Life-changing care forges a family-physician bond

Following a global trek for the right care, a family finds success, and calm, at Yale

Hal Blumenfeld, M.D., Ph.D., the recently named Mark Loughridge and Michele Williams Professor of Neurology, has spent his career trying to prevent loss of consciousness in people with epilepsy.

Earlier this year his team reported in the journal Epilepsia that impaired consciousness during and after focal seizures can be reversed by deep brain stimulation. Now he is working toward making the treatment available for patients. The discovery comes after more than a decade of research on the mechanisms of consciousness loss in focal seizures, including a landmark article recently published in Neuron, as well as research on the physiological changes in what are called absence seizures and generalized tonic-clonic seizures.

Says Blumenfeld, “My research is one hundred percent motivated [by a desire to] improve the lives of people with epilepsy. Consciousness impacts their ability to drive a car and to function at school or in other social situations.”

Blumenfeld is making significant progress, and few know better how important that is than the family who earlier this year endowed his professorship.

Meghan Loughridge’s father, Mark Loughridge, and stepmother, Michele Williams, had taken Meghan around the world looking for a way to control her epilepsy. Eventually they found themselves in Houston, at another hospital, waiting for yet another test. Meghan was scared, but this was nothing unusual.

Mark describes Meghan’s life as “a movie with every fifth frame missing.” She would have 30 seizures in a single minute and one daily grand mal seizure, the kind characterized by a loss of consciousness and violent muscle contractions.

A more precise approach to dyslexia

Pediatrician aims to reduce the impact of a broad range of learning disabilities

Jeffrey R. Gruen, M.D., professor of pediatrics and genetics, is taking a holistic view in working to remedy learning disabilities. Focusing on reading, attention, and mathematics disabilities, Gruen and his colleagues are preparing to follow around 3,200 first-graders in New Haven Public Schools (NHPS) over five years.

The new study, called the New Haven Lexinome Project (NHLP) and supported by a grant from the New York-based Manton Foundation, focuses on “genes-by-environment” effects: Gruen’s team is studying how home and cultural environments interact with a child’s genetics to influence his or her learning.

Says Gruen, “Disabilities in schoolchildren cost billions for federal, state, and local intervention programs. We hope to improve the effectiveness of those efforts by harnessing the predictive tool of genetics to target the kids who can benefit most from help, and to precisely match them with their optimal intervention.”

The NHLP builds on Gruen’s previous work in the field. In 2005 the journal Science described his discovery of the gene DDC2—once of just a handful of genes associated with dyslexia—as the fifth most important breakthrough of that year. In 2008 Gruen coined the term human lexinome to capture all of the genes and specific physiological changes in what are called absence seizures and generalized tonic-clonic seizures.

Using “precision education,” a team led by Jeffrey Gruen (left) is collecting data on about 3,200 first-graders in New Haven schools to further our understanding of and ability to predict and address dyslexia. A gift from the Manton Foundation is supporting the team’s research.

Foundation enables continued progress in stem cell research

Earlier this year, Haifan Lin, Ph.D., director of the Yale Stem Cell Center (YSCC), and colleagues discovered a potentially unique ability of stem cells: they can avert the damaging effects of stress better than regular cells. Stem cells are biologically valuable because they can both differentiate into other kinds of cells and divide to produce more stem cells. The team’s findings suggest that stem cells are designed to avoid passing on damaged DNA that could cause molecular-level irregularities, like cancer. The research was published in the journal Stem Cell Reports.

A $1.86 million grant from the Li Ka Shing Foundation made to YSCC earlier this year will help the Center continue similarly innovative research.

The grant will help fund new research equipment and strengthen collaborations between Yale and Shantou University (STU), in southeastern China. The Hong Kong businessman Li Ka-shing founded STU. A self-made billionaire, Li dropped out of high school to help earn money for his family. He has spent his career building his company, which he endowed a new professorship in neurology.
LIFELINES

A willingness to question dogma keeps a Yale immunologist motivated

For as long as she could, Akiko Iwasaki, Ph.D., resisted a call to basic science research. She grew up outside Osaka, in the Kansai region of Japan, with a physicist father who spent long nights studying. The lifestyle initially did not appeal to her. But later, as an undergraduate at the University of Toronto, she discovered immunology, and found she could no longer deny her innate attraction to science.

Iwasaki, professor of immunobiology and of molecular, cellular, and developmental biology and a Howard Hughes Medical Institute investigator, has built a career asking research questions that examine accepted tenets within the field of immunology. Her doctoral thesis, also at the University of Toronto, was about why the common cold spreads more readily in the winter months. Researchers assumed rhinovirus evolved to function best in cooler climates—and in the nasal cavity, usually colder than the rest of the body. But when her team incubated the virus in airway cells in a warm environment, it not only survived, but grew, when the host’s immune cells lacked key defense genes.

These studies suggested it may be the host immune response, rather than the virus, that determines the virus’s growth. The immune system itself appears “impaired at the lower body temperature compared to the core body temperature,” Iwasaki says.

The findings, published in Proceedings of the National Academy of Sciences last January, suggest that colder temperatures “dampen” cell receptors designed to detect rhinoviruses, and therefore the immune system never gets a memo to attack.

In parallel, Iwasaki’s team is investigating the immune defense against influenza viruses, particularly among older adults. In the U.S., more than 90 percent of deaths from influenza occur among adults over 65. A vaccine that helps older adults fight the flu would mark a huge breakthrough—and Iwasaki is hopeful that will come.

Since she started her lab at Yale in 2000, Iwasaki’s peers have frequently recognized her work. In 2003 she received the Wyeth Lederle Young Investigator award from the Infectious Diseases Society of America. The Burroughs Wellcome Fund recognized her research on the pathogenesis of infectious diseases in 2005.

The American Association of Immunologists awarded her the BD Biosciences Investigator Award in 2011. And in 2012 the American Society for Microbiology honored her work on the role of autophagy, or “self-eating,” in antiviral immunity with the Lilly Research Award.

What drives Iwasaki’s productivity? “The fun of it,” she says. Next, she wants to figure how to fight viruses by harnessing the infection-fighting power of T cells, rather than relying only on antibodies, as most current vaccines do. Such work could have implications for the treatment of HIV and the herpes simplex type 2 virus.

At home, Iwasaki can puzzle out experiments with her husband, Ruslan M. Medzhitov, Ph.D., the David W. Wallace Professor of Immunobiology and a Howard Hughes Medical Institute investigator. And their two daughters, ages 5 and 7, routinely drop immunology-related vocabulary into conversation, she says.

This suggests yet another accomplishment: she’s passed on the fun of science.

International collaboration opens doors for student researchers

When Daniel Colón-Ramos, Ph.D., associate professor of cell biology, arrived from Puerto Rico as a freshman at Harvard in 1994, things didn’t quite go as planned. Once in his dorm room, he felt dizzy and recalls telling his roommate, “I’m dying. You have to take me to the hospital.”

The hospital physicians suspected meningitis, but results on a spinal tap were negative. Following a phone call between Puerto Rican and American physicians, it came to light that “these were all the symptoms of dengue fever. I was coming in with a tropical disease,” Colón-Ramos says.

With this global context in mind, Colón-Ramos has spearheaded a new M.D./Ph.D. collaboration with the University of Puerto Rico (UPR). Starting this year, students accepted in the M.D. program at UPR can apply to Yale’s Combined Program in the Biological and Biomedical Sciences and will be assigned mentors while studying for their Ph.D.s in New Haven. After completing their research, they will return to UPR for the final year of medical school.

The training that UPR students receive at Yale will prepare them for careers as physician-scientists, currently a small community in Puerto Rico’s medical community. But they will also bring their island experiences to enrich the environment at Yale.

“We’re training our next generation,” says Urroyo Walker, Ph.D., president of UPR. “And when I say ours, I mean the world’s.”

Heeding the call of basic research

School of Nursing alumna returns to lead the school

Ann Kurth, Ph.D., M.P.H., B.N., M.S.N., a global health expert and a Yale School of Nursing (YSN) alumna, will return to Yale as YSN’s new dean on January 1, 2016.

Kurth, associate dean for research at New York University College of Global Public Health and the inaugural Pauline Goddard Professor of Global Health Nursing at New York University College of Nursing (NYUCN), is a clinically trained epidemiologist with a career-long interest in the prevention, detection, and care of HIV and other sexually transmitted infections.

“[Kurth’s] leadership in promoting health care around the world fits ... with the YSN mission of promoting better health for all,” Yale President Peter Salovey wrote to the University community.

At NYUCN Kurth is also professor of medicine and executive director of NYUCN Global, which supports research and improved health care infrastructure. In addition to her M.S.N. from YSN, she holds an A.B. magna cum laude from Princeton University, an M.P.H. from Columbia University, and a Ph.D. in epidemiology from the University of Washington. She is a fellow of the National Academy of Medicine and a member of the U.S. Preventive Services Task Force that sets screening guidelines for the country.

Kurth succeeds Margaret Grey, Dr.P.H., B.N., the Annie W. Goodrich Professor of Nursing, who stepped down in August. Holly Farrell Williams, Ph.D., executive deputy dean and the Helen Varney Professor of Midwifery, is serving as interim dean.

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Managing Editor Charles Goddard

Contributors Jenny Rian, Jessica Carapeto, Dan Hubert, Angela Holmiga, Deff Man, Kathleen Ranson, Colleen Shaddox, Sarah C.P. Williams, Karen Zuo

Design Jennifer Stockwell

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Telephone: (203) 785-9146 Fax: (203) 785-4327 E-mail: medicine@yale.edu

Website medicine@yale.edu

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Peter Salowy (left) and University of Puerto Rico President Uroyoñ Walker at an event celebrating the university’s collaboration, which will bring their island experiences to enrich the environment at Yale.

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Ann Kurth

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Peter Salowy (left) and University of Puerto Rico President Uroyoñ Walker at an event celebrating the university’s collaboration, which will bring their island experiences to enrich the environment at Yale.

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Ann Kurth
Solving a multiple sclerosis mystery

In the field of cancer research, one of the most significant discoveries in the last two decades has been the finding that most cancers are caused by overactive cell division due to genetic mutations. The concept of “precision medicine” now uses a patient’s specific mutations to help treat his or her cancer. For a subset of patients, this approach—matching patients with appropriate targeted drugs—works exceedingly well. But unfortunately, many patients develop treatment resistance over time, after which the cancer can make an aggressive return. “For people like me in the signaling field, it was a pretty major disappointment that resistance can readily develop,” says David F. Stern, Ph.D., professor of pathology and associate director of shared resources at Yale Cancer Center (YCC). “And it’s been a real practical problem for the clinicians.”

Cancer cells, just like healthy cells, try to maintain internal stability, or homeostasis. When single drugs are introduced that interfere with the cells’ division pathways, many eventually switch to parallel pathways that cause the cells to continue dividing.

For Stern, who was researching melanoma, it eventually became clear that these single-agent therapies weren’t going to work well enough. He needed to find a cocktail of drugs that could hit enough targets in the cell to shut down the cancer for good. Six years ago, he and collaborator Marcus W. Rosenberg, M.D., Ph.D., a professor of medicine and associate professor of dermatology and pathology, turned to the Yale Center for Molecular Discovery (YCMD) for help. “We brought the project to them and they said, ‘Yes, we can do this,’ even though no one had done this kind of combination screening here, or really anywhere,” Stern recalls.

The YCMD, one of the core research facilities on Yale’s West Campus in New Haven, Conn., specializes in drug screening and development. “We help faculty access and correctly implement a suite of technologies for early-stage drug design,” explains Janie Merkel, Ph.D., director of biology at the YCMD. The YCMD’s staff includes both biologists and chemists with industry experience. The Center has a range of technologies to screen small molecules for particular effects and to quantify the results in almost any small study system, from plant seeds to nematode eggs to cell lines. Its library contains 150,000 compounds, covering a wide swath of chemical structures that can pass through the cell membrane. Once useful compounds are identified in a screen, the chemists take over, tinkering with their molecular structures to maximize their effectiveness.

When Stern and Rosenberg brought their project to the YCMD, they started with a small single-agent screen on a melanoma cell line, then worked up to a much larger assay using 41 different agents in combination with each other. The advantage of having the screening center here is that we developed this whole system,” he says. “Nobody showed us how to do it. Five or six years ago, there was little published literature in combination work.” It took his team nearly a year to analyze their data: they have since published their work in the journal Cancer Discovery and are hoping to move into clinical trials, while also coordinating similar projects using lung and pancreatic cancer cell lines.

Early-career researchers at the School of Medicine have also benefited substantially from collaborations with the YCMD. Ranjit Bindra, M.D., Ph.D., assistant professor of therapeutic radiology and of pathology, met with Merkel before joining the faculty three years ago. He received a YCMD pilot grant and began investigating drugs that would block DNA repair in tumors. Standard therapies—chemotherapy and radiation—largely tackle cancer by damaging cellular DNA, but cancer cells have DNA repair mechanisms that can diminish the therapies’ effectiveness. Bindra’s team is seeking a class of compounds that inhibit these repair mechanisms, making the cancer more susceptible to treatment.

“It’s easy to think you could do it all yourself,” Bindra says, “but you really need a screening, like these folks, who are going to keep you on track and make sure you design a screen which will get you meaningful hits.” Bindra’s lab has worked on four different projects with the YCMD, two of which are currently running. His work has generated two manuscripts, and Bindra plans to use the preliminary data in an application for federal grant funding.

An initial project with the YCMD often leads to funding from larger institutions, as Chen Yan, Ph.D., associate professor of pathology, discovered when he began research at Yale. Like Bindra, Yan was awarded a YCMD pilot grant shortly after he joined the medical school’s faculty in 2008. He had discovered a category of enzymes that act as major epigenetic regulators, altering gene expression globally—and realized that inhibiting these enzymes might lead to a potential cancer treatment. Searching for a compound to do so, he first screened 15,000 compounds at the YCMD, then increased that number to 106,000 in a second screen, looking for samples where the enzymes had failed to react. His lab discovered a handful of candidates, which later led to a patent and the promise of related research projects. He has successfully applied for two Department of Defense grants as an extension of the work he did at the YCMD and has developed a partnership with the National Cancer Institute.

The YCMD not only provides assay development and drug screening technologies, but also consults on projects and provides grant-writing assistance. The Center is subsidized to provide the best possible costs to School of Medicine faculty. For many researchers, it adds translational potential to their basic science research. And its highly trained staff pride themselves on creating long-term relationships and offering a custom approach to help develop any research project brought to their doorstep. “We’ll be emailing Saturday at seven a.m. going back and forth,” Bindra says. “They’re almost on-call, [as if we’re] in the hospital.”

Says Denton Hoyer, Ph.D., director of chemistry at the YCMD, “It starts with a conversation. Just call us.”
March 27–29 Entrepreneurs, physicians, and engineering students convened at a Hackathon sponsored by Yale’s Center for Biomedical and Interventional Technology (CBIT) and Center for Outcomes Research and Evaluation (CORE) to brainstorm ways to improve clinical care.

May 21 Medical Education Day gave members of Yale’s medical community a chance to share educational projects and research as well as engage in numerous educational sessions.

May 5 At Student Research Day, medical students presented their thesis research for members of the community. M.D./Ph.D. student Genevieve Yang ’17 (left) stands in front of her poster on schizophrenia while M.D./Ph.D. student Wendy Kline ’17 (right) discusses her research project, showcasing data on consciousness collected from electrodes implanted in the brains of patients.

May 18 At the School of Medicine’s Commencement Ceremonies, Howard Koh, M.D. ’77, the Harvey V. Fineberg Professor of the Practice of Public Health Leadership at Harvard University’s T.H. Chan School of Public Health, encouraged members of the Class of 2015 to stay humble. (From left) Adriana Blakaj and Christopher Bartley graduated from the M.D./Ph.D. Program. 2. Jessica S. Wang poses with her diploma. 3. (From left) Ryan Aromberg, Katherine Davis, Nour Kibli, Abijit Gumadavelli, and Brian Letzén.

May 29 Scores of alumni returned to campus on Reunion Weekend. 1. (From left) Kim Fish and her husband Guy Fish, M.D. ’85, with classmates Julie Danaher, M.D. ’83, and Sara Catnall, M.D. ’85. 2. (From left) Linda Maxwell, M.D. ’100, Robert H. Gifford, M.D., former deputy dean for education, and Oscar R. Colegio, M.D. ’00, Ph.D. ’00, assistant professor of dermatology. 3. (From left) Ben Zabar, M.D. ’11, Natalie Spicyn, Ph.D. ’11, Barbara Ann (Hirschman) Chaiyachati, M.D. ’15, Ph.D. ’15, and her husband, Krisda Chaiyachati, M.D., M.P.H. 4. James W. Bona, M.D., assistant professor of emergency medicine, gave a demonstration at the Yale Center for Medical Simulation.

July 20 At a reception for the Covidien Clinical Immersion Program, engineers and workers at the medical device company Covidien were recognized for their successful completion of a yearlong program that includes observing surgeries at Yale-New Haven Hospital and attending lectures given by School of Medicine faculty and hospital administrators. (From left) Justin Williams, Mark Rodbourn, Corrie O’Donnell, Jeff Varese, Brett Roessler, Matthew Chowaniec, Rob Satti, Rich Fillion, and Dave Jermine.

July 21 Carina Dehner, M.D. (second from left), postgraduate fellow in immunobiology, attended the Lindau Nobel Laureate Meeting in Germany as a Young Scientist Fellow. Dehner joined Peter C. Doherty, Ph.D. (center), a 1996 recipient of the Nobel Prize in Physiology or Medicine, and colleagues for a lunch.
Alzheimer’s research accelerates at Yale

When the Robert Wood Johnson Foundation (RWJF) ended its longstanding Clinical Scholars Program last year, the city of New Haven had lost its lead in deep health care expertise and free help. The national program began in 1972 with the goal of bringing an academic approach to the training of clinician-investigators. Yale was one of the earliest participating institutions in the program, starting in 1974 under the leadership of the late Alvan R. Feinstein, M.D., the Sterling Professor of Medicine and Epidemiology. Since then, more than 175 RWJF scholars at Yale have worked on diverse projects, with a common theme of translating research into action. Scholars have conducted community-based research on a range of topics including the best dietary choices, healthy foods, HIV/AIDS status, gun violence, immigrant and refugee health, and access to health care for the homeless.

Though the RWJF decided last year to stop funding the Clinical Scholars Program, four junior sites—the University of California Los Angeles; University of Michigan; University of Pennsylvania; and Yale—took up the mantle to begin a new, independent fellowship similar in spirit to the original program.

“It felt fortunate to be part of a training program that is blessed with so much loyalty, appreciation, and dedication among the alumni, the faculty, and the institutional and community partners,” says Cary Gross, M.D., professor of medicine and co-director of the new National Clinician Scholars Program (NCSP) at Yale. “That is why we simply had to find a way to continue training the next generation of scholars who will lead our efforts to improve the health care system and enhance the health of individual patients, our communities, and the nation.”

The NCSP, which will start in 2016, shares many features of the original program but incorporates changes that consider today’s changing health care landscape. Among these, it emphasizes team-based approaches to research and clinical care. As a result, the NCSP will train doctor-level nurse-scientists alongside physicians. In clinical practice, team-based models such as patient-centered medical homes—which bring together physician, nurses, physician associates, and others—to care collaboratively for patients—are increasingly common.

“Team-based care is a common and effective part of our health care system, yet we’re still struggling to learn how to do it well,” says Gross, who is leading the planning of the NCSP at Yale.

The decision to include nurse-scholars in the NCSP builds on the interdisciplinary framework of the RWJF program, which trained physicians from various specialties, including internists, surgeons, pediatricians, and others, together.

“No profession can do it all themselves, and we each have important roles to play in the...
Shilpa Hattangadi, n., Elucidating the Role of Nuclear Protein Export in EyeTrophic Nucleolar Con-
struction, 3.8 years, $1,932,305 • Raimund Herzog, n., Regulation of Brain Glucose Metabo-
lism in Alzheimer’s Disease, 5 years, $4,873,258 • Robert Hill, n., Colular Mechanisms of Cortical Myelin Plasticity and Regeneration in Vivo, 3.6 years, $315,934.

Elisa Lamas, n., Non-Invasive Monitoring Channels in Hypoxic Neurons, 3.8 years, $1,685,000.

Naftali Kaminski, n., Mi-2 Immunity as a Therapy for Pulmonary Fibrosis, 1.8 years, $27,790,000 • Alan Anticevic, n., and Matt Farber, n., in Cigarette Smoke-Induced Inflammation and Alveolar Remodeling, 3 years, $428,498 • Robert Kerns, n., Pain, Care, Quality and Integrated Communities, 3 years, $2,298,410 • Kenneth Kolls, n., Institute of Justice/Department of Justice, Continued Development of reco-AB: A Foresight Resource/Refining Protocols in 1903, 5 years, $2,541,468 • Michael Koelle, n., Neuroimaging Signalizing and Activity in the C. elegans Egg Laying Cinct, 3.9 years, $4,126,819 • Diane Krause, n., Molecular Basis of Discreetly Inherit-
ted Dementia, 3 years, $3,260,900 • Elie Lebowitz, n., Explanatory Clinical Trial of a Novel Parenterl Intervention for Childhoolz Azythry, 3.8 years, $592,830 • Becca Levy, n., Stress Bio-
markers as a Potential Link Between Age Benefits and Health, 1.8 years, $533,047 • Aaron Levy, n., Integrin- αi2-αv Integrin Signaling Activate, 3.6 years, $529,800 • Chuanshu Xi, n., Cell-Free Membrane Remodeling Guided by TLNA, 1.8 years, $1,902,810 • Kasia Lipinska, n., Predicting Severe Hypoglycemia among Older Adults with Diabetes, 4.8 years, $527,195 • Shuangge Ma, n., Penalization Methodolgy for Predicting and Spatially Mapped Molecular Data, 2.6 years, $1,595,300 • Diwu Ben-Arie, n., Structure of Cortical Remapping, 2.9 years, $666,000.

Don Nguyen, n., A Novel Lineage Pathway Control, Metabolic Adaptation by Metabolic Liver Cancers, 5 years, $1,300,390 • Michael Nibbelath, n., Synaptic Microcircuits Controlling Sleep, 4.8 years, $2,209,162 • In-Hyun Park, n., Investigation of the Function of methyined Binds in Brain, 2.6 years, $3,028,280 • Alex Perry, n., liquid, 4 years, $2,044,880 • Daryl Martin, Do., Targeting Prostate Cancer with Multi-Functional Nanoparticles, 3.5 years, $354,023 • James Mazer, n., and Andreas Thoma, n., Develolng Novel Therapies, 1.8 years, $1,066,110.

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In addition to independent lab work, scientists in these core labs work with researchers across the university who need assistance in any of these areas. Since its founding in 2006, YSCC resources have contributed to hundreds of research projects at Yale. Just this year, researchers showed how stem cells could be used to create miniature human brain models to better understand autism. Another group tracked stem cell development in mouse hair follicles and found that the cells’ development appeared to be influenced extrinsically by the surrounding microenvironment. Yet another Yale team found that a variant of the gene CCNE1 appears critical for reprogramming mature cells.

Li Ka-shing (left) and Hafan Lin attend a commencement ceremony at Shantou University (stu), in China. A new gift from the Li Ka Shing Foundation to the Yale Stem Cell Center supports research and a continued international collaboration between Yale and stu.

“Yale is extremely grateful to the Li Ka Shing Foundation for its continued support of basic science, translational research, and scholarly exchange,” said Carolyn Slattery, Ph.D., Sterling Professor of Genetics, professor of cellular and molecular physiology, and deputy dean for academic and scientific affairs. “This grant will help expedite the development of therapeutic treatments for some of the world’s most debilitating diseases.”

When she was a year old, now. That she’s seizure-free, there is finally a window to work on the behavioral issues that have presented such challenges to Meghan and her family.

Mark Loughridge is the former chief financial officer of IBM, and is currently lead director of Vanguard government and public sector. He then served as a fellow in epilepsy at Yale School of Medicine (ysm).

Blumenfeld’s research draws on a wealth of experience caring for children with epilepsy. She says Mark, “This was an opportunity for us to build the community … and to a facility that had done so much for our family.”

In addition to his research on loss of consciousness during seizures, Blumenfeld, also professor of neuroscience and neurosurgery, has delved into the prevention of epilepsy. In 2008 he reported in Epilepsia that giving the anti-seizure medication ethosuximide to animals with absence epilepsy before onset of seizures markedly reduced seizures and continued to do so for months after the treatment. He continues to explore the possibility of very early treatment for human patients to change the course of the disease.

In 2010, Meghan sat in a room at Columbia Presbyterian Medical Center in New York. She had never been under a doctor’s care for her epilepsy. Says Michele, “She has been seizure-free for nearly two years under Blumenfeld’s care. His gentle demeanor made it easy for Meghan to buy into working with the YCSC, Mark says: “Meghan really trusts Hal.” With a thorough review of her long and complicated history, the team came up with a strategy to bring the seizures under control.

Meghan’s family offered annual support to Blumenfeld’s epilepsy research for several years before enrolling the professorship. Says Mark, “This was an opportunity for us to pay back to the community … and to a facility that had done so much for our family.”

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Blumenfeld is director of the Yale Clinical Neuroscience Imaging Center and a member of the Kavli Institute for Neuroscience. A graduate of Harvard University, Blumenfeld earned his M.D. and Ph.D. from Columbia University. He completed his internship in internal medicine at Columbia Presbyterian Medical Center and his neurology residency at Massachusetts General Hospital. He then served as a fellow in epilepsy at Yale School of Medicine (YSM).

Blumenfeld’s research draws on a variety of areas including imaging, bioengineering, and neuroscience. Excellence across disciplines and a culture of collaboration keep him at YSM, he says: “It’s a really a team effort that brings us happy stories such as Meghan’s.”

Meghan has neurological impairment from the epilepsy that began in 2010, into the Chung Kong Group, now a multinational conglomerate. He established the Li Ka Shing Foundation in 1980 in part to help spur education reforms and medical innovation. His new gift to Yale builds on a "Continued support from Li Ka-shing allows us to accelerate the pace and broaden the scope of our work," says Lin, also professor of cell biology; of genetics; and of obstetrics, gynecology, and reproductive sciences. "We are extremely grateful to Mr. Li for his generosity," Lin says.

As YSCC’s founding director, Lin created four core facilities for basic stem cell research and has supported more than 80 research labs at Yale on projects covering a range of critical topics. The YSCC’s core facilities focus on research in human embryonic stem cells and induced pluripotent stem cells, cell imaging, genomics, and cell manipulation.

In 2010, into the Chung Kong Group, now a multinational conglomerate. He established the Li Ka Shing Foundation in 1980 in part to help spur education reforms and medical innovation. His new gift to Yale builds on a...
Physiologist joins National Academy of Sciences

John D. MacMicking, Ph.D., associate professor of microbial pathogenesis, is one of 26 scientists named in May as investigators of the Howard Hughes Medical Institute (HHMI).

MacMicking is a leading expert in the emerging field of cell-autonomous immunity—the ability of most nucleated cells, not just those of the immune system—to defend against infection via sophisticated antimicrobial strategies evolved to deal with a wide array of microbial pathogens. Many of these strategies are orchestrated through interferon (IFN) signaling pathways essential for host resistance to major infectious diseases such as tuberculosis, AIDS, and malaria. In work begun at The Rockefeller University and continued at Yale School of Medicine (YSM), he and his lab members identified a new superfamily of enzymes termed IFN-inducible GTPases in both immune and non-immune cells that play a critical role in this unusual form of host defense.

An HHMI announcement about MacMicking’s selection noted that his “discoveries about how individual cells protect themselves against viruses, bacteria, and other pathogens is forcing scientists to reconsider what constitutes the boundaries and breadth of the traditional immune system.”

MacMicking earned his B.S.C. at the Australian National University in Canberra and his Ph.D. at the Sloan-Kettering Institute–Cornell University Medical College in New York City. He was a HHMI Life Science Research Foundation Fellow and adjunct assistant professor at The Rockefeller University before being recruited to YSM.

MacMicking has been recognized as a Scarf Scholar, an Edward Mallinkrodt Jr. Foundation Fellow, a Cancer Research Institute Investigator, and a Burroughs-Wellcome Fund Investigator in the pathogenesis of infectious disease. In 2014, he was named both an American Asthma Foundation Scholar and the Kenneth Rainin Foundation Innovator. A non-profit medical research organization with an endowment of more than $16 billion, HHMI was founded by businessperson Howard Hughes in 1953. The HHMI’s grants to scientists from 19 institutions across the United States for basic biomedical research are worth $153 million over the next five years. The new investigators—who include four current HHMI early career scientists—were selected for their individual scientific excellence from 894 eligible applicants, and are expected to begin their appointments this fall.

Yale Immunologist Named HHMI Investigator

Nancy Carrasco, M.D., professor of cellular and molecular physiology, has been named to the National Academy of Sciences (NAS) as a foreign associate. She is among 84 new members and 21 foreign associates selected for membership this year in recognition of their achievements in original scientific research. The new cohort includes three other Yale faculty members.

Carrasco’s work explores the mechanisms of transport across the cell membrane. Her research on the Na+-I- symporter (NIS), the key plasma membrane protein that mediates active iodide transport in the thyroid, lactating breast, and other tissues, ranges from biochemical, biophysical, and physiological investigations to translational studies, including development of new cancer treatments. Her research group was the first to discover the mechanism for cellular uptake of iodide, after cloning NIS. A recipient of the Manton Foundation, she was the principal investigator of a multicenter pharmacogenomics study investigating the use of genomic analyses. Once they reach the clinic, some students will also participate in an intense intervention come too late after a child says. However, “often the diagnosis and intervention can have additional disabilities that span more than one domain, and hence the need to gather more information,” Grau’s aim is to know as much as possible about how genes and the type of learning intervention a child receives interact with each other. Whereas the GRaD Study focused on presymptomatic screening, the goal of the NHLP is to use genetics to predict optimal learning intervention, and to inform the optimal intervention for each student with learning disabilities.

The team will selectively enroll qualified students for individual cognitive assessments, classroom and testing performance, family life and background, culture, serial magnetic resonance imaging of brain structure and function, and comprehensive genomics analyses. Once they reach the second grade, some students will also participate in an intense intervention with specially trained teachers. By mid-October the NHLP had enrolled 30 children. The researchers are focused on recruitment and testing in first grade classes. The target for the study’s conclusion and results is 2021.

“The School of Medicine is deeply appreciative of this further encouragement and support from the Manton Foundation, an institution that has a strong record in the advancement of important work on behalf of under-served, urban communities,” said Dean Robert J. Alpern, M.D., Ensign Professor of Medicine. “This new grant allows the school to continue its ground-breaking genetics research and, equally important, to apply discoveries and progress toward improving human lives.”

Sometime in the future, Grau says he hopes district-wide screening can be implemented to identify children at high risk for learning disabilities, and then to match them to a precisely-designed curriculum that can provide a child’s unique genomic sequence. “We know that dyslexia can respond to intervention programs that address multiple learning modalities and are offered in early childhood,” Grau says. However, “often the diagnosis and intervention come too late after a child has experienced repeated academic failures, and when the child is less likely to respond,” he says.

The Manton Foundation was established in New York City in 1991 by Sir Edwin and Lady Manton to support the arts, education, health care, cultural preservation, and medical research.

"I think that one of the most beautiful things about science is that it’s an international pursuit.”

—Nancy Carrasco, M.D.