilead has the first option to license and develop any compound it deems promising.

"The pace of scientific exchange and innovation spurred by our work together is unlike anything I have seen before," Schlessinger says. "If our accomplishments over the past three years are any indication, we are confident that our future endeavors will significantly advance our current understanding and treatment of cancer."

// Chair *(from page 1)* also grateful to Dennis Spencer for his many years of outstanding leadership and service."

The Nixdorff-German Professor of Neurosurgery, Günel led the largest international genome-wide association studies of intracranial aneurysms, identifying several susceptibility loci, as published in two papers in *Nature Genetics*. Through international collaborations, his lab identified several genes mutated in malformations of cerebral cortical development. The work resulted in publications in *Nature* and *Nature Genetics*, and recently in *Cell* and *Neuron*, in which a team led by Günel identified mutations in the CLP1 and KATNB1 genes in patients with complex, structural brain abnormalities.

In 2013 Günel was the senior author of a pivotal manuscript published in *Science*, which unveiled that somatic mutations in just five genes, including two that have never been implicated in abnormal tissue growth, or neoplasia, can explain the mutational landscape of a majority of meningiomas, the most common type of brain tumor. This and other genomic studies have formed the basis of personalized treatments for brain tumor patients now ongoing at the School of Medicine and YNHH.

Also professor of genetics and neurobiology, Günel earned his medical degree from Istanbul University and completed his internship and residency in neurosurgery at YNHH.

Grants and contracts awarded to Yale School of Medicine

July 2013–February 2014

Federal

Chadi Abdallah, NIH, *Examining the Effect of Ketamine on Glutamate/Glutamine Cycling*, 5 years, $907,630 • **Clara Abraham**, NIH, *Functional Outcomes of Inflammatory Bowel Disease Associated Variants*, 4.7 years, $1,810,690 • **Serap Aksoy**, NIH, *Expanding the Toolbox for Tsetse Reproductive Biology*, 2 years, $427,572; NIH, *Tsetse Transmitted African Trypanosomiasis*, 5 years, $1,216,240 **Nadia Ameen**, NIH, *Functional Relevance of CFTR Trafficking* In Vivo *to Intestinal Disease*, 5 years, $1,810,690 • **Amy Arnsten**, NIH, *Highly Evolved Brain Circuits in Primates: Molecular Vulnerabilities for Disease*, 4.7 years, $4,162,499; NIH, *Potential mGLuR Treatment of Age-Related Cognitive Decline*, 4.7 years, $3,201,204 • **Peter Aronson**, NIH, *Methods in Nephrologic Research*, 5 years, $2,147,254 **Renata Belfort De Aguiar**, NIH, *Effect of Circulating Glucose on Eating Behavior and Brain Activation in Diabetes*, 3.8 years, $594,071 **Titus Boggon**, NIH, *Molecular Assembly and Regulation of the Cerebral Cavernous Malformation Complex*, 5 years, $1,821,095 • **Pramod Bonde**, NIH, *Characterization and Safety Profiling for Wireless LVADS*, 2 years, $419,354 **Angelique Bordey**, NIH, *TSC-MTOR on Neuron Development*, 5 years, $1,835,806 • **Elizabeth Bradley**, DHHS, *Yale Training Program in Health Services Research*, 5 years, $1,477,429 • **Judson Brewer**, NIH, *Augmenting Mindfulness Training Through Experience-Driven Neurofeedback Devices* (*ATTEND*), 5 months, $316,350 • **Richard Bucala**, NIH, *Mechanisms of Rheumatoid Synovial Fibroblast Activation*, 4.9 years, $1,769,065 **Christopher Burd**, NIH, *Sorting and Trafficking in the Endosomal System*, 3.9 years, $1,465,200 **David Calderwood**, NIH, *Filamin Interactions in Differentiation, Invasion and Disease*, 3.8 years, $1,378,140 • **Michael Caplan**, NIH, *Training Program in Molecular Medicine*, 5 years, $811,453 • **Jessica Cardin**, NIH, *GABAergic Contributions to Neural Circuit Deficits in Schizophrenia*, 5 years, $2,081,250 • **Owen Chan**, NIH, *Mechanisms of Counter-Regulatory Failure*, 4.8 years, $1,810,690 • **Sreeganga Chandra**, NIH, *Roles of the CSPalpha Chaperone Complex in Presynaptic Maintenance and ANCL*, 5 years, $1,821,795 • **Sandy Chang**, NIH, *Telomere Replication and Maintenance of Genome Stability*, 2 years, $457,875 • **Katarzyna Chawarska**, NIH, *Components of Emotional Processing in Toddlers with ASD*, 4.7 years, $3,412,696; DoD, *AR120201 Subtyping of Toddlers with ASD Based on Patterns of Social Attention Deficits*, 3 years, $665,455 • **Michael Choma**, NIH, *Quantitative Optical Imaging of Cilia-Driven Fluid Flow*, 4.9 years, $2,052,945; NIH, *Development of a New Light Source for Parallel Optical Coherence Tomography*, 2 years, $435,006 • **Geoffrey Chupp**, NIH, *Longitudinal Analysis of Transcriptomic Endophenotypes in Asthma*, 3.8 years, $3,144,566 • **Daniel Cifuentes Buira**, NIH, *Analysis of the Molecular Machinery of MicroRNA-Processing Pathways*, 2 years, $217,334 • **Victoria Clark**, NIH, *Characterizing the Genomic Architecture and Molecular Mechanisms Driving the Formation of Non-NF2 Meningiomas*, 3 years, $137,345 • **Robert Constable**, NIH, *O-Space Imaging-Accelerating MRI with Z2- Gradient Encoding*, 3.9 years, $2,004,429 • **Kelly Cosgrove**, NIH, *Microglial Activation in Alcohol Dependence: A*[*C-11*]*PBR28 PET Study*, 2 years, $429,882 • **Pietro De Camilli**, NIH, *OCRL and the Pathogenesis of Lowe Syndrome and Dent Disease*, 4 years, $1,158,840 **Jonathan Demb**, NIH, *Neural Circuits and Synapses for Early Visual Processing*, 5 years, $2,081,250 • **Francesco D'Errico**, Department of Homeland Security, *ARI-MA Superheated Emulsions for Nuclear Material Detection*, 2 years, $155,011 • **Sabrina Diano**, NIH, *Role of Peroxisome Proliferation in Leptin Resistance*, 3.9 years, $1,448,552 • **Vishwa Dixit**, NIH, *Impact of Obesity and Weight-Loss Interventions on Immune-Surveillance Mechanisms*, 1 year, $822,374; NIH, *Impact of Calorie Restriction on Thymopoiesis in Humans*, 3 months, $66,150; NIH, *Inflammasomes and the Mechanisms of Thymic Demise in Aging*, 5 years, $1,837,398; NIH, *Impact of CR on Inflammasome Driven Immune-Metabolic Interactions*, 1.9 years, $524,616; NIH, *Thymic Adipogenesis and Age-Related Thymic Demise*, 1.8 years, $391,275 • **Ronald Duman**, NIH, *Research Training–Biological Sciences*, 5 years, $1,474,532 • **James Duncan**, NIH, *Integrated RF and B-Mode Deformation Analysis for 4D Stress Echocardiography*, 4 years, $3,587,112 **Stephanie Eisenbarth**, NIH, *Regulation of Adaptive Immunity by the NOD-like Receptor NLRP10*, 5 years, $2,081,250 • **Shawn Ferguson**, NIH, *Molecular Mechanisms that Match Lysosome Function to Cellular Demand*, 4.7 years, $1,570,517 • **Carlos Fernandez-Hernando**, NIH, *Caveolin-1 in Lipoprotein Metabolism and Atherosclerosis*, 3 years, $1,404,348; NIH, *Role of MicroRNA in Lipid Metabolism and Cardiovascular Disease*, 2 years, $966,307 • **Karin Finberg**, NIH, *Identification of Novel Genes that Modulate Systemic Iron Homeostasis*, 11 months, $157,699 • **Helen Fox**, NIH, *Stress System Changes in Alcoholics with and without Depressive Symptomatology*, 1.9 years, $141,900 **James Freeman**, NIH, *Comparative Effectiveness of Catheter Ablation Compared with Medical Therapy for Atrial Fibrillation*, 4.7 years, $787,160 • **Alison Galvani**, NIH, *Evaluating the Social Influences that Impact Vaccination Decisions*, 4.7 years, $1,550,019 • **Kseniya Gavrilov**, NIH, *Suppression of BCR-ABL by siRNA-loaded Nanoparticles for the Treatment of Chronic Myeloid Leukemia*, 2.9 years, $127,584 • **Joel Gelernter**, NIH, *Genetics of Opioid Dependence*, 4.9 years, $4,665,445 • **Thomas Gill**, NIH, *Academic Leadership Award in Disability and Disabling Disorders*, 5 years, $644,564 • **Antonio Giraldez**, NIH, *The Role of MicroRNAs in Vertebrate Development*, 4 years, $1,265,400 • **Elena Grigorenko**, National Institute of Justice/Department of Justice, *Trends in Juvenile Criminal Case Processing and Education*, 1 year, $39,976 • **Jhumka Gupta**, United States Institute of Peace, *Adapting Innovative Programs for Women's Social and Economic Empowerment and Reduction of Gender-Based Violence in Abidjan, Côte d'Ivoire*, 1 year, $108,706 **Stephanie Halene**, DoD, *Assessing the Mechanisms of MDS and its Transformation to Leukemia in a Novel Humanized Mouse*, 2 years, $399,600 • **Marc Hammarlund**, NIH, *Identification of Transcriptional Targets of the DLK-1 Axon Regeneration Pathway*, 2 years, $480,811 **Edward Herman**, NIH, *The Role of Follicular Helper T Cell Cytokines in the IgE Response*, 3 years, $122,628 • **Amanda Hernandez**, NIH, *Sodium Chloride Induced Dysregulation of CD4+CD25+ Regulatory T Cells in MS*, 2 years, $80,249 • **Kevan Herold**, NIH, *Analysis of Beta Cell Death in Type 1 Diabetes*, 2.9 years, $806,617 • **Raimund Herzog**, NIH, *Human Brain Ketone Metabolism in Type 1 Diabetes and Hypoglycemia*, 2 years, $164,219 • **Karen Hirschi**, NIH, *Neurovascular Regeneration*, 5 years, $4,751,619 • **Mark Hochstrasser**, NIH, *Functions and Mechanisms of Deubiquitinating Enzymes*, 3.7 years, $1,334,722 • **Rafaz Hoque**, NIH, *GPR81 & GPR109a Regulate Innate Immune Injury in Sterile Inflammation*, 2 years, $166,500 • **Mark Horowitz**, NIH, *Myeloid Lineage Differentiation and Osteoclast Priming by a Novel Pax5 Cytokine*, 2 years, $389,193 **Yiyun Huang**, **Nabeel Nabulsi**, **Richard Carson**, **Wendol Williams**, NIH, *Novel PET Tracers for Imaging Kappa Opioid Receptor*, 3 years, $2,030,642 • **Natalia Ivanova**, NIH, *Epigenetic Control of the Pluripotent State by Chromatin-Associated Factor Dppa2*, 5 years, $1,644,190 **Joshua Johnson**, NIH, *Use of Fragile X Premutation Knock-In Mouse to Study FXPOI*, 1.8 years, $480,739 • **Elizabeth Jonas**, **Hongmei Li**, **Kambiz Alavian**, NIH, *Role of Bcl-xL in Neuronal Mitochondrial Calcium Dynamics*, 2 years, $455,793 • **Celina Juliano**, NIH, *Identifying Targets of the Piwi/piRNA Pathway in Stem Cells*, 4 years, $474,660 • **Michael Jurczak**, NIH, *Parkin's Role in Hepatic Mitochondrial Turnover and Steatosis and Insulin Resistance*, 2.8 years, $441,339 • **Amy Justice**, NIH, *CHAART Consortia Scientific Meetings*, 3 years, $226,365 • **Arie Kaffman**, NIH, *Microglia Play a Critical Role in the Long-Term Sequelae of Early Life Stress*, 5 years, $2,081,250 • **Naftali Kaminski**, NIH, *Gene Networks beyond Organ Boundaries: Heart, Lung and Pulmonary Vascular Disease*, 1.8 years, $1,025,715 • **Erdem Karatekin**, NIH, *Nucleation and Dynamics of Exocytotic Fusion Pores*, 5 years, $2,236,569 • **Kenneth Kidd**, Department of Justice, *High Resolution SNP Panels for Forensic Identification of Ancestry, Family, and Phenotype*, 2 years, $952,255 • **Tae Hoon Kim**, NIH, *Nuclear, Genomic and Molecular Regulation of Type I Interferon Transcription*, 2 years, $445,290 • **Harriet Kluger**, NIH, *A Research and Training Program for Junior Clinicians in Treating Metastatic Melanoma*, 5 years, $780,420 • **Monica Lee**, NIH, *An Isoform-Specific, Conditional Deletion Approach to Decipher Akt1 and Akt2 Function*, 3 years, $157,590 **Robert Leeman**, NIH, *Testing Automatic Action-Tendency Retraining in Heavy Drinking Young Adults Using a Novel Self-Administration*, 2 years, $141,900 • **Chiang-Shan Li**, NIH, *Cerebral Correlates of Early Habitual Drinking*, 5 years, $1,189,310; NSF, *A Computational and Neuroimaging Investigation of Prediction and Learning in Cognitive Control*, 3.8 years, $489,315 • **Richard Lifton**, NIH, *Genetics and Genomics of Human Disease*, 4.7 years, $1,570,470 • **Kasia Lipska**, NIH, Toward Personalized Diabetes Care: Understanding Hypoglycemia in Older Adults, 2 years, $166,500 **Xingguang Luo**, NIH, *Deep Sequencing of Genes in Ethanol-Metabolism Pathway in Alcoholism*, 2 years, $343,613 • **Charles Lusk**, NIH, *Establishing a Blueprint for Nuclear Pore Complex Assembly*, 4.8 years, $1,568,666 • **Thomas Lynch**, **Henry Durivage**, NIH, *Yale Comprehensive Cancer Center Support Grant*, 4.9 years, $12,405,033 • **Shuangge Ma**, NIH, *Development of Integrated Analysis Methods and Applications to TCGA Data*, 2 years, $166,500 **Kathleen Martin**, NIH, *Regulation of Vascular Smooth Muscle Cell Plasticity*, 4 years, $1,665,000 • **Kathleen Martin**, NIH, *Novel Targets of Rapamycin in VSMC*, 5 years, $2,061,270 • **Graeme Mason**, NIH, *Brain Acetate and Ethanol Metabolism in Alcohol Dependence and Abuse*, 5 years, $2,730,603 **Aditi Mathur**, NIH, *Role of Plexin C1 in Scleroderma Related Interstitial Lung Disease*, 9 months, $51,185 • **Sherry McKee**, NIH, *Does Guanfacine, an Alpha2 Adrenergic Agonist, Attenuate Stress-Induced Drinking*? 4 years, $1,498,500 • **James McPartland**, NIH, *Neural Markers of Shared Gaze during Simulated Social Interactions in ASD*, 2.8 years, $1,248,750 **Wajahat Mehal**, NIH, *Regulation of Hepatic Repair Response by Metabolites of the Uric Acid Pathway*, 1 year, $333,000 • **Ana-Claire Meyer**, NIH, *Treatment of HIV- Associated Cognitive Impairment*, 3 years, $405,299 • **Wang Min**, NIH, *The Role of Signaling Molecule AIP1 in Pathological Angiogenesis*, 3.9 years, $1,657,751 **Andrew Miranker**, NIH, *Predoctoral Program in Biophysics*, 5 years, $2,634,620 • **Lauren Moore**, NIH, *Mechanistic and Biomarker Studies on Cancer Progression and Taxane Resistance*, 3 years, $106,705 • **Brent Moore**, NIH, *Automated Recovery Line for Medication-Assisted Treatment*, 2.9 years, $1,073,006 • **Evan Morris**, NIH, *Endotoxin-Induced Inflammation Affects Striatal Dopamine: A Raclopride PET Study*, 1.7 years, $457,875; NIH, *PET Imaging of Naltrexone Occupancy of Kappa Receptors in Heavy Drinkers*, 5 years, $3,219,529 • **Richard Nowak**, **David Hafler**, **Jonathan Goldstein**, NIH, *A Phase II Trial of Rituximab in Myasthenia Gravis*, 3.9 years, $4,125,866 • **Chirag Parikh**, NIH, *Progression of Acute Kidney Injury to Chronic Kidney Disease*, 4.9 years, $2,379,999 • **Godfrey Pearlson**, NIH, *3/4 Psychosis and Affective Research Domains and Intermediate Phenotypes*, 2.9 years, $782,105 • **Manoj Pillai**, NIH, *Role of MicroRNAs in Regulation of the Marrow Microenvironment* (*R01HL104070*), 2.6 years, $1,416,035 • **Lori Post**, National Institute of Justice/Department of Justice, *Evaluation of the Domestic Violence Homicide Prevention Initiative*, 4 years, $1,899,856 • **Marc Potenza**, NIH, *Neural Mechanisms of CBT in Cocaine Dependence*, 4 years, $2,393,220 • **Helen Pushkarskaya**, NIH, *Neural Correlates of the Uncertainty Intolerance in Obsessive Compulsive Disorder*, 4.3 years, $730,772 • **Yibing Qyang**, NIH, *Human Tissue-Engineered Blood Vessels Using Induced Pluripotent Stem Cells*, 4.8 years, $2,061,270 • **Lynne Regan**, NSF, *Stimuli-Responsive Nano-Materials from Designed Proteins*, 3 years, $450,000 • **Valerie Reinke**, NIH, *Deciphering Mechanisms Governing Functional Partitioning of the* C. elegans *Genome*, 4 years, $1,265,399 • **Michael Robek**, NIH, *Enhancing Oncolytic Virotherapy with Type III Interferon*, 2 years, $391,701; NIH, *A New Humanized Mouse Model of Chronic Hepatitis B*, 2 years, $456,349 • **John Rose**, NIH, *R56 Development of Chimeric Vesiculo/Alphaviruses as an Alphavirus Vaccine*, 2 years, $1,156,616 • **Marc Rosen**, NIH, *SBIRT* (*Pain Management*) *for Veterans Filing Compensation Claims*, 2.8 years, $554,003 • **Craig Roy**, NIH, *Modulation of Host Cell Function by* Coxiella Burnetii, 1 year, $416,250 • **Robert Schonberger**, NIH, *Integrating Perioperative Care into Treatment of Hypertension*, 5 years, $688,165 • **William Sessa**, NIH, *Phosphorylation and Endothelial Nitric Oxide Production*, 4 years, $1,645,020 • **Gerald Shadel**, NIH, *Nuclear Control of Mitochondrial Gene Expression*, 4.7 years, $1,661,695 • **Robert Sherwin**, NIH, *Glucoregulatory Hormone Interactions in Diabetes*, 4.9 years, $2,964,725 **Frederick Shic**, NIH, *Gaze Modification Strategies for Toddlers with ASD*, 2 years, $457,875 **Frederick Sigworth**, NIH, *Cryo-EM Structure of a Membrane-Embedded Glutamate Receptor*, 2 years, $454,550 • **Michael Simons**, **George Tellides**, NIH, *Angiogenesis and Ischemia*, 4 years, $2,274,578 • **Michael Simons**, **Anne Eichmann**, NIH, *Syndecan Function in Endothelial Cells*, 3.9 years, $1,973,462 • **Rajita Sinha**, **Carlos Grilo**, **Robert Sherwin**, NIH, *Food Cues, Stress and Motivation for Highly Palatable Foods*, 5 years, $3,012,326 • **Mehmet Sofuoglu**, NIH, *Cholinergic Enhancement as Treatment for Nicotine Addiction*, 2 years, $376,106 • **Mark Solomon**, NIH, *Biochemistry of the Anaphase Promoting Complex-Mediated Ubiquitination*, 3.8 years, $1,262,872 • **Stefan Somlo**, NIH, *Mechanisms of Polycystin and Cilia Function in ADPKD*, 4.7 years, $1,810,690 • **Serena Spudich**, NIH, *Central Nervous System Events in Primary HIV Infection*, 1.8 years, $349,559 • **Vinod Srihari**, NIH, *STEP-ED: Reducing Duration of Untreated Psychosis and its Impact in the U.S.*, 4.9 years, $3,690,681 • **Mario Strazzabosco**, NIH, *Epithelial Angiogenic Signaling in Polycystic Diseases of the Liver*, 4.8 years, $1,810,690 **Samantha Streicher**, NIH, *Genome-Wide Case-control Association Study of Pancreatic Cancer in Jews*, 2 years, $84,464 • **Yajaira Suarez**, NIH, *MicroRNAs in Endothelial Cell Activation*, 3 years, $1,454,067 • **Denis Sukhodolsky**, NIH, *Using CBT to Examine Circuitry of Frustrative Non-Reward in Aggressive Children*, 4 years, $1,665,000 • **Patrick Sung**, NIH, *Formation and Resolution of Recombination Intermediates*, 3.7 years, $1,191,308 • **Richard Sutton**, NIH, *Host Genetic Control of HIV*, 4.7 years, $3,710,300 **Seyedtaghi Takyar**, NIH, *MIR-1 is a Critical Regulator of VEGF-Induced Angiogenesis*, 3 years, $735,048 • **Peter Tattersall**, **Susan Cotmore**, NIH, *Molecular Genetics of Parvoviral DNA Replication*, 5 years, $2604392 • **Nicholas Theodosakis**, NIH, *Evaluation of BRAF-Inhibitor Induced Alterations in Glucose Metabolism*, 3 years, $141,696 • **Mary Tinetti**, **Heather Allore**, NIH, *Health Outcome Effects of Common Medications in Elders with Multiple Conditions*, 1.7 years, $457,875 • **Susumu Tomita**, NIH, *Regulation of Glutamate Receptors by Calcium-Dependent Protein Kinase*, 2 years, $832,500 **Derek Toomre**, NIH, *Dynamics of Exocyst Recruitment and Assembly*, 3 years, $1,048,950 **Alda Tufro**, NIH, *Function of Semaphorin3a in Diabetic Nephropathy*, 3.9 years, $999,000 **Benjamin Turk**, NIH, *Modeling Human Phosphorylation Networks through Kinome-Wide Profiling*, 4.7 years, $2,401,355 • **Flora Vaccarino**, NIH, *Genomic Mosaicism in Developing Human Brain*, 5 years, $3,515,307 • **Wendilywn Walker**, **Richard Sutton**, NIH, *Investigating the Genetic Basis of CD4-Intrinsic HIV Control*, 5 months, $76,614 • **Rong Wang**, NIH, *Comparative Effectiveness of Treatments for Acute Myeloid Leukemia in the Elderly*, 2 years, $164,003 • **Sherman Weissman**, NIH, *Cytokines and Lineage Choice in Hematopoietic Precursors*, 2.8 years, $869,130 • **Nicole Wilson**, NIH, *Elucidating the Connections between the SUMO Pathway and the ER Stress Response*, 2 years, $52,464 • **Adam Wisnewski**, DHHS, *Biochemistry Connecting Glutathione and Isocyanate Asthma*, 2 years, $452,011; DHHS, *Signature Peptide Approach to Biomonitor MDI Exposure*, 2 years, $448,083 • **Dianqing Wu**, NIH, *Sustained Signaling for Fibroblast Migration*, 3.8 years, $1,636,695 • **Qin Yan**, DoD, Targeting *Epigenetic Regulator JARID1B in Malignant Melanoma*, 2 years, $399,600 • **Jun Yu**, NIH, *Role of RTN-4 in Artherosclerosis*, 11 months, $416,250 **Christina Yuan**, DHHS, *Understanding How Social Influence and Social Networks Affect EMR Implementation*, 1.3 year, $39,853

Non-federal

Chadi Abdallah, American Psychiatric Association, *Examining the Effect of Ketamine on Glutamate/Glutamine Cycling in Healthy Subjects*, 3.1 years, $45,000 • **Parwiz Abrahimi**, The Paul & Daisy Soros Foundation, *The Paul & Daisy Soros Fellowship for New Americans*, 2 years, $40,000 • **Fuad Abujarad**, Michigan Licensing and Regulatory Affairs (DHHS), *Michigan Workforce Background Check-Enhancement*, 2.6 years, $468,911 • **Meenakshi Alreja**, Foundation for Prader-Willi Research, *Oxytocin Actions on Prefrontal Cortical Circuits in a Mouse Model of Prader-Willi Syndrome*, 2 years, $108,000 • **George Anderson**, University of Southern California (DoD), *Altered Placental Tryptophan Metabolism: A Crucial Molecular Pathway for the Fetal Programming of Neurodevelopmental Disorders*, 1 year, $68,761 • **Emily Ansell**, George Mason University (NIH), *Parent-Adolescent Iterations and Substance Abuse Risk: Gender Differences*, 4 years, $205,401 • **Nicolas Baeyens**, American Heart Association (Founders Affiliate), *Mechanism of Directional Flow Sensing by Endothelial Cells and Atherogenesis*, 2 years, $92,300 • **Sviatoslav Bagriantsev**, American Heart Association, *Studying a Novel Role for K2P Channels as Excitatory Conduits in the Heart and Brain*, 4 years, $308,000 **Oscar Bartulos-Encinas**, Connecticut Innovations, *Cell Therapy with ISL1+ Cardiovascular Progenitor Cells for Cardiac Repair after Myocardial Infarction*, 2 years, $200,000 • **Chyrell Bellamy**, Patient-Centered Outcomes Research Institute, *Increasing Health Care Choices and Improving Health Outcomes Among Persons with Serious Mental Illness*, 3 years, $2,080,934 **Michael Bloch**, Brain & Behavior Research Foundation, *Double-Blind, Placebo-Controlled Trial of N-Acetylcysteine for Pediatric Obsessive-Compulsive Disorder*, 2 years, $58,254; Robert E. Leet and Clara Guthrie Patterson Trust, *A Randomized, Placebo-Controlled Crossover Trial of an N-methyl-D-aspartate Antagonist in the Treatment of Social Anxiety Disorder*, 2 years, $100,000 • **Marcus Bosenberg**, **Harriet Kluger**, Sanford-Burham Medical Research Institute (NIH), *PDK1 as a Novel Target in Melanoma*, 11 months, $70,822 • **Lidia Bosurgi**, American-Italian Cancer Foundation, *Reprogramming Macrophage Polarization through TAM Signaling in Inflammation-Driven Cancer*, 1 year, $35,000 • **Elizabeth Bradley**, **Leslie Curry**, Robert Wood Johnson Foundation, *Health and Social Service Spending and Health Outcomes: A State-level Analysis*, 2 years, $483,056 • **Janet Brandsma**, University of Texas Health Science Center at San Antonio (NIH), *Secondary Screening of HPV16+ Women using HPV16 DNA Methylation Biomarkers*, 1 year, $88,250 **Cynthia Brandt**, Connecticut Children's Medical Center, *Using the Adverse Event Reporting System: Can Analysis be Streamlined by Text Processing?* 11 months, $64,123 **Ketan Bulsara**, Stryker Instruments, *Skull Base Cerebrovascular Dissection Fund #2*, 1 year, $9,999 • **Susan Busch**, Cambridge Health Alliance (DHHS), *Comparative Effectiveness Research Diffusion and Mental Health Care Disparities*, 1 year, $33,333 • **Sonia Caprio**, Wake Forest University School of Medicine (NIH), *B-Cell Function and Cognition in the Restoring Insulin Secretion (RISE) Study*, 1 year, $31,259 • **Jessica Cardin**, Simons Foundation, *GABAergic Contributions to Neural Deficits in a Genetic Model of Autism*, 2 years, $249,955 **David Carlson**, Dartmouth College, In Vivo *Electron Paramagnetic Resonance (EPR) Tooth Dosimetry for Rapid Point-of-Care Diagnostic Assessment of Absorbed Doses of Ionizing Radiation*, 7 months, $84,331 • **Richard Carson**, Astellas Pharma U.S., *Evaluation of HSD1 with C-11-AS2471907-CL*, 4 months, $292,957; Astellas Pharma U.S., *CMC Preparation for [11C]HDD-1683*, 1.5 years, $30,719; Pfizer U.S. Pharmaceuticals Group, *Evaluation of PF-06266047 with LPS and [11C]PBR28*, 1 year, $318,348; Bristol-Myers Squibb Company, *IM136-106; Evaluation and Development of LPA1 Receptor Ligand*, 1 year, $117,882 • **Eda Cengiz**, Juvenile Diabetes Research Foundation International, *Acceleration of Insulin Action by Hyaluronidase during Closed-Loop Therapy*, 2 years, $722,341 • **Anees Chagpar**, Connecticut Breast Health Initiative, *Understanding Intratumoral Heterogeneity in Breast Cancer*, 1 year, $50,000 • **Toby Chai**, New England Research Institutes (NIH), *Plasma NTX and Vitamin D Levels as Prognostic Factors for Surgical Outcomes after Midurethral Slings*, 5 months, $106,212; New England Research Institutes (NIH), *Urinary Incontinence Treatment Network (UITN)*, 1 year, $36,921 **Yung-Chi Cheng**, National Foundation for Cancer Research, *NFCR Fellow Renewal*, 3 years, $225,000 • **Keith Choate**, Doris Duke Charitable Foundation, *Genetics and Pathobiology of Mosaic Skin Disorders*, 1.5 years, $64,800 **Hyung Chun**, American Diabetes Association, *Role of GPCR Mediated FoxO1 Regulation in Diabetic Endothelial Dysfunction*, 3 years, $310,500; American Heart Association, *Endothelium in Health and Disease: Pursuit of Novel Mechanisms to Promote Vascular Homeostasis*, 5 years, $400,000 • **Elizabeth Claus**, Acoustic Neuroma Association, *Genetic Epidemiology of Acoustic Neuroma*, 2 years, $49,199 • **Eve Colson**, The Doctors Company Foundation, *Reform Health Professional Curriculum at Yale*, 3 years, $200,000 • **Gianfilippo Coppola**, Brain & Behavior Research Foundation, *Integrative Regulatory Network Analysis of IPSCs Derived Neuronal Progenitors from Macrocephalic ASD Individuals in a Family-based Design*, 2 years, $60,000 • **Philip Corlett**, International Mental Health Research Organization, *Potassium Channels and Prediction Error: Targeting Schizophrenia with Retigabine*, 3 years, $150,000 **Joseph Craft**, University of Massachusetts (NIH), *Toll-Like Receptors in Systemic Autoimmune Disease*, 9 months, $198,163 • **Larry Davidson**, New York University (NIH), *Person Centered Care Planning and Service Engagement*, 1.3 years, $203,565 • **Vishwa Dixit**, Albert Einstein College of Medicine (NIH), *Glia-Neuron Interaction via IKK-beta/NF-kappaB in Obesity and Related Pre-T2D*, 3 months, $25,752 **Seth Dodds**, OMeGA Medical Grants Association, *OMeGA Grant for Orthopaedic Grand Rounds and Visiting Professorship*, 11 months, $2,500 • **Deepak D'Souza**, Brain & Behavior Research Foundation (formerly NARSAD), *Consequences of Chronic, Heavy, Early Cannabis Use*, 2 years, $99,185 • **Lydia Dugdale**, University of Chicago, *Care of the Dying Patient: Reconciling Paradox*, 2 years, $218,730 • **Stephanie Eisenbarth**, Charles H. Hood Foundation, *Targeting Dendritic Cells to Block Allergen Sensitization in Asthma*, 2 years, $150,000 • **William Elam**, American Heart Association, *Regulation of Cofilin Activity by Phosphorylation and Actin-Binding Proteins*, 2 years, $87,600 **Adrienne Ettinger**, University of New Mexico (DHHS), *Continuing Prospective Birth Cohort Study Involving Environmental Uranium Exposure in the Navajo Nation*, 1 year, $45,951 **Thomas Fernandez**, Regents University of California, San Francisco (NIH), *4/4 The Autism Sequencing Consortium: Autism Gene Discovery in the >20,000 Exomes*, 1 year, $56,901 **Romina Fiorotto**, PSC Partners Seeking a Cure, *Role of Epithelial Toll-Like Receptor-Dependent Innate Immune Responses in the Pathogenesis and Treatment of PSC*, 2 years, $60,000 • **Helen Fox**, **Emily Ansell**, Peter F. McManus Charitable Trust, *Immune System Adaptations Underpinning the Transition from Social to Hazardous Drinking*, 1 year, $49,781 • **Carlos Fragoso**, University of Florida (NIH), *mtDNA Variant Modifiers of Cardiopulmonary Responsiveness to Physical Activity*, 1 year, $16,442 • **Nicola Gagliani**, Cancer Research Institute, *Targeting Th17 Cell Plasticity to Control Colorectal Cancer Development*, 3 years, $164,500 • **Kathleen Garrison**, American Heart Association, *Mobile Mindfulness Training for Smoking Cessation*, 2 years, $154,000 • **Mark Gerstein**, **Valerie Reinke**, University of Washington, Seattle (NIH), *Comprehensive Identification of Worm and Fly Transcription Factor Binding Sites*, 10 months, $680,604 • **Mark Gerstein**, **Kei-Hoi Cheung**, **Philip Askenase**, Baylor College of Medicine (NIH), *Data Management and Resource Repository for the EXRNA ATLAS*, 1 year, $721,737 • **Mark Gerstein**, Jackson Laboratory (NIH), *An Integrative Analysis of Structural Variation for the 1,000 Genomes Project*, 2.9 years, $333,829 • **Thomas Gill**, University of Florida (NIH), *The LIFE Study*, 1 year, $477,703 • **Elena Gracheva**, Rita Allen Foundation, *Mammalian Hibernation as a Model to Understand Temperature Sensitivity*, 5 years, $500,000; Alfred P. Sloan Foundation, *Sloan Foundation Fellowship*, 2 years, $83,250 • **Liqiong Gui**, Rensselaer Polytechnic Institute (NIH), *Differentiating Embryonic Stem Cells Toward Arterial and Venous Endothelial Cells for Vascular Regeneration*, 4.8 years, $137,711 • **Ann Haberman**, University of Pittsburgh (NIH), *Murine Memory B Cell Development and Function*, 1 year, $164,121 **David Hafler**, Dana Farber Cancer Institute (NIH), *Antigen Presentation and T Cell Programming in Human Autoimmune Diseases*, 5 years, $176,395; Nancy Taylor Foundation for Chronic Diseases, *Human Genetic Variation in Cytokine Signaling Pathways and Susceptibility to Autoimmune Disease*, 2 years, $230,000; Dana Farber Cancer Institute (NIH), *Project 3: T:B Collaboration and Induction of Autoimmune Tissue Inflammation*, 5 years, $35,279 • **James Hansen**, Radiological Society of North America, *Targeting Glioblastoma with a Lupus Autoantibody*, 2 years, $152,000 • **Kevan Herold**, JDRF, *Epigenetic Modifications of the Insulin Gene in Response to Beta Cell Stress*, 5 years, $739,564; Albert Einstein College of Medicine (NIH), *Impact of HSV-2 on Female Genital Tract Mucosal Immunity and HIV Infection*, 1.2 years, $103,230; Juvenile Diabetes Research Foundation International, *ITN027AI Follow up Study Proposal*, 2 years, $211,284; Juvenile Diabetes Research Foundation International, *Phase II Trial of Bydureon in Patients with Established Type 1 Diabetes*, 3 years, $2,221,714 • **Erica Herzog**, Bristol-Myers Squibb Company, *Innovative Studies of Pulmonary Fibrosis*, 3 years, $250,000 • **Michael Higley**, Simons Foundation, *Regulation of Cortical Circuits by tsc1 in GABAergic Interneurons*, 1 year, $69,443 • **Erin Hofstatter**, Terri Brodeur Breast Cancer Foundation, *Evaluation of Age-related Epigenetic Changes in the Breast as Risk Factors for Breast Cancer Development*, 2 years, $100,000 • **Rafaz Hoque**, The Global Fibrosis Foundation, *GPR109a and GPR81 Agonists as Novel Therapies for Pancreatic Injury and Fibrosis*, 1 year, $30,000 • **Tamas Horvath**, Vanderbilt University (NIH), *Molecular and Cellular Basis for the Efficacy of Bariatric Surgery*, 1 year, $47,388 • **Jeannette Ickovics**, Patrick and Catherine Weldon Donaghue Medical Research Foundation, *Evaluation of the Early Consumer Experience Enrolling into Access Health CT*, 9 months, $15,000 • **Melinda Irwin**, Breast Cancer Research Foundation, *Biological and Biochemical Effects of Exercise and Diet on Breast Tissue*, 1 year, $240,000 • **Daniel Jane-Wit**, American College of Cardiology, *Developing Novel Diagnostic Methods and Therapeutics for Cardiac Allograft Vasculopathy*, 1 year, $70,000 • **Ryan Jensen**, Ovarian Cancer Research Fund, *A 'Cellular Switch' to Modulate BRCA2-Mediated Tumor Progression*, 3 years, $450,000 • **Susan Kaech**, Mayo Clinic College of Medicine (NIH), *Effects of Aging on STAT3 Function in T Cells*, 1 year, $96,978 • **Amanda Kallen**, Washington University in St. Louis (NIH), *H19 lncRNA-Mediated Regulation of Gene Expression in Granulosa Cells*, 1 year, $135,000 **Naftali Kaminski**, University of Pittsburgh (NIH), *Lung Tissue Research Consortium (LTRC): Clinical Centers Core*, 1.4 years, $11,223; University of Pittsburgh (NIH), *Implications and Stability of Clinical and Molecular Phenotypes of Severe Asthma*, 11 months, $11,885; University of Pittsburgh (NIH), *Sarcoidosis and MAT Genomics & Informatics Center*, 1.4 years, $553,612 • **Kaveh Khoshnood**, Bhutan Foundation, *Training the Royal Institute of Health Sciences Faculty and Students in Capacity and Curriculum Development for New Public Health Programs in Bhutan*, 1 year, $53,748 • **Tae Hoon Kim**, Connecticut Innovations, *Pluripotency and Heterochromatin Topology*, 4 years, $750,000 • **Joseph Kim**, Conquer Cancer Foundation, *Systematic Evaluation of Immune Modulatory Effect of Radium 223*, 1.5 years, $52,637 **Roger Kim**, American Society of Nephrology, *The Effects of Dopamine and Angiotensin-II on NHE3 Patterns of Phosphorylation*, 11 months, $52,000 • **Steven Kleinstein**, Fred Hutchinson Cancer Research Center (NIH), *Development of the HIPC Database and Research Portal*, 11 months, $75,374; Mayo Clinic of Rochester (NIH), *Integration of HIPC Data to ID Common Signatures of Influenza Vaccination Response*, 1 year, $84,279; Mayo Clinic of Rochester (NIH), *Development of HIPC Data Standards*, 1 year, $229,177 • **Steven Kleinstein**, **Kei-Hoi Cheung**, Stanford University (NIH), *Enabling Systems Immunology through Ontological Normalization and Analysis of Literature Based Standards*, 1.1 years, $133,200 • **Yuval Kluger**, New York University School of Medicine (NIH), *Role of Nuclear Organization in Protecting Genome Stability during Recombination*, 1.2 years, $21,595 • **Albert Ko**, Vanderbilt University (NIH), *MEPH: Odetunde Site Support*, 1 year, $11,664 • **Harlan Krumholz**, Robert Wood Johnson Foundation, *The RWJF Clinical Scholars Program: First Year Cohort (2013-2015)*, 2 years, $747,498 • **John Krystal**, University of Texas Health Science at Houston (DoD), *CAP-Biomarkers Core (Neuroimaging)*, 1 year, $227,546 • **Priti Kumar**, Connecticut Innovations, *Human ES-Derived Neuronal Cell Culture Systems for Investigating West Nile Virus Pathogenesis*, 2 years, $200,000 • **TuKiet Lam**, Cerno Bioscience (NIH), *High Accuracy and High Throughput MS Screening for Large Numbers of Compounds in Complex Food Samples*, 10 months, $39,023 • **Eli Lebowitz**, Brain & Behavior Research Foundation, *Motion Tracking for the Study of Avoidance in Anxiety Disorders*, 2 years, $58,121 • **Patty Lee**, Flight Attendant Medical Research Institute, *TLR4-Mediated Emphysema: Role of Aging*, 3 years, $325,500 • **Chun Geun Lee**, Brown University (NIH), *MAPGen-Yale and Collaborators Supplemental Proposal*, 10 months, $16,925; Brown University (NIH), *Distinct and Overlapping Pathways of Fibrosis and Emphysema in Cigarette Smokers*, 10 months, $81,322 • **Rafael Lefkowitz**, University of Washington, Seattle (DHHS), *Assessing Hearing Conversation Effectiveness*, 1 year, $225,200 • **Judith Lichtman**, American Heart Association (Founders Affiliate), *Preventable Readmission after Ischemic Stroke in the Elderly*, 3 years, $197,248 **Janghoo Lim**, National Multiple Sclerosis Society, *The Role of Nemo-like Kinase in Oligodendrocyte Development*, 1 year, $44,000 **Haifan Lin**, **Diane Krause**, Connecticut Innovations, *Continued Service and Technology Development at the Yale Stem Cell Center Cores*, 1 year, $500,000 • **Yi-Hwa Liu**, American Heart Association (Founders Affiliate), *Detection, Correction and Quantification Methods for Molecularly Targeted SPECT/CT Imaging of the Heart*, 3 years, $198,000 • **Chi Liu**, American Heart Association, *Quantitative Dynamic SPECT/CT Imaging of Cardiac Sympathetic Innervation*, 3 years, $197,859 • **Arya Mani**, American Diabetes Association, *The Mechanisms of Combined Hyperlipidemia Caused by Altered Wnt Signaling*, 3 years, $310,500 **Robin Masheb**, The John B. Pierce Laboratory (NIH), *The Gut-Brain Axis: A Novel Target for Treating Behavioral Alterations in Obesity*, 3.8 years, $31,428 • **Wajahat Mehal**, Dynavax Technologies (NIH), *The Development of TLR Antagonists for Therapy of Liver Fibrosis and Cirrhosis*, 1.1 years, $135,000 • **Lauren Metskas**, American Heart Association, *Dynamics of the Cardiac Troponin I C-Terminus: The Effect of Hypertrophic Cardiomyopathy Mutations on Contact Rates in Troponin Complexes and Thin Filaments*, 2 years, $44,000 • **Ana-Claire Meyer**, World Federation of Neurology, *Augmenting Human Resources for Neurological Care in East Africa: Developing a Foundation for Post-Graduate Neurology Training Program*, 1 year, $49,600 • **Wang Min**, Oklahoma Medical Research Foundation (NIH), *The Role of Signaling Adaptor Protein Epsin in Atherosclerosis*, 5 months, $9,420 • **Pramod Mistry**, Mount Sinai School of Medicine (NIH), *Understanding the Skeletal Phenotype of Gaucher Disease*, 1 year, $238,291 • **Ruth Montgomery**, Mayo Clinic of Rochester (NIH), *Influenza Tetramers and Cy TOF*, 1 year, $56,239; Mayo Clinic of Rochester (NIH), *Deciphering the Role of Natural Killer Cells in Resistance to Infection with West Nile Virus*, 1.5 years, $101,998 • **Ruth Montgomery**, **Xiaoling Yuan**, Mayo Clinic of Rochester (NIH), *Enabling Advanced High and Low Level Analytics for Luminex Technology*, 1 year, $4,995 • **Evan Morris**, Duke University (NIH), *Fast-Fail Trials in Mood and Anxiety Spectrum Disorders (FAST-MAS)*, 1.2 years, $863,095; Pfizer, U.S. Pharmaceuticals Group, *Receptor Occupancy of PF-06659286 at GABAA-BZRS in Non-Human Primates Using (11C) Flumazenil PET*, 2 months, $235,265 • **Alan Morrison**, Northwestern University, *Macrophage B3 Integrins Signal Through Non-Muscle Myosin IIA Modulate VEGF-A Protein Levels During Ischemia-Induced Arteriogenesis*, 1.6 years, $500 **Walther Mothes**, Drexel University College of Medicine (NIH), *Structure-Based Antagonism of HIV-1 Envelope Function in Cell Entry*, 4.9 years, $435,537 • **Adam Naples**, Autism Science Foundation, *Cross-Modal Automated Assessment of Behavior during Social Interactions in Children with ASD*, 1 year, $5,000 **Kevin O'Connor**, Myasthenia Gravis Foundation of America, *EPITOME (Efficacy of Prednisone in the Treatment of Ocular MyasthEnia)*, 1 year, $50,000; EMD Serono, *B Cell-Mediated Autoimmunity in MS: Understanding Autoantibody Production and Defects in B-Cell Tolerance Mechanisms*, 2 years, $280,000 • **Elaine O'Keefe**, Central CT Health District, *Central CT Health District Workforce Development Plan*, 5 months, $12,000

// Grants *(page 8)*

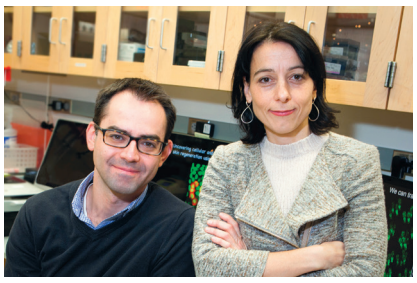
Foundation recognizes geneticist's promise

Panteleimon Rompolas, PH.D., MBA, postdoctoral fellow in genetics, is the recipient of a 2014 Blavatnik Regional Award for Young Scientists in the category of life sciences.

The award, which carries an unrestricted cash prize of $30,000, honors Rompolas' contributions to the understanding of tissue development and regeneration. His research, conducted in the lab of Valentina Greco, PH.D., associate professor of genetics and dermatology, includes examining hair follicle stem cell behavior.

To directly address how stem cells maintain and regenerate adult tissues, he developed a system that established for the first time the ability to visualize stem cells in their native environment in real-time in mammalian skin. This research, published in 2012 and 2013 in the journal *Nature*, has enhanced our understanding of stem cell function in live mammalian tissue, and the influence of cell position on cell behavior and fate.

Rompolas is a current Druckenmiller Fellow with the New York Stem Cell Foundation and in 2013 received



TERRY DAGRADI

Panteleimon Rompolas (left) is a postdoctoral fellow in the lab of Valentina Greco (right).

the Merton Bernfield Memorial Award from the American Society for Cell Biology. He earned his B.SC. at the National and Kapodistrian University of Athens in Greece, and his PH.D. and MBA at the University of Connecticut.

The Blavatnik Regional Awards for Young Scientists were established in 2007 to honor outstanding postdoctoral scientists in Connecticut, New York, and New Jersey. They are administered by the Blavatnik Family Foundation, which is led by industrialist and philanthropist Len Blavatnik, and the New York Academy of Sciences, an independent non-profit group committed to advancing science, technology, and society worldwide.

Two on faculty assume new leadership roles

The new academic year has seen a shifting of roles within Yale's largest graduate program with the appointment of its director, Lynn Cooley, PH.D., as dean of Yale's Graduate School of Arts & Sciences (GSAS).

Cooley, the C.N.H. Long Professor of Genetics, stepped down as leader of the Combined Program in Biological and Biomedical Sciences (BBS) July 1 to assume the deanship of GSAS. She is succeeded as BBS director by Anthony J. Koleske, PH.D., professor of molecular biophysics and biochemistry and of neurobiology.

Cooley, also professor of cell biology and of molecular, cellular, and developmental biology, had served as BBS director since 2001. She received her B.A. from Connecticut College, and earned her PH.D. at the University of Texas for research carried out with Dieter Söll, PH.D., Sterling Professor of Molecular Biophysics and Biochemistry and professor of chemistry. She was a postdoctoral fellow at the Carnegie Institution for Science, where she established new methods using transposable elements

CARL KAUFMAN

Anthony Koleske (left) succeeds Lynn Cooley (right) as director of the Combined Program in Biological and Biomedical Sciences.

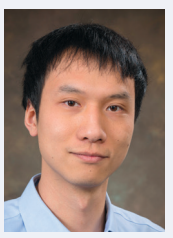
for genetic and molecular analysis of genes in the fruit fly *Drosophila*.

Koleske has served as director of graduate admissions for the BBS Program's Molecular Biophysics and Biochemistry track and its successor, the Biochemistry, Biophysics, and Structural Biology track. He is a member of the executive committees of the Interdepartmental Neuroscience Program and the Cellular and Molecular Biology Training Program.

Koleske earned his PH.D. and completed a postdoctoral fellowship at MIT. His research is focused on the mechanisms underlying cell adhesion and how these processes break down in cancer and neurodegenerative diseases.

// Grants *(from page 7)* **Darren Opland**, Hilda & Preston Davis Foundation, *Exploring Sex Differences in Anticipatory Negative Contrast Behavior by Manipulating Labeled Neural Ensembles*, 3 years, $153,000 • **Nicole Overstreet**, Fordham University (NIH), *Ethical Considerations in Intimate Partner Violence Research: Examining the Role of Stigma*, 10 months, $19,175 • **John Pachankis**, Hunter College, City University of New York (NIH), *Multicomponent Intervention to Reduce Sexual Risk and Substance Use*, 1 year, $8,500; Hunter College, City University of New York (NIH), *Compulsive Behaviors, Mental, Health, and HIV Risk*, 1.6 years, $8,000 **Chirag Parikh**, University of Pittsburgh (NIH), *Biomarker Collection and Analysis in the PRESERVE Trial Cohort*, 1 year, $55,565 • **John Pawelek**, Access Business Group International, *Hyperpigmented Disorders of the Skin; Pathology and Model Development*, 3 years, $174,825 **Kevin Pelphrey**, University of Texas at Dallas, *Virtual Reality Social Cognition Training for Adults with Autism Spectrum Disorders*, 10 months, $20,000 • **Rafael Perez-Escamilla**, Baylor College of Medicine (DHHS), *LATCH: Lactation Advice thru Texting Can Help*, 2 years, $250,000 • **Melinda Pettigrew**, Duke University (NIH), *Antibacterial Resistance Leadership Group (ARLG)*, 1 year, $34,202; State University of New York at Buffalo (SUNY) (NIH), *Persistent H. Influenzae in COPD: Virulence Vaccines and Antibiotic Resistance*, 11 months, $86,022 • **David Pitt**, Novartis Pharmaceuticals Corporation, *Expression of S1P Receptors in Multiple Sclerosis Lesions*, 2.2 years, $250,340; Dana Farber Cancer Institute (NIH), *Regulation of T Cell Immunity by Stromal Cells in Autoimmune Tissue Inflammation*, 1 year, $5,645 • **Cristina Ramirez-Hidalgo**, American Heart Association, *Role of miR33 during Progression and Regression of Atherosclerosis*, 4 months, $15,305 • **Anna Rhoades**, University of Minnesota (NIH), *Modeling Synaptic Vesicles: How Does Alpha-Synuclein Inhibit Fusion*, 4.9 years, $187,305 • **David Rimm**, Breast Cancer Research Foundation, *Whole Exome Sequencing of Cancer Samples from the NeoALTTO Clinical Trial and Studies of Immunologic Targets in Breast Cancer*, 1 year, $240,000; Board of Trustees of the Leland Stanford (NIH), *High-Content Pathology with Confocal Microscope Arrays*, 10 months, $83,250 • **Panteleimon Rompolas**, Connecticut Innovations, *Elucidating the Role of Stem Cells in the Skin Tumor Pilomatricoma by* In Vivo *Imaging*, 2 years, $200,000 • **James Rothman**, G. Harold and Leila Y. Mathers Charitable Foundation, *Mechanism of Membrane Fusion by SNARE Proteins in Glucose Homeostasis and Exocytosis*, 1 year, $481,855 • **Nancy Ruddle**, **Matthew Rodeheffer**, Connecticut Innovations, *The Role of Adipocyte Stem Cell in Lymphatic Vessel Differentiation*, 2 years, $200,000 • **Gerard Sanacora**, Massachusetts General Hospital (NIH), *Double-Blind, Placebo-Controlled, Proof-of-Concept (POC) Trial of Ketamine Therapy in Treatment-Resistant Depression (TRD)*, 1.7 years, $354,237 • **Lauren Sansing**, Robert E. Leet and Clara Guthrie Patterson Trust, *Monocyte Differentiation and Outcome after Intracerebral Hemorrhage*, 2 years, $25,000 • **Carolyn Sartor**, Robert E. Leet and Clara Guthrie Patterson Trust, *The Contributions of Genetic Liability, Parenting and Childhood Trauma to the Development of Problem Substance Use in Young African-American and White Women*, 2 years, $100,000 • **Mark Schlesinger**, Robert Wood Johnson Foundation, *Encouraging Physicians' Precommitment to Less-intensive Care to Reduce Use of Clinical Services of Low or Questionable Value*, 2 years, $213,652 **William Sessa**, American Heart Association, *Identification of Novel Mechanisms of LDL Uptake into Endothelium*, 2 years, $150,000 **Gerald Shadel**, Connecticut Innovations, *Testing the Oxidative Stress Theory of Ataxia-Telangiectasia Pathology Using Induced Pluripotent Stems Cells*, 2 years, $200,000 • **Yushane Shih**, American Heart Association (Founders Affiliate), *Optimizing Tissue Engineered Grafts by Computational Modeling*, 1 year, $22,000 • **Gerald Shulman**, American Diabetes Association, *Role of Apolipoprotein A5 in the Regulation of Ectopic Lipid and Insulin Resistance*, 2 years, $124,140; Georgia Regents University (NIH), *Energy Expenditure Working Group Collaborative Project*, 1 year, $24,975 • **Alexa Siddon**, Cap Foundation Scholars Program, *Implementation of a Novel Flow Cytometric Assay for Assessing Patients with Suspected Hemophagocytic Lymphohistiocytosis*, 1 year, $8,832 • **Wendy Silverman**, Florida International University (NIH), *Attention Bias Modification Training in Child Anxiety CBT Nonresponders*, 2.5 years, $38,463 • **Megan Smith**, Community Foundation for Greater New Haven, *New Haven MOMS Partnership*, 3 years, $130,000 • **Serena Spudich**, Brigham and Women's Hospital (NIH), *AIDS Clinical Trials Group (ACTG) Leadership and Operations Center*, 11 months, $31,993 • **Hanna Stevens**, Klingenstein Third Generation Foundation, *Gene-Environment Interaction and ADHD: Translation Between Rodent and Human Models of Prenatal Stress, Genetic Risk, and Postnatal Environment*, 2 years, $60000 • **Stephen Strittmatter**, Alzheimer's Association, *Signaling by Aß Oligomer in the Post-Synaptic Density*, 3 years, $449,997; Axerion Therapeutics (NIH), *Small Molecule Development of PrPc Antagonists for the Treatment of Alzheimer's Disease*, 8 months, $165,741 • **Sumati Sundaram**, Connecticut Innovations, *Potential of Human Pluripotent Stem Cell-Derived Mesenchymal Stem Cells for Lung Tissue Engineering*, 2 years, $200,000 • **Richard Sutton**, Texas Tech University (NIH), *Investigating the Genetic Basis of CD4-Intrinsic HIV Control*, 7 months, $5,928 **Joann Sweasy**, University of Southern California (NIH), *DNA Polymerase Fidelity Mechanisms: Theory and Experiment*, 1 year, $155,975 • **Jean-Leon Thomas**, Connecticut Innovations, *Vascular Growth Factor Signaling in Human Neural Stem Cells*, 2 years, $200,000 • **Mary Tinetti**, John A. Hartford Foundation, *Improving the Care of Persons with Complex Health Needs: Realigning the Patient, Primary Care, and Specialty Care Relationship toward Patient-Centered Care*, 1.5 years, $497,734; American Federation for Aging Research, *John A. Hartford Foundation's Center of Excellence in Geriatric Medicine and Training*, 1 year, $88,000 **Tamara Vanderwal**, American Academy of Child and Adolescent Psychiatry, *Intrinsic Connectivity Networks in Young Children*, 2 years, $60,000 • **Pamela Ventola**, Autism Science Foundation, *Sex Differences in the Neural Mechanisms of Treatment Response*, 1 year, $5,000 • **Narendra Wajapeyee**, International Association for the Study of Lung Cancer, *Targeting Metabolic Drivers of Lung Cancer*, 2 years, $80,000 • **Emily Wang**, Robert E. Leet and Clara Guthrie Patterson Trust, *Risk of Morbidity and Mortality Upon Release from Correctional Facilities Among Medicare Beneficiaries*, 2.5 years, $100,000 • **Stephen Waxman**, **Yang Yang**, Connecticut Innovations, *Modeling Chronic Pain Condition with iPS Cells from Patients with "Man on Fire" Syndrome for Better Pharmaco-Genomic Analysis and Drug Testing*, 2 years, $200,000 • **Stephen Waxman**, European Commission, *Propane Study*, 3 years, $1,111,851 • **Jadon Webb**, American Academy of Child and Adolescent Psychiatry, *Meta-Analysis: Do Stimulants Work as "Smart Pills"? The Cognitive Effects of Stimulants in Healthy Adults without ADHD*, 1.2 years, $24,975 **Li Wen**, IACOCCA Family Foundation, *Dampening Diabetogenic Commensal Bacterial to Prevent and Treat Type 1 Diabetes*, 1 year, $99,990; American Diabetes Association, *Innate Immunity and Dendritic Cells in Obesity of Mouse and Man*, 3 years, $310,500 • **Scott Woods**, TeleSage (NIH), *MPSY IRT-Base Self-Report Screener for Prodrome Schizophrenia Early Psychosis-Phase II*, 2 years, $26,541 • **Andrew Xiao**, Connecticut Innovations, *Improving the Fidelity of Human iPSC with Epigenetic and Chemical Genetic Approaches*, 3 years, $532,500 **Yong Xiong**, Veterans Medical Research Foundation (NIH), *Inhibiting Immune Evasion by HIV-1 Nef to Facilitate Eradication*, 2 years, $108,225 • **Qin Yan**, American Cancer Society, *Functional Analysis of Histone Demethylase RBP2 in Breast Cancer*, 4 years, $720,000 **Jie Yao**, Connecticut Innovations, *Characterize Nuclear Lamina-Associated Chromatin in Human ES Cells*, 2 years, $200,000 • **Lawrence Young**, American Heart Association (Founders Affiliate), *The DDT Pathway in the Ischemic Heart*, 3 years, $198,000 • **Zhong Yun**, Connecticut Innovations, *Hypoxia and Maintenance of Human Cancer Stem Cells*, 2 years, $200,000 • **Hai Feng Zhang**, American Heart Association, *Function of CCM3 in Pericyte/SMC: Mechanism and Disease Model*, 4 years, $308,000 • **Yongli Zhang**, Brain Research Foundation, *Structures, Stabilities, and Formation Kinetics of Amyloid Beta Precursors and Oligomers*, 1 year, $50,000 • **Jing Zhou**, American Heart Association, *Graft-Related Host Cardiovascular Disease*, 4 years, $308,000 **Lingjun Zuo**, Alcoholic Beverage Medical Research Foundation (ABMRF), *Post-GWAS Search for Risk Loci for Alcohol and Nicotine Co-Dependence Using Third-Generation Sequencing*, 2 years, $100000

Awards & Honors



Three Yale scientists are among 50 recipients of the 2014 National Institutes of Health Director's New Innovator Awards. The $1.5 million awards support innovative approaches to major challenges in biomedical research today. With the award's support, **Murat Acar**, PH.D. (top), assistant professor of molecular, cellular, and developmental biology and of physics, will work to uncover novel connections between single-cell aging and cellular metabolism, chromosome instability, and protein misfolding. **Chenxiang Lin**, PH.D. (middle), assistant professor of cell biology, will aim to generate artificial membranes to better study membrane trafficking in cells. **Matthew Simon**, PH.D. (bottom), assistant professor of molecular biophysics and biochemistry, will use organic chemistry and enzyme engineering to research RNA dynamics in the cell.