

weillcornellmedicine

The magazine of Weill Cornell Medicine
VOLUME 15, NUMBER 1

Best of Both Worlds

Weill Cornell physician-scientists and Cornell University engineers collaborate to improve human health





Weill Cornell Medicine



Alumni Reunion



Sept 23-24
2016



The Weill Cornell Medicine Alumni Reunion will take place from Friday, September 23 – Saturday, September 24, offering engaging guest speakers, institutional updates and tours, class get-togethers, a gala dinner dance, and opportunities to mingle and network with old friends.



Class years ending in '0, '1, '5, and '6 are celebrating milestone reunions, and, as always, all alumni are invited back to campus to commemorate another year since graduation.

We hope to see you there! Visit www.weill.cornell.edu/alumni/reunion for updates.



Save the Date





FEATURES

24 HEALTH BY DESIGN

BETH SAULNIER

“From my perspective,” says professor of surgery Jason Spector, MD, “it’s absolutely crucial to have collaborations with engineers.” Spector is one of the many WCM faculty who have ongoing research projects with counterparts in the Ithaca campus’s College of Engineering. Research teams are working together on topics from Alzheimer’s to epilepsy, reconstructive surgery to heart disease. Says Brian Kirby, PhD, an associate professor of mechanical and aerospace engineering who is based in Ithaca but holds a joint appointment in WCM’s Division of Hematology and Medical Oncology: “There’s basically no way for me to impact human health directly unless I’m working with clinicians, looking at real samples, and trying to influence actual clinical practice.”

30 DIGITAL DOMAIN

ANNE MACHALINSKI

Improving the implementation and use of electronic records and patient portals could lead to better health outcomes for entire populations. At WCM, investigators in the Department of Healthcare Policy and Research are piecing together a nuanced picture of the strengths and weaknesses of these systems as part of a broad inquiry into how to make medical care more accessible, effective, and affordable for patients and the people and institutions that provide it. “Problems with quality and cost in the U.S. healthcare system are well recognized,” says Rainu Kaushal, MD, MPH, the Nanette Laitman Distinguished Professor of Healthcare Policy and Research and chair of the department. “We’re doing this comprehensive and multidisciplinary research so that each patient gets the right treatment at the right time, every time.”

34 HIS BEST SHOT

BETH SAULNIER

For the past three decades, Stephen Hoffman, MD ’75, has been laser-focused on a single goal: developing a vaccine against malaria. Now his biotech company, Sanaria, is in the midst of clinical trials around the globe, testing a vaccine that has strikingly high efficacy rates of as much as 100 percent. “He has defied conventional wisdom multiple times and has always turned out to be correct,” says Anthony Fauci, MD ’66, director of the National Institute of Allergy and Infectious Diseases, the NIH agency that has long been one of Sanaria’s funders. “Whether he is going to get to the goal line, I do not know—but I think he is, actually. Knowing him, his incredible perseverance, and his innate capabilities, I think he will get there. If anybody is going to do it, Steve is.”

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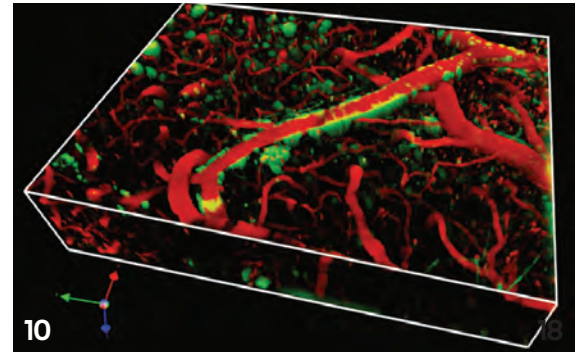
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Cracking the Code to Innovation



LISA BERG

It was a nineteenth-century bedside observation that led to a dramatic improvement in patient care. Struck by the tragic deaths of women soon after giving birth, and perplexed that mortality rates were significantly higher in operating theaters staffed by doctors than in those where midwives delivered the babies, the Hungarian physician Ignaz Semmelweis was determined to curb these deaths by figuring out their source. The critical association he identified in his subsequent research—that the delivering doctors were not adequately disinfecting their hands after performing autopsies—resulted in a simple but profound innovation: hand hygiene that slashed maternal deaths.

Key to scientific innovations and discoveries like these is our ability as physicians to catalyze our creativity and imagination. And like Semmelweis did, we have only to look as far as our patients for inspiration.

Case in point: alumnus Stephen Hoffman's unusual approach to protecting populations against malaria. As you'll read in "His Best Shot," after years of caring for malaria patients in Indonesia and decades of research in the U.S., Hoffman, MD '75, is testing an experimental vaccine based on a weakened form of the infecting parasite—and initial clinical trials have shown it to be as much as 100 percent effective. Hoffman is an excellent example of how vision and innovation—combined with the tenacity necessary to prove a radical idea—can come together in one person and lead to potentially transformative results.

At their patients' bedsides, doctors might envision better ways to provide care, but sometimes need additional expertise to bring their ideas to fruition. For this reason, among others, we're fortunate to be able to draw from a deep well of engineering and tech savvy at Cornell University, and myriad collaborations between our campuses are producing inventive new treatment approaches. Among the most robust and

successful inter-campus collaborations are those between Weill Cornell Medicine physicians and Ithaca scientists from the Nancy E. and Peter C. Meinig School of Biomedical Engineering, highlighted in our cover story. Groundbreaking work by our investigators includes projects based on both bedside observations and the scientists' visions for how they might apply new technologies to healthcare. They are creating living replacement ears for children born with malformed ears, engineered in a lab and grown from the patients' own cells; refining laser-based surgery for treating a challenging form of epilepsy; and developing a micro-device that can detect circulating prostate cancer tumor cells in the blood.

Our researchers are also imagining how to improve healthcare delivery at the population level. Technological advancements that seemed unimaginable just a few decades ago are driving innovations in this area—none more profoundly than electronic health records, which store clinical information and provide patients access to it through online portals. Our feature "Digital Domain" shows how our faculty are taking creative approaches to questions about how to collect and manage these data, and how to process and mine it so that physicians can make better, more individualized decisions at the point of care. Their visionary uses of big data ultimately will enable investigators to uncover important information about diseases and conditions—which can be harnessed to improve patient care.

When ideas like these are sparked at the bedside and then taken back to the lab, we demonstrate our commitment to improving patient care. As faculty like Rainu Kaushal, chair of our Department of Healthcare Policy and Research, say, it's about ensuring that each patient gets the right treatment at the right time, every time. We are dedicated to this mission everywhere at Weill Cornell Medicine, using creativity, imagination, and collaboration to turn today's problems into tomorrow's innovations.



**Weill Cornell
Medicine**

A Wise Investment: Research Funding Speeds Treatments and Cures to Patients

At Weill Cornell Medicine, support from our leadership, donors, and friends has helped to advance early-stage research projects, promote groundbreaking work by top-tier faculty, and recruit new leading lights to campus – all with the goal of helping patients.

Since 2012, Weill Cornell Medicine has recruited more than 50 esteemed scientists and physician-scientists. The donor-funded Belfer Research Building, which opened in 2014, serves as the hub for their translational efforts. This important work has led to a 20 percent growth in sponsored research support – funding received from external sources such as government or industry – for Weill Cornell Medicine.

GIVE.WEILL.CORNELL.EDU

“The robust growth of our research program is a testament not only to the fine caliber of our faculty, but also to the ongoing support from our donors and friends, who are helping us provide the most cutting-edge treatments to our patients,” says Dr. Laurie H. Glimcher, Stephen and Suzanne Weiss Dean. “There is nothing more essential than that.”

Dr. Ted Schwartz, director of the Center for Epilepsy and Anterior Skull Base and Pituitary Surgery, is a 2015 recipient of the Daedalus Fund award, a donor-sponsored initiative to facilitate innovation and discovery.

Dr. Schwartz and his colleagues have spent many years searching for ways to treat epileptic patients who are not candidates for conventional surgery. In that time, they have created a new surgical tool: a laser scalpel that can cut into the grey matter of the brain without damaging either critical brain tissue or the overlying blood vessels that supply it with oxygen. To date, the laser has been tested in the laboratory but has not yet moved into clinical trials – an essential step to test safety and efficacy before obtaining a patent. Support from the Daedalus Fund will bring this laser one step closer to being patient-ready, helping to make it more attractive for potential industry partners.

“The state of medicine – as great as it is, and as much as we’ve accomplished – is currently not sufficient to cure and treat so much of human disease,” says Dr. Schwartz, who is also the David and Ursel Barnes Professor of Minimally Invasive Surgery. “Research, collaborative work and partnerships with industry are critical to moving medicine to the next level, so that we can address those diseases and give our patients the finest care.”



Dr. Ted Schwartz successfully treated patient Tracy Branick, whose epileptic seizures were affecting her daily life. She is now seizure-free.

To support the Daedalus Fund or other critical research initiatives at Weill Cornell Medicine, please contact:

Lucille Ferraro, Campaign Director, 646-317-7387 or luf2003@med.cornell.edu

'Truly Remarkable Growth'

Dean Glimcher gives State of the Medical College talk

In her State of the Medical College address in December, Dean Laurie Glimcher, MD, reported that 2015 was an extraordinary year for Weill Cornell Medicine—capped off by a new name that exemplifies the unprecedented clinical expansion, scientific advancement, and educational accomplishments that have cemented the institution as a driving force in healthcare. “We are set on a path for truly remarkable growth,” she told the audience of more than 150 faculty, students, and staff in Uris Auditorium. “Our trajectory has been impressive over the last several years.”

Glimcher noted numerous accomplishments and milestones in 2015, including the fact that the Association of American Medical Colleges named WCM the fastest-growing medical school in the country, based on its increase in operating revenue over the past five years. The Physician Organization added more than forty medical practices, she said, and WCM added more than 150 physicians to its ranks at NYP/Lower Manhattan. This expansion culminated in 1.64 million patient visits last year, an 11.2 percent increase from fiscal 2014 and a 42.3 percent increase from 2010.

On the educational side, she said, the Class of 2019 marked the highest average undergraduate GPA in the institution's history

(3.84) and tied for highest-ever MCAT scores. A year earlier, the Medical College had successfully launched a new curriculum with the Class of 2018; it integrated student feedback into version 2.0, unveiled last fall. Glimcher noted that the Graduate School is thriving under the leadership of Gary Koretzky, PhD, “who in the last few years has improved the quality of students, the quality of the curriculum, and the attention that we pay to our graduate students.”

‘Our trajectory has been impressive over the last several years.’

Glimcher went on to point out that, of any U.S. medical school, WCM has the highest percentage of graduates who have obtained full-time faculty positions at academic medical centers. She also highlighted the institution's distinguished legacy in preparing a diverse physician workforce, noting that it ranks in the 92nd percentile of medical schools in the number of graduates who are African American and in the 82nd percentile of those who are Hispanic. WCM is in the 91st percentile of medical schools in the number of women faculty, and in the 81st percentile in the number of faculty from underrepresented groups. Said Glimcher: “Diversity is essential to developing creative solutions to the challenging problems we are all facing in healthcare, biomedical research, and education.”

Junior Faculty Win NIH Director's Awards

Dylan Gee, PhD, assistant professor of psychology in psychiatry, and Matthew Greenblatt, MD, PhD, assistant professor of pathology and laboratory medicine, are among sixteen scientists to win 2015 Director's Early Independence Awards from the NIH. This marks the first time that WCM faculty have won the award, which is part of the NIH's High-Risk, High-Reward program. The honor comes with as much as \$1.25 million over five years for

each winner to lead his or her own laboratory and conduct independent research as a principal investigator without the need for traditional post-doctoral training. Gee is studying the biological state of the developing brain to optimize treatments for anxiety disorders, particularly during adolescence, while Greenblatt is exploring new ways to offset the deterioration of bone density—and the resulting fractures—in patients with osteoporosis.



Off to a good start: Dylan Gee, PhD (left), and Matthew Greenblatt, MD, PhD

TIP OF THE CAP TO . . .

Emilio Carrillo, MD, associate professor of clinical medicine, winner of the American Medical Association's Pride in the Profession Award.

Owen Davis, MD, professor of obstetrics and gynecology and of reproductive medicine, named president of the American Society for Reproductive Medicine.

Oliver Fein, MD, associate dean (affiliations) and professor of clinical medicine and of clinical healthcare policy and research, winner of the Award for Excellence from the American Public Health Association.

Marc Goldstein, MD, the Matthew P. Hardy, PhD, Distinguished Professor of Reproductive Medicine and Urology, given the Star Award from the American Society for Reproductive Medicine.

Philip Li, MD, associate professor of research in urology and of research in reproductive medicine, winner of the Chinese Society of Andrology's Outstanding Contribution Award.

David Madoff, MD, professor of radiology, inducted as a fellow of the American College of Radiology.

Fred Pelzman, MD, associate professor of clinical medicine, and **Vishwas Singh, MD**, assistant professor of medicine, winners of Physician of the Year awards from the NYP/Weill Cornell Department of Nursing.

Holly Prigerson, PhD, co-director of the Center for Research and End-of-Life Care and the Irving Sherwood Wright Professor in Geriatrics, winner of an Outstanding Investigator Award from the National Cancer Institute. It carries a grant of up to \$600,000 in direct research-related costs per year for seven years.

Lower Manhattan Cancer Center Opens

WCM and NewYork-Presbyterian Hospital have opened the NYP/ Lower Manhattan Cancer Center, a freestanding, state-of-the-art radiation oncology facility that is the only one of its kind downtown. “Patients in Lower Manhattan will now have access to the exact same quality of care available at NewYork-Presbyterian/Weill Cornell Medical Center and Weill Cornell Medicine, without the need to miss work or skip other obligations to receive treatments,” says Silvia Formenti, MD, radiation oncologist-in-chief at NYP/ Weill Cornell and chair of radiation oncology at WCM. “This is a unique environment which blends top care with an enhanced patient experience, catering to the busy schedules of residents and workers downtown.”

The center features the latest radiation therapies, allowing the care team to customize treatment to each patient’s unique cancer and individual tumor. Treatment is given in a spa-like atmosphere to ease anxiety and promote optimal recovery, with complementary therapies such as Reiki, meditation, yoga, and acupuncture available on site.

Two Named to ‘30 Under 30’ List

PhD candidates Kaitlyn Gayvert and Neel Madhukar have been named to *Forbes’s* “30 Under 30” for healthcare. They study cancer genomes in the lab of Olivier Elemento, PhD, associate professor of physiology and biophysics and of computational genomics in computational biomedicine. “They’re using machine learning and molecular biology to do everything from finding new drug targets (and predicting those drugs’ toxicity) to predicting whether a clinical trial will be successful,” the magazine reported.

WCM to Help Plan Clinic in China

WCM will help develop an outpatient diagnostic clinic in Shenzhen, China’s fourth-largest city. Under an agreement with Top Spring Huaxia Medical Investment Co. Ltd., WCM will help lead a feasibility study that will determine how to structure the clinic and which specialties and diagnostics to deliver, and help establish a continuing medical education center. As envisioned, the clinic will provide advanced patient care by incorporating Western medical standards, practice guidelines, and innovations.

FROM THE BENCH



Monica Guzman, PhD

Precision Treatment for Leukemia

Researchers have made progress in identifying why some patients with acute myeloid leukemia respond to an experimental chemotherapy, while others don’t.

Monica Guzman, PhD, assistant professor of pharmacology in medicine, and colleagues found that the drug, PU-H71, kills leukemia cells abundant in certain proteins critical to cancer growth. The findings, published in *Cell Reports*, may point to a new biomarker to help oncologists decide whether to prescribe PU-H71 to patients with this aggressive form of blood cancer, which has a five-year survival rate of only about 25 percent. Guzman’s team will next test the findings in patients.

Exploring ‘Dirty Drugs’

Clinicians have long observed that using a “dirty drug”—one that hits a number of targets instead of just one—is the most efficacious way to treat conditions that cause abnormal heart rhythms. Now, WCM researchers may have discovered how such drugs become “dirty.” In the *Journal of General Physiology*, the investigators identified a possible mechanism involved in the beneficial, as well as toxic, effects of amiodarone, one of the most popular of the multi-target, antiarrhythmic drugs. They found that at typical therapeutic doses, amiodarone affects the lipid bilayer—an outside envelope of the cell where membrane proteins reside—which in turn can affect the proteins themselves. Says first author Radda Rusinova, PhD, instructor in physiology and biophysics: “Now we have a solid hypothesis that can be followed up on in future studies, and a starting point to figure out how to change this drug to make it better at doing its job.”



Lewis Cantley, PhD '75

Vitamin C vs. Cancer?

In *Science*, researchers from WCM and several other institutions report that high levels of vitamin C kill certain kinds of colorectal cancers in cell cultures and in mice—pointing the way toward targeted treatments.

They found that levels roughly equivalent to those in 300 oranges impaired the growth of tumors with two mutations that make the disease particularly aggressive and unresponsive to current therapies. The researchers note that since vitamin C has multiple influences on cellular function, it will be important to study its effects on normal and immune cells. Says Lewis Cantley, PhD '75, professor of cancer biology in medicine and the Meyer Director of the Sandra and Edward Meyer Cancer Center: “This is not a therapy that you would want to wander into blindly without knowledge of what is going on in your tumor.”

Lung Test Can Miss COPD Risk

A quick, non-invasive, and widely available lung function test—known as spirometry—is likely mislabeling a significant percentage of smokers as not at risk for developing chronic obstructive pulmonary disease (COPD). In a study in the *European Respiratory Journal*, Ronald Crystal, MD, chairman of the Department of Genetic Medicine and the Bruce Webster Professor of Internal Medicine, and colleagues report that the more comprehensive (but still non-invasive) “capacity diffusing” test can more accurately evaluate the risk of COPD, which strikes 20 percent of smokers. The more specialized test measures the function of a patient’s air sacs, which can be destroyed by smoking—but it’s less portable, more expensive, and harder to run, and therefore is typically only used by pulmonologists.

Inflammation May Increase Metastasis

Pre-existing inflammation in the lungs may increase the risk that cancers beginning elsewhere in the body will spread to the organ, researchers report in *Proceedings of the National Academy of Sciences*. A team led by Vivek Mittal, PhD, director of the Neuberger Berman



Vivek Mittal, PhD

Foundation Lung Cancer Laboratory and an associate professor of cell and developmental biology, describes a mechanism by which this occurs, potentially offering new insights into how to

treat and prevent metastases. In a rodent model, the researchers found that inflamed lung tissue had increased numbers of white blood cells called neutrophils, which release two enzymes into the lungs—targeting and destroying a protein that protects against tumors.

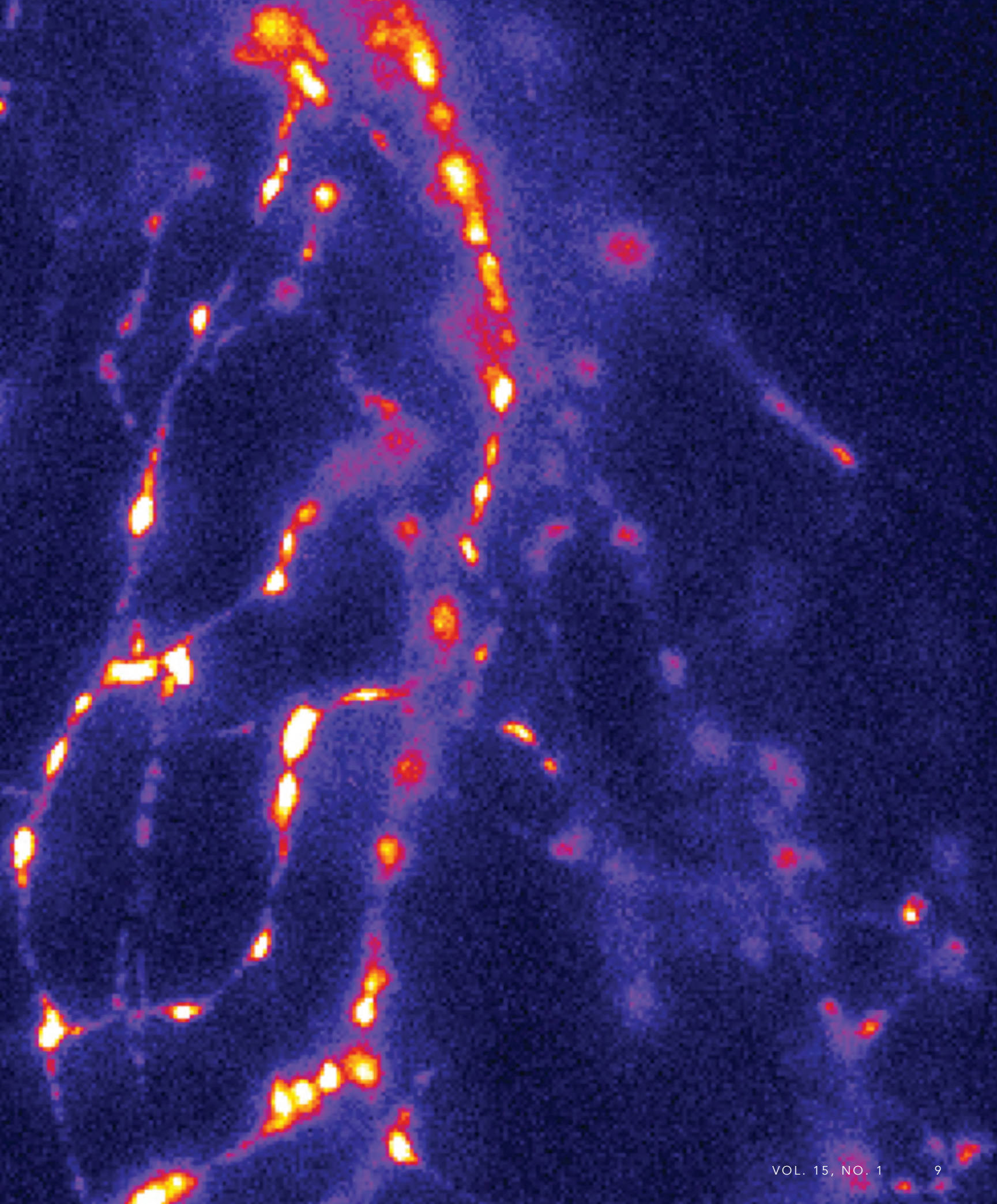
Obesity Hampers Vitamin A Usage

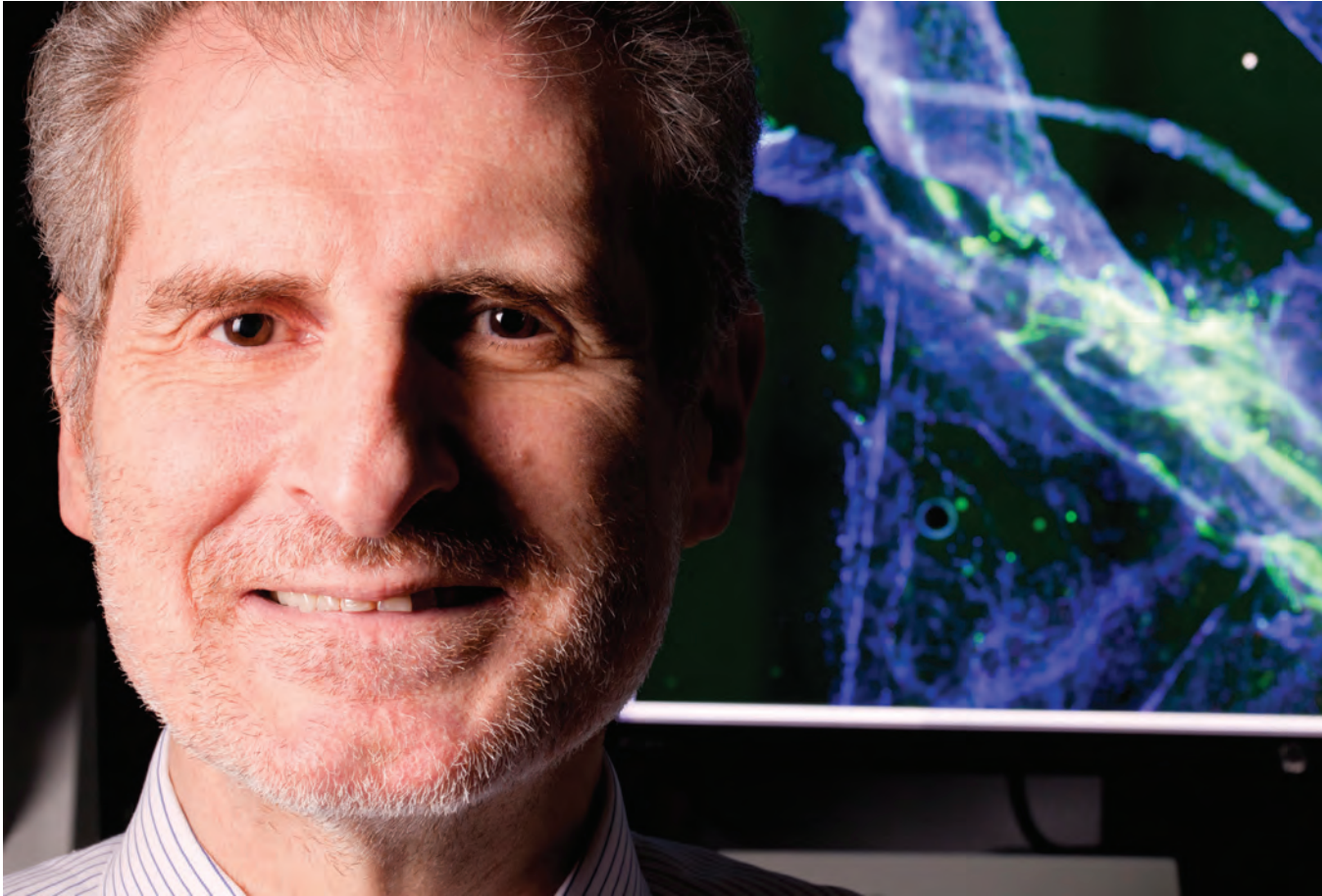
Vitamin A is critical to many body systems including vision, reproduction, immune responses, and wound healing. But obesity impairs the ability to use the vitamin, say WCM investigators, who studied the topic in a mouse model. “Our research shows that, even if an obese animal consumes normal amounts of vitamin A, they have deficiencies of the vitamin in major organs,” says Steven Trasino, PhD, a pharmacology postdoc who was first author on an article in *Scientific Reports*. Adds senior author Lorraine Gudas, PhD, chair of pharmacology and the Revlon Pharmaceutical Professor of Pharmacology and Toxicology: “We know that obesity is associated with many illnesses, such as poor immune response and diabetes; what we don’t know is why. This gives us more information for understanding how the two go together, but many puzzles remain to be solved before we fully understand why obesity leads to less vitamin A in major organs of the body.”

Lightbox

Inner glow: In an image obtained using fluorescent biosensors, light indicates the release of chemical signals from a rat neuron in culture. The work, part of a study of how general anesthetics affect communication between neurons, was published in *Proceedings of the National Academy of Sciences* in September. It was led by Hugh Hemmings, MD, PhD, the Joseph F. Artusio Jr. Professor of Anesthesiology and chair of the department.

HUGH HEMMINGS, MD, PHD, ZHENYU ZHOU, PHD, AND DANIEL COOK, MD '15





Costantino Iadecola, MD

Blood-Brain Barrier

Costantino Iadecola, MD, has long been at the vanguard of understanding the vascular drivers of Alzheimer's disease

Today Costantino Iadecola, MD, is known as one of the world's leading experts on dementia, stroke, and the aging brain. Twenty-five years ago, he was considered something of a heretic.

In the early Nineties, Iadecola's team at the University of Minnesota Medical School discovered that mice genetically engineered to get Alzheimer's disease also developed blocked vessels in their brains, reducing cerebral blood flow by as much as 30 percent. This occurred before a mouse showed any signs of dementia, but it was clearly connected to the severity of the animal's eventual symptoms. At the time, scientists were aware that plaques, made up of accumulations of the peptide amyloid beta, played a major role in Alzheimer's. But they believed that it was a disease of the neurons, not of the brain's vascular system. "Nobody thought blood vessels were relevant," says Iadecola, now the Anne Parrish Titzell Professor of Neurology and director of the Feil Family Brain and Mind Research Institute (BMRI) at Weill Cornell Medicine. "Obviously, the Alzheimer's field was skeptical."

By 2000, epidemiological and pathological data had caught up: it was clear that people with Alzheimer's also had suffered damage to the brain's blood vessels, including blockages that caused small strokes. The two most common types of dementia—Alzheimer's and vascular dementia, caused by small strokes—were connected. "Eventually the field came around," Iadecola says.

ABBOTT

“Everybody confirmed the other results, and new data showed there was a reduction in blood flow even before a patient displayed the first signs of cognitive impairment. Now it has become common knowledge, and there is a major push at the level of governmental funding agencies to investigate the vascular components of dementia.”

That push includes a five-year, \$2 million grant from the National Institutes of Health, awarded to Iadecola’s longtime collaborator Chris Schaffer, PhD, an associate professor of biomedical engineering on the Ithaca campus and of neuroscience in the BMRI. A physicist by training, Schaffer specializes in developing novel, optics-based tools and techniques for biomedical research. “He is a world leader in this new technology,” Iadecola says. “It’s cutting edge, using lasers to image the brain and to do all kinds of experiments that were not previously possible.”

The grant will fund Schaffer and Iadecola’s continuing investigations into the impact of blood-flow disruptions on the course of Alzheimer’s disease. During a previous study, they noticed that Alzheimer’s mice were experiencing a slowing of blood flow at the level of individual capillaries (“which could cause the smallest stroke you could imagine,” Schaffer says). When they looked more closely at these tiny occlusions, they realized that they might have discovered the key to the relationship between reduced blood-flow to the brain and the amyloid beta plaques that were the hallmark of Alzheimer’s disease. “In essence, what Chris and his team found was that, in the smallest possible vessels in the brain—capillaries—there were white blood cells blocking blood flow or making the flow sluggish,” Iadecola says. “Now, this puts in a new twist to the whole story, suggesting that there may be something happening within the plumbing itself that prevents the normal flow of blood that the brain desperately needs to keep working.” Essentially,

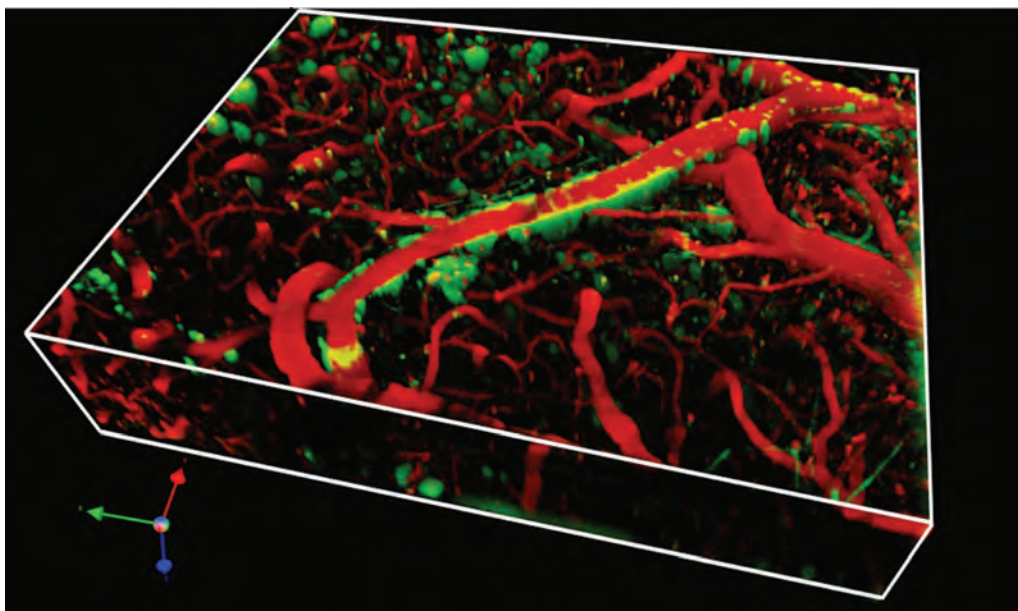
‘There is a major push at the level of governmental funding agencies to investigate the vascular components of dementia.’

the brain’s drains get blocked, launching a vicious cycle in which amyloid beta—normally cleared out of the brain before it can accumulate—is allowed to build up and form neurotoxic plaques. “You decrease the clearance, and the concentration is higher,” Schaffer says. “The concentration gets higher, then the probability of aggregation is higher. And the aggregates of amyloid beta drive the inflammation, which causes decreased brain blood flow.”

The pair’s research could point to new targets for drugs that could slow or even stop the progress of the disease, and they are now trying to understand the molecular signaling that makes white blood cells adhere to the inside of the brain’s capillaries in the first place. But their findings also reinforce the importance of maintaining good cardiovascular health—not only to prevent heart attack, stroke, and other well-known consequences of atherosclerosis and high blood pressure, but to stave off dementia.

The good news, Iadecola says, is that thanks to several years of messages about maintaining vascular health, the rate of Alzheimer’s seems to be going down; though in the aging global population the number of patients with dementia will continue to increase, it will be at a slower rate. “In the absence of a cure, there is now, in the U.S. and in the world, a much greater appreciation for preventing Alzheimer’s disease,” he says. “And this means controlling vascular risk factors like hypertension, diabetes, cholesterol, lack of mobility, smoking—all the things that make the vessels suffer.” Iadecola notes that the involvement of the brain’s vascular system could also help explain why mental agility exercises and learning new things seem to buffer against Alzheimer’s: mental activity increases blood flow. “Whether you’re learning a new language or a musical instrument,” he says, “you should always keep your brain active to keep Alzheimer’s away.” ■

— Amy Crawford



Mind and matter: Blood vessels in a mouse brain (seen in red) surrounded by amyloid plaque (green).

COURTESY OF CHRIS SCHAFFER, PHD

Last Requests

A married pair of social scientists promotes compassionate care for cancer patients at the end of life—and the loved ones they leave behind



Holly Prigerson, PhD, and Paul Maciejewski, PhD

Sociologist Holly Prigerson, PhD, was an assistant professor at Yale in 1999 when she was summoned to the bedside of her father, whose pancreatic cancer had taken a turn for the worse. Even then, Prigerson—now the Irving Sherwood Wright Professor in Geriatrics at Weill Cornell and co-founding director of Weill Cornell Medicine’s Center for Research on End-of-Life Care—was no stranger to the academic literature on death and dying.

A decade earlier she’d penned her doctoral dissertation at Stanford on a study seeking answers to the question, “If most older patients want to die comfortably at home, why are so many dying miserably in hospitals?” At the time of her father’s illness, she was running two studies—one examining how to identify the signs and symptoms of maladaptive grief reactions and another examining the factors influencing the quality of life and care of advanced cancer

‘We need psychosocial solutions to address what are fundamentally psychosocial problems in the delivery of cancer care to patients confronting death.’

patients and their closest family members. And yet like most Americans, Prigerson had spent very little time with people in their final days.

“This is what someone looks like when they’re dying,” she heard herself say at the sight of her delirious, jaundiced father. A nurse confirmed her impression. But when the oncologist arrived, he downplayed the situation. He asked her father—himself a physician—to extend his arms as though to stop traffic, and the older man’s hands shook uncontrollably. Prigerson asked the point of the exam. As she recalls: “My dad didn’t quite understand who I was; he said, as though I were a student, ‘It’s the flap test. If my hands shake, it means I have a lot of ammonia in my brain and I’m going to die soon.’ ” Indeed, he passed away shortly afterward.

The way Prigerson had registered her father’s prognosis stuck with her, informing her work on new ways to assess how caregivers come to terms with a

loved one’s death—particularly from cancer, the focus of many of her investigations. A few years later, the *American Journal of Geriatric Psychiatry* published her Stressful Caregiving Adult Reactions to Experiences of Dying (SCARED) Scale, a tool for quantifying a caregiver’s risk for major depressive disorder and quality-of-life impairments in response to their loved one’s suffering. “At the time,” she recalls, “research was a form of coping.”

The work has implications far beyond Prigerson’s own bereavement. The global rate of deaths from cancer—a diagnosis frequently associated with especially aggressive, and often expensive, end-of-life care and significant latitude for patients to participate in treatment decisions—is on the rise. A principal investigator on multiple NIH-funded studies, Prigerson challenges conventional wisdom around cancer care and end-of-life issues, using rigorous study designs to help patients and their families make informed choices about their treatment options. Her research seeks to enhance understanding of patient prognoses to better comply with end-of-life desires and to facilitate healing after bereavement. She frequently collaborates with her husband, Paul Maciejewski, PhD, assistant professor of biostatistics in radiology and in medicine and co-founding director of the Center for Research on End-of-Life Care. Says Prigerson: “We need psychosocial solutions to address what are fundamentally psychosocial problems in the delivery of cancer care to patients confronting death.”

Prigerson and Maciejewski have taken a three-pronged approach, simultaneously studying caregivers, oncologists, and patients. This summer, their paper in *JAMA Oncology* revealed that palliative chemotherapy—intended to extend survival and preserve quality of life for people with late-stage terminal cancer—achieved neither goal. A paper Prigerson published in the *British Medical Journal* in 2014 showed that patients who chose palliative chemotherapy were also less likely to die at home, more likely to die in an intensive care unit, and more likely to receive aggressive interventions—all outcomes contrary to what patients often prefer and associated with poorer adjustment by their surviving caregivers. A study currently under way at NYP/Weill Cornell seeks to quantify how such an aggressive, ultimately futile approach affects caregivers. “There



is no measurement of states worse than death,” says Prigerson, who suspects that loved ones pay a high emotional price when people who sought to die at home end their days sedated and dependent on ventilators, feeding tubes, and other invasive technology.

A growing body of work by Prigerson, Maciejewski, and colleagues homes in on a condition known as “prolonged grief,” a diagnosis they coined in a 2009 *PLOS Medicine* report. Roughly 10 to 15 percent of people experience an extreme response after the death of a loved one, developing unique physiological and cognitive features that differ from major depressive disorder or the kind of classic grief that fades over time. The authors found that individuals with prolonged grief suffer greater disability and a heightened risk of suicide.

While the World Health Organization plans to include prolonged grief in its upcoming International Classification of Diseases, the authors of the latest edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) deemed it too controversial for inclusion. However, the DSM-5 makes a vital concession: they recognize the need for greater research attention on bereavement-related psychological distress—adding to the Appendix symptom criteria for

a disorder they term “prolonged grief” and, thereby, clearing the way for prompt treatment. Maciejewski, a mechanical engineer by training and an expert in quantitative analysis, credits the progress to rigorous study design and data collection. “Without the technical work we’ve done that has made it possible to clearly identify prolonged grief disorder,” he says, “I don’t think the world would have come to the conclusion that there might be types of grief that aren’t normal and require outside help.”

In an ongoing project, the pair has developed a Grief Intensity Scale, a twelve-question online survey to identify bereaved individuals at high risk for prolonged grief. They’re also creating a free, online self-management tool to help people employ cognitive behavioral therapy techniques proven to reduce prolonged grief. Another study seeks to identify the features of hospice care that reduce a surviving caregiver’s risk of depression, which is heightened by aggressive end-of-life treatment. “Social science has huge, untapped potential to improve the way healthcare is delivered,” Prigerson says, “particularly when people are confronting life-threatening illness and death, which is such a psychologically loaded and threatening time.” ■

—Sharon Tregaskis

Beat Poet

Fine art photographer Richard Ehrlich '59, MD '63, captures musicians in the act of listening

In the unsparing portrait—sharply focused, dramatically lit—Roger Daltrey isn't gazing into the camera. According to the photographer who took it, the bright blue eyes of the rock icon are in fact looking back over a life. "This guy is the lead singer of the Who, and he wanted to hear Edith Piaf's 'Non, Je Ne Regrette Rien' while I took his picture," marvels Richard Ehrlich '59, MD '63. "And he told me that it's because he's never regretted anything he's ever done."

That connection between music and the inner life is both the inspiration and the subject of Ehrlich's new book, *Face the Music*, which collects portraits of forty-one musicians as they listen to songs of their choosing. A fine art photographer whose work is in the permanent collections of such institutions as the Los Angeles County Museum of Art, the Smithsonian, and the United States Holocaust Memorial Museum, Ehrlich is also a practicing urologist known for his work in pediatric surgery. "I think that there's a meticulousness in both surgery and fine art photography that you can see in my work," he says, "but that's really the only connection." Although his medical and photographic careers have largely run on separate tracks, they came together in conversations with a patient whose child has autism—interactions that ultimately inspired his book. "Music has proved to be central to autism treatment," observes Ehrlich, a professor emeritus of urology at UCLA's David Geffen School of Medicine. "It can allow us to experience great depth of feeling, and I wondered if photographing the people who are most passionate about music—musicians themselves—would capture something of that experience."

The result is *Face the Music*, whose sales will benefit the UCLA Center for Autism Research and Treatment. Released in 2015 by celebrated art publisher Steidl, it boasts a table of contents that reads like the marquee at the greatest—and most eclectic—music festival in history. Quincy Jones, Ringo Starr, Emmylou Harris, and Iggy Pop all sat down in front of Ehrlich's digital camera. He caught Metallica drummer Lars Ulrich rocking out to Rage Against the Machine and punk star Johnny Rotten still rocking a Mohawk. Ehrlich's tender photo of Dave Brubeck listening to his sons performing as the Brubeck Brothers is one of the last portraits taken of the jazz great before his death in 2012.

It took Ehrlich five years and countless conversations with publicists, agents, and artists to assemble the range he wanted for



Above: Richard Ehrlich '59, MD '63. Right: Ehrlich's portraits of opera singer Renée Fleming (top) and producer Quincy Jones

As a kid growing up in New York, Ehrlich was so passionate about photography that he had his own darkroom.

Face the Music. Some of the musicians who appear in the book were won over by the project's charitable aim, while others were intrigued by its artistic ambitions. A handful, including Philip Glass, wanted to contemplate their own music, but most chose to listen to other people's songs during the shoots. Herbie Hancock teared up as he heard his mentor, Miles Davis, on the classic track "Lament." Some—like Roseanne Cash choosing the folk rock band the Decemberists—showed the grace of a veteran honoring younger artists. Sometimes, it was hard for Ehrlich to see the connection. "Honestly, I'd never heard of anything that Johnny Rotten picked," he admits. But in every case, says Ehrlich, "if they were willing to sit down in front of the camera at all, they were really open, really into it."

Now Ehrlich is engaged in a related project with a very different approach and a group of subjects: he's using one of only four large-format (twenty-by-twenty-four-inch) Polaroid cameras left in the world to create portraits of children with autism. The shift from digital to old-school technology, and from the famous to the unknown, is typical of Ehrlich's unconventional, wide-ranging photography career. As a kid growing up in New York City, he was so passionate about the art that he had his own darkroom—but he gave it up, first to play baseball and then to earn both his undergraduate and medical degrees at Cornell.

Fifteen years ago, Ehrlich took up photography again in earnest, and he quickly built a reputation in fine art circles with work ranging from portraits of Mexican *lucha libre* wrestlers to abstract images inspired by sunsets in Malibu, where he now lives. Ehrlich recently donated ten large-format photographs from the latter series, *The Other Side of the Sky*, to Weill Cornell Medicine in memory of his late childhood friend Stephen Weiss, a longtime member and chairman of the Cornell University Board of Trustees and founding chairman of the WCM Board of Overseers; they're now on view in the Belfer Research Building. The full range of Ehrlich's work can be seen at his website, ehrlichphotography.com. "Some people say that, just like in music, you need to develop a signature style in photography," he says. "You hear a lot of the musicians who appear in this book—Herb Alpert when he picks up a trumpet, for example—and you know that it can't be anyone but them. But now that I'm immersed in photography, the next project is always something new." ■

— C. A. Carlson



RICHARD EHRLICH '59, MD '63

Gift of Life

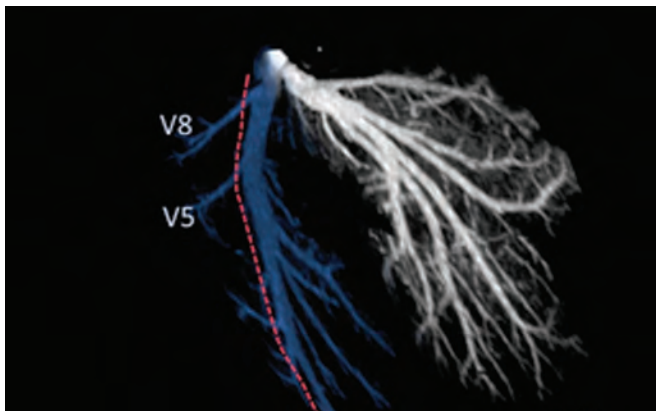
Laparoscopic surgery is poised to revolutionize liver donation

When Gina Vintalore learned that her cousin might die of stage-three cirrhosis while waiting for a liver transplant, the solution seemed obvious to her. “I asked him if he had considered a living donor,” she says, recalling their conversation at a family barbecue. “He said, ‘Who would I ask?’ I said, ‘Well, I would do it.’ ”

Living donations, in which the donor provides between 20 and 60 percent of his or her liver, are possible because the organ has a unique ability to regenerate. But historically, potential donors have faced risks to their own health, along with the certainty of a large scar and a recovery period lasting some two months. It’s not surprising, then, that of the 6,000 liver transplants performed each year, only 5 percent use living donors.

Vintalore, however, faced a much less daunting procedure—thanks to Benjamin Samstein ’92, MD, who has pioneered a first-in-the-nation laparoscopic program with the potential to shorten recovery time, reduce complications, and make living liver donation far more common. For donors, the minimally invasive procedure involves instruments inserted through a few small incisions, rather than open surgery. It means less pain, less fatigue, and faster healing. “I was running ten days later,” says the forty-eight-year-old Vintalore, who underwent a twelve-hour surgery in August to remove the right lobe of her liver, which was transplanted into her cousin. A few days after that, Vintalore—a phys ed teacher in Paterson, New Jersey—was back at work in time for the start of the school year. “It was a very quick recovery,” she says. “I’m back to 100 percent.”

Samstein, the new chief of liver transplantation and hepatobiliary surgery at Weill Cornell Medicine, has so far performed the laparoscopic procedure on about thirty organ donors. He hopes that the new approach will increase the number of liver transplants and save lives. “One of the challenges is that most donors don’t spontaneously come to the center; somebody has to



Kinder cut: An image of the left and right hepatic veins, and (in red) the line of transection for liver transplant



Benjamin Samstein ’92, MD

approach them,” Samstein observes. “If you have to undergo surgery and a recovery that will take two to three months, I’m less likely to ask you to donate an organ. If that recovery is shortened to two weeks, I’m more likely to ask.”

As the risk and recovery time for the donor decreases, Samstein explains, patients feel more comfortable accepting an organ from a stranger or asking an acquaintance or a coworker for help if close relatives cannot donate—and those people will be more willing to oblige. That’s what happened with kidney donation, where more

‘If you have to undergo surgery and a recovery that will take two to three months, I’m less likely to ask you to donate an organ.’

than a third of transplants come from living donors, and where laparoscopic surgery is now routine. “Liver transplant has less experience than kidney transplant,” Samstein says, noting that the first successful kidney transplant took place in 1954, with a living donor. While the first liver was transplanted in 1963, the organ came from a deceased donor. Moreover, the operation only became routine in the Eighties, and the first liver transplant from a living donor didn’t happen until 1989. “I think of liver transplant as being about thirty years more junior to kidney transplantation,” says Samstein, an undergraduate alumnus of the Ithaca campus. “That’s why, I think, there is so little knowledge, and why some doctors might not even present living donation as an option.”

NewYork-Presbyterian is currently the only hospital system in the United States to offer laparoscopic surgery for liver donors, but Samstein hopes that distinction will not last. He and his team recently published a paper in *Annals of Surgery* documenting their success, and they’ve been working to understand how the procedure might be made less technically challenging, so it could be performed at more centers. That would encourage more donations and allow more people in need to get livers—good news

ABOVE: ABBOTT; LEFT: COURTESY OF BENJAMIN SAMSTEIN, MD

for the 18,000 patients on the national waiting list for livers from deceased donors. Every year, some 1,500 people die waiting for a liver. “The need for organs far outstrips our access,” Samstein says. “Our overarching goal is to increase the number of transplants.”

He also points out that the current system for allocating organs prioritizes the sickest patients, even though transplant recipients clearly fare better when they receive new organs sooner, with survival rates up to 40 percent higher. “In order to have the best outcome, it’s not clear that giving organs to the sickest people is the only appropriate way to do it,” Samstein says. “Living donation enables somebody to get a transplant when it’s determined that they need

one, and not only because they are the sickest person on the list.”

For Vintalore, who recently had her cousin over to dinner and watched with delight as he held his two-year-old son on his lap, the donation was undoubtedly worth it. She chuckles as she recounts the efforts Samstein and the Living Donor Advocate Team at NYP/Weill Cornell took to ensure she was psychologically prepared for the experience—and her efforts to assure them that she was just glad she could help. “I did not have a moment of hesitation,” Vintalore says. “I’m laid up for what, a couple of weeks? And he gets to live. It’s a no-brainer.” ■

— Amy Crawford

The Tree of Life

Rebecca Baergen, MD, has devoted her career to placental pathology

About five years ago, an abnormally small placenta arrived in the surgical pathology laboratory at NYP/Weill Cornell. A patient had suffered a miscarriage well into her second trimester, and she craved an explanation for what had gone wrong. Because the placenta controls life inside the womb—providing nutrients to the growing fetus and acting as its lungs, kidneys, and immune system—many issues can be traced back to it after birth. Rebecca Baergen, MD, chief of obstetric and perinatal pathology, was asked to see if it offered any clues.

Because the fetus had short limbs, doctors had earlier suspected skeletal dysplasia, a type of genetic dwarfism, but X-rays and other analyses had disproved this hypothesis. When Baergen inspected the placenta—which is ideally soft, spongy, and beefy red—she noticed a severe loss of blood supply. This had caused some of the placenta’s cells and tissue to die and indicated that the fetus hadn’t received enough nutrients and oxygen.

While the placenta’s appearance suggested preeclampsia, a serious pregnancy complication characterized by high blood pressure, it was ruled out because the mother had no history of the condition. So Baergen, a professor of pathology and laboratory medicine, recommended that the woman’s doctors check her for autoimmune diseases and blood disorders—and they found that she had Protein S

deficiency, a genetic condition that causes over-clotting. In the placenta, this meant that the blood vessels were abnormal, which impeded the transfer of blood and nutrients to the fetus and kept it from growing properly. Doctors treated the mother with a blood thinner, and she went on to have two healthy children.

“Most pathologists don’t get to talk to patients, but I work with a lot of mothers,” says Baergen, author of the *Pathology of the Human Placenta*, the preeminent clinical text on the subject. “It makes

‘Most pathologists don’t get to talk to patients, but I work with a lot of mothers.’

a big impression on me when I’m able to help somebody in that way.”

Baergen is one of only a hundred or so pathologists across the country who focus on the placenta, a complex, temporary organ that develops early in pregnancy and is expelled immediately after birth. As recently as fifty years ago, it was thrown away post-delivery without a second thought. But in her decades-long work, Baergen has seen the organ gain



Rebecca Baergen, MD

importance and significance. Today, every placenta that’s delivered at NYP/Weill Cornell is stored in a labor and delivery unit refrigerator for one week. This procedure, which Baergen implemented soon after arriving eighteen years ago, ensures that any pregnancy-, birth-, or newborn-related issue can be properly investigated. Information uncovered from that research has meant improvements to maternal and neonatal care. And on a larger scale, thanks to the new \$41.5 million NIH-supported Human Placenta Project, scientists are now studying the organ in a major way. “The placenta is the chronicle of intrauterine life, and it can tell you so much,” Baergen says. “It can be the problem, it can reflect the problem—or even if it’s normal, it can help doctors rule things out. It’s really important.”

About six or seven days after fertilization, the placenta starts forming when the >

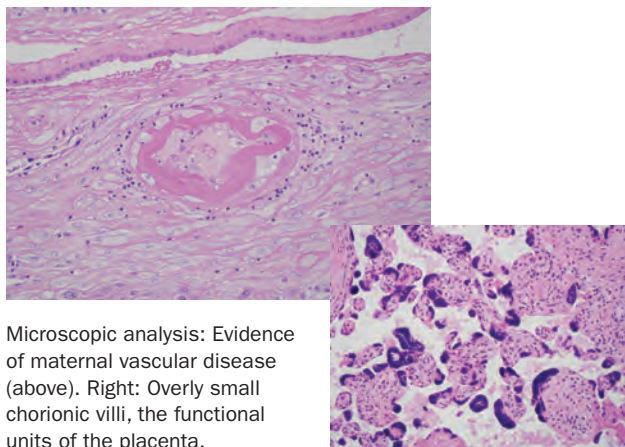
hundred or so cells that form the pre-embryonic mass, called a blastocyst, start differentiating. At that time, the outer layer of cells (called trophoblasts) invade the uterine wall and by day nine develop a primitive support network of vessels, which ultimately becomes the placenta.

As the blastocyst grows and becomes an embryo, then a fetus, the placenta grows, too. By the end of the first trimester, a seamless exchange of nutrients and oxygen takes place between mother and child. Deoxygenated blood is pumped from the fetus through two umbilical arteries to the placenta; there, the arteries subdivide and burrow deep within it, where they continue to spread and multiply—“like branches on an upside-down tree,” Baergen says. Eventually, they become tiny capillaries, which feed into the functional units of the placenta, called chorionic villi. The villi control the nutrient, fluid, and oxygen exchange, which takes place between fetal blood from the capillaries and maternal blood being pumped into the placenta from underneath it. This process happens naturally throughout pregnancy; after delivery, contractions force the placenta, which weighs about a pound, to detach from the uterine wall to be delivered as well. “But there are a million things that can go wrong,” Baergen says, and if they do, the health of the fetus and the mother are at stake.

Baergen came to Weill Cornell Medicine in 1997 from the University of California, San Diego, where she worked with her mentor, Kurt Benirschke, MD, known as the father of placental pathology. At NYP/Weill Cornell, she sees the placentas of every patient who has experienced complications during pregnancy or delivery, or whose babies had problems immediately after birth. Through her work, she has uncovered genetic disorders, infections, and a host of other conditions that impede the transfer of nutrients within the organ. She also studies physical problems that can cause fetal death, including cords that are too long, twisted, restricted, or inserted into the wrong part of the placenta. Some of these are just random flukes; others, like clotting issues, can be better managed in future pregnancies once discovered; still others are of unknown origin and require further study before they can impact clinical decisions. “Because this discipline is relatively new, there are still so many basic aspects of the placenta to study,” Baergen says. “It’s an amazing organ.” ■

— Anne Machalinski

COURTESY OF REBECCA BAERGEN, MD



Microscopic analysis: Evidence of maternal vascular disease (above). Right: Overly small chorionic villi, the functional units of the placenta.

Tropical Medicine

Elizabeth Triche, MD '09, practices on a Pacific island with sun, sand—and a host of challenging health problems



Pediatrician in paradise: Elizabeth Triche, MD '09, with a patient and his mom. The boy, Jazzy, was born three and a half months early.

In the U.S., the far-away island of Saipan is probably most familiar to aficionados of World War II history. Part of the Northern Mariana archipelago, it was the site of a 1944 battle that cost the lives of thousands of American and Japanese soldiers and helped end the war in the Pacific. Today, Saipan is the capital of a U.S. commonwealth; as in nearby Guam, people born there are American citizens. The island is a striking mash-up of the developed and developing worlds, says pediatrician Elizabeth Triche, MD '09—which makes it a compelling place for her to practice medicine. “It’s this weird dichotomy of beautiful ocean, resorts—we have a water park—and then abandoned strip malls, people living in corrugated metal huts,” says Triche, who works at the island’s only hospital, Commonwealth Healthcare Corporation. “But we have a dialysis unit, because we’re part of American medicine. We take Medicare and Medicaid. I have a NICU. We have one general surgeon who’s always on call—but we have no specialists.”

Located about 6,000 miles southwest of San Diego, Saipan has some 51,000 residents, a third of whom are of Filipino ancestry. For the indigenous people—the Chamorro and Carolinian ethnic

ABOVE AND OPPOSITE: COURTESY OF ELIZABETH TRICHE, MD '09

groups, which comprise about a quarter of the population—the importation of Western lifestyles has been devastating to public health, Triche says. “World War II was the turning point—before that, they walked everywhere and lived to eighty—but we brought them Spam and hot dogs and canned goods, and it’s been killing them ever since,” says Triche, an avid dancer who teaches Zumba classes at a local gym to encourage exercise. “People are very overweight, and diabetes is at crisis levels—like 35 percent of adults. I have a three-year-old patient with high blood pressure.”

Triche arrived on Saipan in February 2014 on a two-year contract with the hospital, and she plans to renew for at least one additional year. Because her colleagues have similar arrangements, she says, “the number of physicians varies wildly”; there can be as few as two pediatricians on staff or as many as six. “It’s feast or famine,” she says. “Everyone seems to sign contracts at the same time.” While severely ill or injured patients can be referred to off-island hospitals, including those in the Philippines and San Diego—the latter requiring multiple flights and twenty-four hours in transit—Triche treats a much wider variety of cases than her mainland colleagues do. “It forces you to be incredibly adaptable, to think outside the box,” she says. “I end up being the intensive care doctor, the neurologist, the person taking care of someone who’s dying from diabetes or has a brain bleed—whereas in the States, a specialist would immediately step in.”

Still, Triche notes that Saipan has more medical resources than many of the places where she’s studied and practiced. A native of Miami, she traces her passion for treating underserved populations to a post-college Peace Corps stint in Honduras, where she tried in vain to use her basic first-aid skills to revive a young man who’d drowned in a river. “The only medical person in my tiny town was a woman with an eighth-grade education who was an auxiliary nurse and just gave antibiotics for everything,” she recalls. “And I thought: Oh my God, I may be the highest-trained medical person here.”

During med school, Triche spent two months working at a hospital in Tanzania and took a year off to earn a master’s in international public health from the University of Sydney. As a pediatrics resident at UCSE, she was on a special track focusing on advocacy for underserved populations, work that brought her to Guatemala and Swaziland. After residency she spent a year and a half in Ethiopia, helping train pediatrics residents in an effort to stem that country’s medical brain drain. During her tenure, she notes, the program graduated its first three residents—“so we put ourselves out of a job,” a global health worker’s fondest wish. In her current post, Triche

has helped address the chronic shortage of medical professionals on Saipan by recruiting several MDs and a physician assistant to the island. She notes—with a nudge to her fellow WCM grads—that practitioners can commit to as little as a month of service. “Liz is really trying to make a difference,” says Madelon Finkel, PhD, a professor of clinical healthcare policy and research who was one of Triche’s WCM mentors. “She’s a terrific inspiration for students who are thinking of combining clinical medicine with global health. She’s compassionate—as hopefully all medical students are—but she takes it to the next degree, where she’s willing to live in some pretty underserved areas. She walks the talk.

‘Liz is a terrific inspiration for students who are thinking of combining clinical medicine with global health.’

I’m delighted at how she’s turned her interest and passion in global health into a wonderful career.”

While Triche’s medical work is demanding and stimulating, her off hours are the stuff of many a Northerner’s island fantasies. Her apartment has a balcony with a hammock and an ocean view. Although Saipan sees its share of extreme weather—Triche’s first home was heavily damaged in a typhoon that clocked 200-mile-per-hour winds—the island enjoys one of the planet’s balmy climates. In fact, it holds the *Guinness Book* record for most consistent temperature, with the mercury hovering around 79–89 degrees Fahrenheit year-round. “People keep asking me, ‘When are you going to start your real life?’—basically, ‘When are you coming back?’ Triche says. “But my real life feels like other people’s vacations. Not that it isn’t stressful sometimes, but this is what life should be. Here, people care about spending time with each other; no one cares what kind of car you drive or what clothes you’re wearing. It’s lovely. It’s the pace of life that I enjoy, and it highlights the things I think are important. Every morning, I wake up and see the water and the view, and I know I’m needed. I do the best I can, and I’m learning and growing. So this is *better* than a vacation.” ■

—Beth Saulnier



Inner Life

A new book by bioethicist Joseph Fins, MD '86, explores the rights of the minimally conscious

Just days before she was scheduled to graduate from Smith College, twenty-two-year-old aspiring veterinarian Maggie Worthen had a severe stroke caused by a blood clot in her brain stem. It was May 2006, and earlier in the day she had complained of a terrible headache but didn't go to the infirmary, instead staying in her dorm room at Smith to finish a final paper. After hearing strange noises and getting no response, a friend entered Maggie's room through a window and found her unconscious, her body blocking the door.

For hours, Maggie teetered at the brink of life and death. She had numerous seizures, and after being transferred to a large area hospital she underwent surgery to remove the clot. When she was eventually released to a nursing home months later, it was with a diagnosis of permanent vegetative state.

Despite this designation—which meant that she had no awareness of herself, others, or her environment—Maggie's mother, Nancy, thought there may be more going on in her daughter's mind. Maggie would occasionally make sounds or cry when such a reaction made sense. Nancy wanted to find out whether her daughter was still there—or proof that she wasn't. Eighteen months later, she got that chance when Maggie was accepted into a study at Weill Cornell Medicine.



Mother and child: Nancy Worthen doing art therapy with her daughter, Maggie, who was minimally conscious following a blood clot.

The Worthens' story—along with those of dozens of other families who were forced to deal with the consequences of disorders of consciousness from a severe brain injury—is at the heart of *Rights Come to Mind: Brain Injury, Ethics, and the Struggle for Consciousness* by Joseph Fins, MD '86, the E. William Davis Jr., MD, Professor of Medical Ethics, professor of medicine, and

The minimally conscious state is hard to diagnose—in part because such patients only sporadically show signs that they're aware of themselves, other people, or their environment, even though they are.

chief of the Division of Medical Ethics at WCM. In his book, Fins weaves these narratives into a complex tale of how the care of these patients is complicated by the history of severe brain injury in America, even as research is unraveling new ways to help the brain recover. His aim: to make the case that medicine must use better tools to diagnose these patients, so those

with the potential to improve with rehabilitation and evolving therapeutics can regain function and be reintegrated into society. "Some of these people might be able to interact with their family and friends, but are instead left in a nursing home and never thought to be aware or able to communicate," says Fins. He cites a study which found that more than 40 percent of nursing home patients with traumatic brain injury were misdiagnosed as vegetative, when they could actually feel pain and comprehend some of what was going on around them. "These are things that give me chills and keep me up at night. Mistaking a conscious individual as permanently unconscious is an affront to human rights."

The idea for the book sprang from Fins's collaboration with Nicholas Schiff, MD '92, the Jerold B. Katz Professor of Neurology and Neuroscience in the Feil Family Brain and Mind Research Institute. Since 1997, Schiff and Fins—who co-direct the Consortium for the Advanced Study of Brain Injury (CASBI) at WCM and the Rockefeller University—have worked together to answer the kinds of questions that stand to shape how society treats people with brain injuries. What is the capacity of brains to recover? What are the mechanisms of that recovery? How do we know that our assessments are accurately describing what's going on in a patient's

ABOVE: COURTESY OF NANCY WORTHEN; OPPOSITE: ABBOTT

mind? And what does society morally owe these patients and families? “When we first started, it seemed so shocking to even ask these types of questions,” Schiff says. “No one thought we’d be able to find anything.”

But using sophisticated neuroimaging technology, they upended the previous medical classification system—which often lumped all types of brain injuries into one group—and introduced new distinctions and diagnoses. If a patient’s neural networks, which Fins metaphorically likens to an interstate highway system, were essentially bombed out and cratered, that would mean that he or she was in fact permanently vegetative. But if the roadways were intact—but inactive and untrafficked—that meant something entirely different: the highways could become active. Therein lay the distinction between the vegetative and minimally conscious states.

First categorized in 2002, the minimally conscious state (MCS) is hard to diagnose—in part because such patients only sporadically show signs that they’re aware of themselves, other people, or their environment, even though they are. They might respond to their name once, for instance, but then not again for days, weeks, or months. “It may look like nothing is happening, but the connections are still there,” says Fins, whose research



Joseph Fins, MD '86

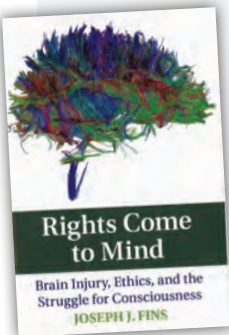
was funded by the Robert Wood Johnson Foundation, the Jerold B. Katz Foundation, and the Buster Foundation. “Our goal is to activate these networks and give these patients the tools to communicate, typically using drugs or devices.” In the future, deep brain stimulation—an approach pioneered by Schiff, Fins, and colleagues in 2007—might also become an established therapy to help MCS patients connect with the outside world.

When the Worthens arrived at WCM in February 2008—the first of five visits—Nancy’s goal was to determine if her daughter was vegetative or minimally conscious. Knowing the results could go either way, she prepared herself for either outcome. During that visit, Schiff got Maggie

to respond to a question—“Do you see your mother in the room?”—via eye movement. She looked decisively down, for yes. “I cried and celebrated,” Nancy says. “The trip was a breakthrough, because after it, people believed that Maggie was there.” And when her brain was scanned, its roadways lit up. Key electrical connections were present and her brain was working. “This was real data, and it was huge,” Nancy says. With those results, Nancy’s friends began to think about Maggie differently. And though it was still a struggle to get proper rehabilitation services, she was now considered a candidate for speech therapy and other rehabilitative treatments, including access to a special computer to aid communication, which made a huge difference in her life. But Fins stresses that these improvements almost did not happen—and would not have, if her diagnosis had not been clarified and her mother hadn’t advocated for her.

Until Maggie’s death last August from complications related to pneumonia, she had a life, Nancy says. Together they did art work, meditated, and visited her favorite places. “It wasn’t the same life that another twenty-five-year-old would have if they weren’t disabled, but I felt that she was at peace.” Nancy says. “Somehow she was able to accept this new reality.” >

‘Show Us You Are Here’ An excerpt from *Rights Come to Mind*



It is one of the oldest philosophical questions, knowing the conscious existence of another. As noted earlier, each of us can attest to our own existence but cannot say with certainty that another exists. And this seems to suffice in most cases because those of us who are conscious and can speak and affirm our conscious self can defend our interests and choices. Though it is theoretically suspect, in a practical sense, the communication of one’s own consciousness becomes a safeguard of one’s prerogatives and rights.

We have, however, seen the horrible consequences for patients who may have been conscious but have been unable to communicate and therefore assert themselves after brain injury. Without the ability to communicate they have been vulnerable from their entry into the emergency room, all the way through the ICU and chronic care. Ignored, neglected, and mistaken as unconscious, they were relegated to custodial care and worse. The entreaties of their loved ones generally went for naught until a few of them were properly diagnosed and shown to be minimally conscious through careful examination and sometimes ancillary neuroimaging tests.

To ensure that the fate of the next generation of minimally conscious patients is better than the current one, neuroscience will need to enable Maggie and others like her to communicate and show that they are here, and deserve a hearing. Science needs to enable them to more fully demonstrate, through their interactions, that they remain part of a human community, a community that is bound together through communication, reminders of our reciprocal obligations to this population of patients.

Advancing an ethical agenda of obligation will require some requisite degree of scientific “proof” of their conscious presence. These “manifestations of self” will need to occur on a more predictive and consistent basis. Only then will there be clarity about society’s responsibilities, so that at a minimum a conscious being is never again mistaken for one who is not and that the maximal potential of each patient is achieved.

The importance of such demonstrations cannot be overstated given the legacy of neglect, which has been described, and ongoing concerns about the inflated chronic care costs. In this environment, it is essential that any conflation of vegetative and minimally conscious patients be eliminated so that patients who are in fact conscious are provided with the care that conscious individuals deserve.

From *Rights Come to Mind*, published by Cambridge University Press. Copyright © 2015 by Joseph J. Fins. Reprinted by permission.

In his book, Fins—who is also the Solomon Center Distinguished Scholar in Medicine, Bioethics, and the Law at Yale Law School—argues that patients with disorders of consciousness should have access to the diagnostic, therapeutic, and rehabilitative interventions that will maximize their recovery. But because law and public policy have lagged behind the science, this

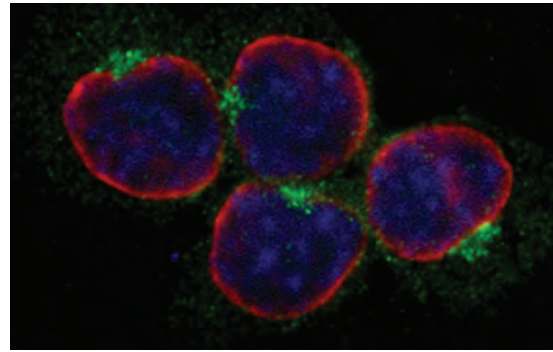
isn't currently happening. "It's unequivocal that, based on scientific advancements in this field, many people aren't getting the resources they deserve," Schiff says. "His book is spot on." Fins aimed the volume, which was published in August by Cambridge University Press, not only at fellow researchers and clinicians but also educated lay readers and policy makers. "Any

reasonable person who reads Maggie's story and the stories of others in this book should realize that the way we're treating these people—many of whom are conscious—just isn't right," Fins says. "There are a lot of people out there who could be helped, but aren't. We have a moral obligation to do a better job." ■

— Anne Machalinski

Father Figures

WCM researchers tackle male infertility on a variety of fronts



Stuff of life: Spermatogonial stem cells grown in a dish

After a failed round of IVF, John Martin and his wife sought a second medical opinion. Although their original doctor had run a standard semen analysis on Martin and hadn't seen any cause for concern, their new one thought that the percentage of his sperm that had a normal size and shape was too low. So he referred Martin to Marc Goldstein, MD, the Matthew P. Hardy Distinguished Professor of Reproductive Medicine and Urology at Weill Cornell Medicine.

Goldstein, who founded WCM's Center for Male Reproductive Medicine and Microsurgery in 1982, diagnosed Martin—a thirty-three-year-old who works in data analytics, and asked that his real name be withheld to protect his privacy—with a varicocele, an enlarged testicular vein and the leading cause of male infertility. Goldstein did microsurgery to treat the issue in July 2014. By early August, Martin's wife was pregnant; their son was born in April. Says Martin: "Dr. Goldstein treated male infertility seriously and got to the root of the problem."

Infertility affects about one in eight couples, with a third of those cases attributed to the male partner, a third to the female, and another third to both or to unclear causes—and WCM is one of the few places that works to diagnose and treat male infertility aggressively, Goldstein says. With the support of major NIH grants and close collaborations with investigators in other disciplines, WCM's clinician-scientists conduct translational research exploring the underlying causes of male reproductive problems. "What's unique in our program is that we're able to take an unanswered or difficult-to-treat clinical question and take it to the lab," says Darius Paduch, MD, PhD, the Herbert Fisk Johnson Associate Professor of Reproductive Medicine and Urology. "In the lab, we can figure out how to overcome it or come up with a new diagnostic test to give us more information, and then take it back to the patient quickly. This close relationship between the clinicians and

researchers has helped us become worldwide leaders in this field."

At WCM, clinicians at both the Center for Male Reproductive Medicine and Microsurgery and at the Ronald O. Perelman and Claudia Cohen Center for Reproductive Medicine work closely together to achieve successful pregnancies even in the most challenging cases, says Zev Rosenwaks, MD, the Revlon Distinguished Professor of Reproductive Medicine in Obstetrics and Gynecology. "The centers are highly complementary," says Rosenwaks, director of the Perelman Center. "It's a cooperative, highly intertwined program."

In the late-Eighties, as Goldstein pioneered the microsurgical technique for varicoceles and blockages that he used to treat Martin, Peter Schlegel, MD, chairman of urology, the James J. Colt Professor of Urology and a professor of reproductive medicine, first used a similar approach to retrieve sperm from the testis of men who had a zero sperm count in their semen. Because the system is so intricate, with up to fifteen feet of tubules coiled into a spot the size of a pinkie, the procedure can take five hours or longer. When it's finished, Schlegel and his team hope to have retrieved between fifty and a hundred sperm so they can select the best for IVF the following day.

That careful selection is done by embryologists at the Center for Reproductive Medicine, including the physician-scientist who invented a key technique that has allowed tens of thousands of previously infertile men to become fathers. Gianpiero Palermo, MD, PhD, the Blavatnik Family Professor of Reproductive Medicine, pioneered intracytoplasmic sperm injection (ICSI), a method for manually inserting sperm into an ovum. "Weill Cornell Medicine is one of the few institutions in the world where expertise in both the male-factor and female-factor areas work together intimately to diagnose and treat the most difficult male-factor infertility cases," says Rosenwaks. "That's what makes us unique." He notes

COURTESY OF MARCO SEANDEL, MD, PHD



that WCM has aided in the conception of more than 13,500 ICSI babies over the years—and credits that success to “our world-class team of clinicians, our andrology team headed by Dr. Palermo, and our embryology team headed by Nikica Zaninovic, PhD,” an associate professor of embryology and the Tessler Grandchildren Clinical Scholar.

To help ensure that only the highest quality sperm are used in IVF—thus increasing the odds of success—Paduch further refined an add-on test to traditional semen analysis: an assay to determine the percentage of a patient’s sperm with nicked or damaged DNA, which can occur because of age or if a man smokes or has an infection. If there are a lot of breaks, even an egg that fertilizes won’t develop properly, and the pregnancy will end in miscarriage. “If the percentage of DNA fragmentation is high, we can retrieve sperm directly from the testis before the damage occurs,” Paduch says. “Using this sperm, we go from a zero percent chance of pregnancy up to 50 percent in some cases, which is huge.”

Paduch and Schlegel are both members of WCM’s Center for Reproductive Genomics, founded in April 2014 with a five-year \$10 million grant from the NIH. Thanks in part to that support, Paduch is studying the smallest piece of genetic material, a molecule called microRNA, which could be the key to solving many male reproductive problems. “MicroRNAs are interesting,” Paduch says, “because they’re able to turn on and off the entire signaling and pathways in the testis.” Stem cells in the testis, he explains, only use one or two specific microRNAs, which aren’t used anywhere else; men without these microRNAs stop producing sperm from the stem cells, resulting in a severe form of infertility. “We think that we found a target where we can actually

deliver these missing microRNAs and turn on the spermatogonial stem cells so that they start dividing and producing sperm again,” Paduch says.

Marco Seandel, MD, PhD, is trying to improve sperm quality from another angle. An assistant professor of cell and developmental biology, Seandel conducts basic research that could one day aid infertile men, particularly those who have a defect in the first step of the sperm production process. He studies spermatogonial stem cells, which are “constantly making the decision

to divide or to mature and make sperm—up to 200 to 300 million sperm per day,” Seandel says. “They’re important because they need to maintain their function throughout a man’s lifetime so he can maintain his fertility.” But in some genetic diseases—like Klinefelter syndrome, which occurs when a male has an extra X chromosome—those stem cells can’t produce functional sperm after adolescence.

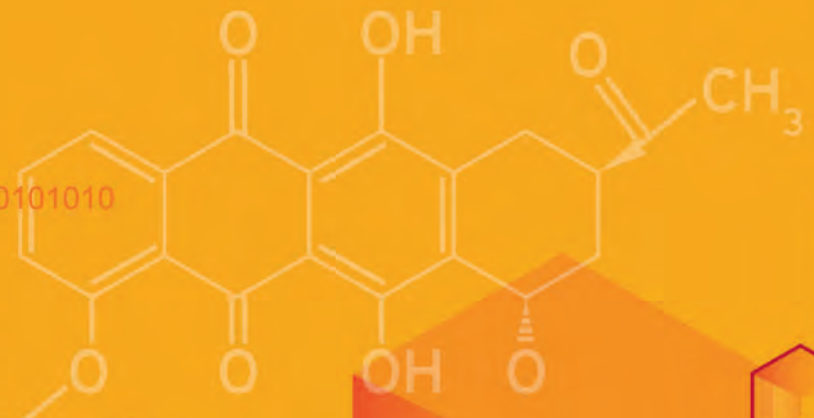
Similar damage is seen in some men who underwent chemotherapy as children. “One of the ultimate goals of our field is to be able to take stem cells out of the testis, put them into a dish, grow them, and potentially treat or correct any abnormalities that might be there,” Seandel says.

As WCM investigators continue their research, their findings related to Klinefelter syndrome—which affects about one in 500 male births—have already had an impact. After finding normal sperm stem cells in these patients, clinician-scientists devised a way to use microsurgical techniques to remove sperm from the testis during mid-adolescence, before the effect of the extra chromosome is fully felt. “These boys may have been told that they’re sterile,” Paduch says, “but they’re not.” ■

— Anne Machalinski

‘What’s unique in our program is that we’re able to take an unanswered or difficult-to-treat clinical question and take it to the lab.’

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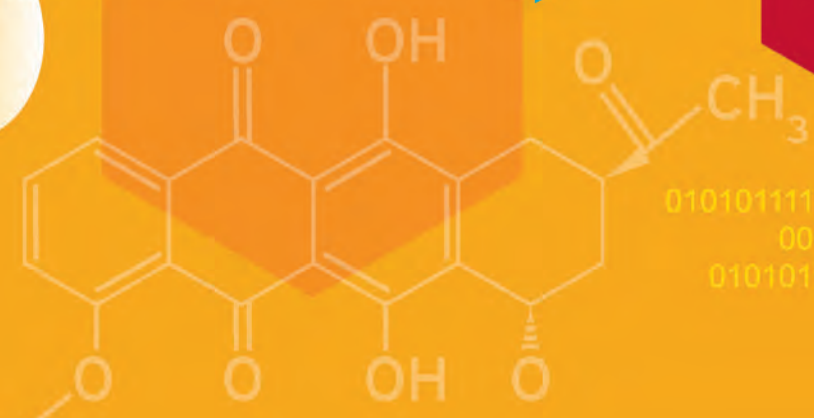


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Health BY DESIGN

Weill Cornell physician-scientists and Cornell University engineers collaborate—and patients benefit

BY BETH SAULNIER

ILLUSTRATION BY HEIDI SCHMIDT

The triple-negative form of breast cancer is one of the disease's most challenging types, with lower survival rates and a more aggressive course. Pioneering cancer researcher Lewis Cantley, PhD '75, has been studying it from various angles for decades—and now, thanks to Ithaca-based engineers, he has a powerful new way to explore it from New York. "Increasingly, biological science is relying on high levels of technology to improve our ability to visualize what's going on in a tumor, and to be able to physically manipulate events within it and follow in real time what happens," says Cantley, professor of cancer biology in medicine and the Meyer Director of the Sandra and Edward Meyer Cancer Center, who has been working with an Upstate colleague, Claudia Fischbach-Teschl, PhD, associate professor of biomedical engineering. "The technologies that have been developed in Ithaca are cutting-edge techniques in growing cells and even tumors in a controlled environment, where you can monitor and physically affect a tumor and look at its response.

"We're able to understand what's going on at a level that has never been possible in the past. It's a very exciting time."

The joint effort between Cantley—himself a doctoral alumnus of the Ithaca campus—and Fischbach-Teschl is just one of the many ongoing collaborations between WCM researchers and Cornell engineering faculty. Research teams are working together on topics from Alzheimer's to epilepsy, reconstructive surgery to heart disease. "From my perspective, it's absolutely crucial to have collaborations with engineers," says Jason Spector, MD, a Weill Cornell Medicine professor of surgery. "Even though I have a background in some other disciplines, at heart I'm a clinical physician and my expertise is in taking care of patients. I may have a clinical insight but no way to pursue it because I don't have the technical knowledge in that particular field. The engineers have incredible expertise in diverse areas ranging from polymer chemistry to tissue engineering to the use of lasers and optical imagery, so their insights and perspectives are perfectly complementary to mine." >

'It's absolutely crucial to have collaborations with engineers. Their insights and perspectives are perfectly complementary.'

Over the past decade, the University has strengthened its commitment to fostering collaborations between the two campuses, including logistical support like the Cornell bus that runs between Ithaca and New York City several times a day, providing reliable wi-fi, snacks, and a comfortable place to work during the 200-mile journey. Occasional retreats between engineers and their counterparts in WCM departments like surgery, neurological surgery, and radiology allow faculty to make matches with colleagues who have complementary research interests. The University has also offered several rounds of seed grant funding to help intercampus projects get off the ground—and according to one initial analysis, the investment has more than paid off.

In 2010, Lawrence Bonassar, PhD, professor of biomedical engineering and of mechanical and aerospace engineering, studied the outside funding generated by roughly a dozen awards given in the previous five years, finding that the seed support had facilitated substantive results that impressed outside granting agencies. "It had about an eight-fold return on investment," reports Bonassar, whose collaborative projects with WCM surgeons include two types of implants made of living tissue: ears for children born without them, and replacements for degenerated spinal discs that cushion the vertebrae. "About \$400,000 in grants had been given out—and they had returned, at that time, more than \$3 million from other organizations including the NIH, private foundations, and the NSF. So these tend to be productive collaborations that are well received by the outside world."

In the field of oncology research, intercampus collaborations got a particularly strong boost in 2009 with the awarding of a five-year, \$13 million grant from the National Cancer Institute that created the Center on the Microenvironment and Metastasis. Established under the NCI's Physical Sciences–Oncology Centers initiative, it has fostered numerous projects including the ongoing effort by WCM's David Nanus, MD, the Mark W. Pasmantier Professor of Hematology and Oncology in Medicine, and Evi Giannakakou, PhD, associate

professor of pharmacology, to develop a method to detect prostate cancer cells in the blood. They're working with Brian Kirby, PhD, an associate professor of mechanical and aerospace engineering who is based in Ithaca but holds a joint appointment in WCM's Division of Hematology and Medical Oncology. Says Kirby: "There's basically no way for me to impact human health directly unless I'm working with clinicians, looking at real samples, and trying to influence actual clinical practice."

Last summer's establishment of the Meinig School of Biomedical Engineering also strengthened intercampus research—elevating an existing department that had been founded in 2004. The school was created with a \$50 million gift from undergraduate alumni Nancy and Peter Meinig and their children; as WCM Dean Laurie Glimcher, MD, said at the time, their generosity "will enable us to expand our collaborations and advance our critical work translating new discoveries into the best patient care."

WCM researchers are also working with Cornell engineers who are based in Manhattan. Not only does the new Cornell Tech campus (temporarily located in Chelsea, but with three buildings currently under construction on Roosevelt Island) have a program devoted to health-related topics, but about 10 percent of students earning PhDs in biomedical engineering at the University are doing their thesis research at WCM. "When you look around the country, you'll see that there are no biomedical engineering programs in the top ten or twenty that aren't strongly tied to a top medical school—and interestingly, there aren't many top medical schools that aren't strongly tied to a biomedical engineering program," says Chris Schaffer, PhD, an Ithaca-based associate professor and director of graduate studies in biomedical engineering, noting that all of his department's first-year PhD candidates spend about two months at WCM for an immersion program in clinical medicine. "Much of the future of biomedical research, and of improving healthcare, will involve increased reliance on quantitative and engineering approaches to drugs and diagnostics. We do that best when we do it together." ■

Ears for Kids

Of every 10,000 babies born worldwide, between one and four have a congenital birth defect called microtia, in which one or both outer ears is missing or deformed. Unfortunately for these kids and their families, the options for surgical reconstruction have long been limited and imperfect—consisting of either an artificial implant or one crafted from the patient’s rib cartilage. But professor of surgery Jason Spector, MD, and biomedical engineer Lawrence Bonassar, PhD, hope they’ll soon be able to offer an alternative: a natural implant created from a patient’s own cells, that would grow along with the child and never require replacement. For several years, the two have been working together on the ears, which could either be formed through 3D printing or shaped in a mold. Since most cases of microtia occur on only one side of the head, computer imaging can be used to scan a patient’s normal ear, so the implants can be custom-made for a perfect fit. While the work began using bovine tissue, it has evolved

to comprise human cartilage; microtia patients usually have a small amount of vestigial ear tissue, which can be nurtured with stem cells until there is enough material to form an implant. The results have been highly promising: the growth system is working well, and the resulting ears are durable and have the proper anatomical form. The researchers hope to move into clinical trials in the next two to three years. “As a result of our collaborative efforts, we are poised to revolutionize the treatment of children who have microtia—and as we further develop these cutting edge tissue engineering strategies, to make much needed ‘replacement parts’ in many other areas of the body,” Spector says. “It’s all very exciting.”

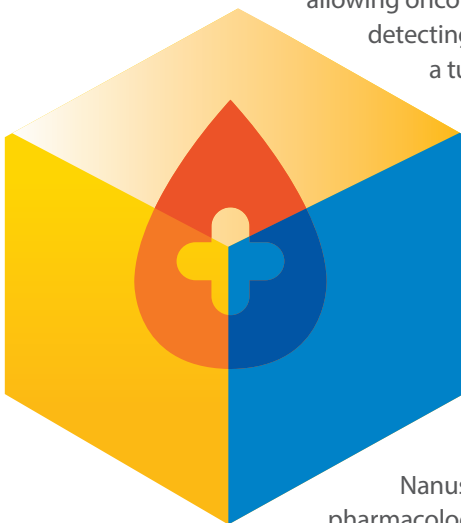


Tumor-Cell Detector

It’s known as a “liquid biopsy”: taking a sample of blood from a patient and analyzing it for cancer cells. Potential uses for such technology include allowing oncologists to refine a diagnosis, detecting the spread of cancer from a tumor to elsewhere in the body, and predicting the efficacy of a certain drug—all without an invasive procedure. According to David Nanus, MD, associate director of clinical services at the Meyer Cancer Center, “it’s something that a lot of medical centers and cancer centers are working on that will have utility in the future.”

Nanus has been working with pharmacologist Evi Giannakakou, PhD, and engineer Brian Kirby, PhD, on employing liquid biopsies for a particular purpose: they’re doing a proof-of-concept study using a microfluidic

device to detect prostate cancer circulating tumor cells. An expert in microfluidics, Kirby devised a silicon chip known as GEDI; pronounced like the *Star Wars* heroes, it stands for Geometrically Enhanced Differential Immunocapture. “We coat the surface of the microdevice with a substance that will specifically stick to cancer cells and not to blood cells,” Kirby explains. “We designed it to be sort of a maze that tricks the cancer cells into colliding with the surfaces many times over.” The multi-institution study, involving about five dozen patients with late-stage prostate cancer, is looking for biomarkers that may predict sensitivity or resistance to a class of chemotherapy drugs known as taxanes. “A major goal is to figure out the mechanism of chemotherapy resistance,” Nanus says. “If a patient progresses, can we look at their circulating tumor cells and—from an analysis of their DNA or RNA expression—determine the molecular reason why they have become resistant to treatment?”





Battling Breast Cancer

The “seed and soil” concept of cancer metastasis holds that tumors require fertile ground in which to grow—which means that making the body inhospitable to them is key to battling the disease. Andrew

Dannenberg, MD, the Henry R. Erle, M.D.—Roberts Family Professor of Medicine, and breast cancer specialist Linda Vahdat, MD, have ongoing collaborations with biomedical engineer Claudia Fischbach-Teschl, PhD, whose Ithaca lab is devoted to studying the environment in which a tumor exists, including its surrounding blood vessels and other non-tumorous host cells. They have worked together to explore diagnosis, treatment, and prevention from two

major angles: the effect of obesity on patient outcomes and—a major focus of Vahdat’s work—the promise of copper-depleting drugs in treating triple-negative breast cancer. For the obesity work, for example, Vahdat provided specimens from lean and obese breast cancer patients; Fischbach-Teschl was able to show that obese women have increased levels of proteins typically associated with wound-healing, which makes for a “soil” more hospitable to cancer, thus raising the likelihood of its spread. “Claudia’s expertise is in physical factors that promote metastasis—getting down to the practical aspects of, ‘How does a tumor cell get from point A to point B?’” says Vahdat, professor of medicine. “It’s a totally different way to look at things, but it’s highly complementary to what someone like myself does, which is on a very macro level, taking care of patients.”

Back Pain Relief

Among the projects sparked during a retreat between Ithaca engineers and WCM surgeons is one that could someday provide relief to the millions of Americans suffering from chronic back or neck pain. Spinal surgeon Roger Härtl, MD, is working with Bonassar to develop a bioengineered intervertebral disc to replace those lost to degeneration or herniation—be it from natural aging, playing contact sports, or other factors like obesity or years of manual labor. Currently, most patients are treated with pain medication or physical therapy—but 5 to 10 percent require more invasive methods such as injections or surgery. In the latter case, the most common procedure is spinal fusion, in which a damaged disc is removed and bone is fused into the gap; while artificial discs made of metal and plastic are



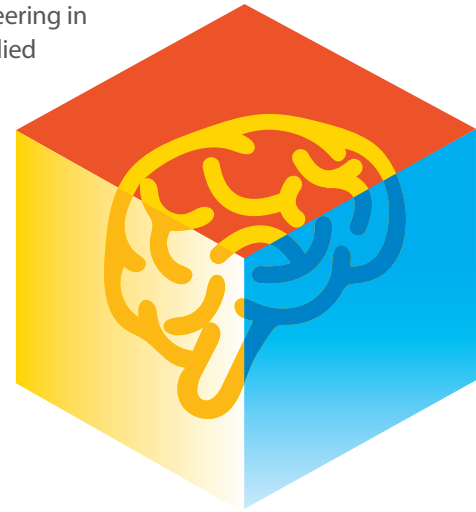
available, they can damage adjacent tissue, and their longevity is unclear. So Härtl, professor of neurological surgery and director of spinal surgery and neurotrauma at

WCM’s Brain and Spine Center, teamed up with Bonassar to design 3D-printed implants made of living tissue. The technology was successfully demonstrated in rats; in collaboration with the College of Veterinary Medicine, it’s currently being tested in animals, who can suffer from disk degeneration just as humans do. Ultimately, the implants could be created based on MRI imaging of a patient’s spine and comprise cells either taken from a cadaver or—a greater challenge—grown using a person’s own tissue. Another project, which Härtl reports is much closer to clinical implementation, is a technique to repair injured discs using tissue-engineered biological “glues.”

A 'Laser Scalpel' for Epilepsy

Of the two main kinds of epilepsy—general and focal—the latter is much harder to treat. While general epilepsy—in which the entire brain spasms with neural activity—can be well controlled with medication, focal epilepsy is more challenging. Often caused by brain trauma or congenital malformation, it involves too much neural activity in specific regions; to control it with drugs, says biomedical engineer Chris Schaffer, “you end up almost anesthetizing the brain.” Instead, the condition is treated with resective brain surgery—an imprecise option that can lead to cognitive and motor deficits. But Schaffer, an expert in advanced optical techniques, is working with Theodore Schwarz, MD, the David and Ursel Barnes Professor of Minimally Invasive Neurosurgery, to offer a much better surgical solution. They’re collaborating to develop a “laser scalpel” that can cut with precision on the scale of a micron—one-millionth

of a meter. They’re writing up a paper reporting promising results in a rodent model, in which a targeted cut decreased seizures by 50 percent; they’re currently studying whether the improvement is long-lasting. Schaffer is also working with Frank Wise, PhD '88, the Samuel B. Eckert Professor of Engineering in Ithaca’s Department of Applied and Engineering Physics, to design the device, which pulses at a rate of 100 femtoseconds. “The ratio of 100 femtoseconds to a minute is about the same as the ratio of a minute to the known age of the universe [about 13.8 billion years],” Schaffer notes. “So it’s a really, really short burst of light.”

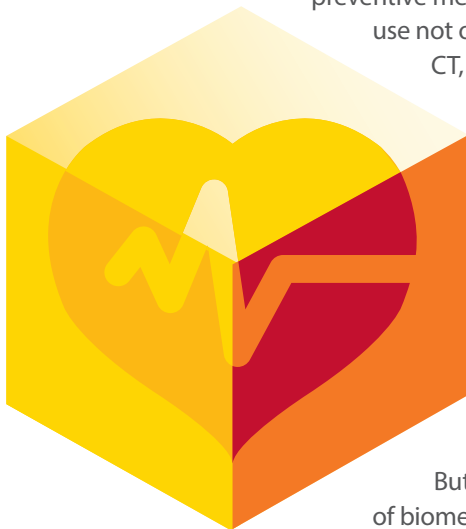


Heart of the Matter

At the Dalio Institute of Cardiovascular Imaging, director James Min, MD, and colleagues aim to better understand heart disease, in the hope that it will lead to improved treatments and preventive measures. To that end, they

use not only familiar tools like MRI, CT, and PET—but also novel technologies like 3D printing and computer modeling of blood flow dynamics, drawing on the expertise of Ithaca-based engineers. Min, a professor of radiology and of medicine who is board certified in cardiology, has been working with Jonathan Butcher, associate professor of biomedical engineering and

associate director of undergraduate studies in biomedical engineering, to study how the particulars of various surgical procedures—say, the shape and placement of a vascular graft—affect patient outcomes. Ultimately, grafts that have been designed for optimum performance in an individual person’s heart could be fabricated through tissue engineering, obviating the need to obtain them from elsewhere in a patient’s body. The grafts—or even entire heart valves—would be made of a patient’s own cardiac cells, harvested by surgeons and grown on a scaffold of water-soluble polymers. In the best-case scenario, Butcher says, “we could do all of those procedures in the operating room, in one sitting.” On the clinical side, the collaboration also involves veteran heart surgeon Leonard Girardi, MD '89, chair of the Department of Cardiothoracic Surgery and cardiothoracic surgeon-in-chief at NYP/Weill Cornell.



Digital Domain

By studying the use of electronic health records, Weill Cornell Medicine investigators aim to transform how patients receive medical care

BY ANNE MACHALINSKI

PHOTOGRAPHY BY JOHN ABBOTT

Jessica Ancker, PhD



Rainu Kaushal, MD, MPH

When Dennis Gawrys saw a doctor for the first time in thirty years, he received some shocking news: not only was the former Marine prediabetic, but he had high blood pressure and high cholesterol. He was prescribed a statin to lower his cholesterol and another medication to control his blood pressure, but a year later was diagnosed with type-2 diabetes and hypothyroidism. His doctors added the diabetes drug metformin and a thyroid medication to his daily regimen. “I was so scared,” says Gawrys, now seventy-three, of Manhattan. But “knowing that 99 percent of your health is up to you,” he took control.

He joined a Weill Cornell diabetes support group, which he still attends every Tuesday, and started exercising and adhering to a low-carb diet. While those changes offered significant improvements, it wasn’t until a decade later—when he logged into an online patient portal called Weill Cornell CONNECT—that he truly felt ownership of his health. Gawrys was able to track his blood test results, cholesterol levels, and hemoglobin A1c score,

which measures how well blood sugar is controlled. He could also access and download his medical records before an appointment with a specialist, manage his prescriptions and order refills, and send questions to his clinicians. Three years ago, Gawrys reaped the benefits: his doctor took him off metformin, decreased other medications, and downgraded him to a twice-yearly appointment. “The online portal represents a guidepost for me,” he says. “While I still have to be vigilant, knowing that the numbers will be there keeps me honest and on top of things.”

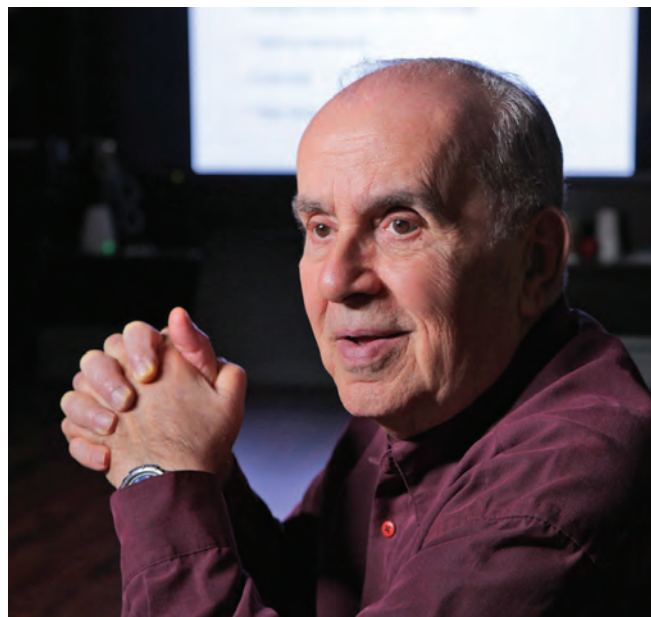
Gawrys is just one patient, but improving the implementation and use of electronic records and patient portals could ultimately lead to better health outcomes for entire populations. Weill Cornell Medicine scientists are piecing together a nuanced picture of the strengths and weaknesses of these systems—among the most widely recognized aspects of modern healthcare—as part of a broad inquiry by faculty into how to make medical care more accessible, effective, and affordable for patients and the people and institutions that provide it. “Problems with quality and cost in the U.S. healthcare system are well recognized,” says Rainu >

Kaushal, MD, MPH, chair of the Department of Healthcare Policy and Research and the Nanette Laitman Distinguished Professor of Healthcare Policy and Research. “We’re doing this comprehensive and multidisciplinary research so that each patient gets the right treatment at the right time, every time.” In addition to scrutinizing the presentation and use of electronic health records, Weill Cornell Medicine is trying to capitalize on the growing availability of electronic data from millions of patients to make research more patient-centered, powerful, and meaningful. Investigators are analyzing data to inform individual patient decisions, such as the cost-effectiveness of treatment regimens for complex conditions, and national policy, such as the efficacy of new healthcare delivery models, like Accountable Care Organizations.

In Gawrys’s case, just having easy access to his medical information made a huge difference. But while such portals are used by hundreds of thousands of people, many patients aren’t as proactive as he is. About a quarter of the public say they use an online portal—but that leaves out most patients, including many who are dealing with complex conditions and multiple providers, says Jessica Ancker, PhD, associate professor of healthcare policy and research. Ancker studies who’s using—and not using—these portals, and whether the information that’s there is actually helping patients better understand their health and make more informed decisions about their care. Among those most at risk of being left out of the online portal trend are patients who are black, uninsured, elderly, less computer literate, or poor. “This raises some concerns from a public health standpoint,” Ancker says. “It means that we have more work to do to improve these systems so that they’re more user-friendly and accessible, even for people who don’t have computers.”

While the vast majority of doctors and hospitals are now using electronic systems for storing patient data, most are not able to easily share information between institutions, Ancker says. As a result, patients are left to manage their own medical data and coordinate between providers. Although it is a national priority to make it possible to transfer patient data between systems, a variety of barriers—technological,

While Kaushal calls the ubiquitous adoption of electronic records ‘inevitable,’ she stresses that the current reliance on systems that don’t seamlessly communicate with one another—including the use of paperwork, phones, and fax machines—puts patients at risk.



Patient Dennis Gawrys

financial, and privacy-related—are slowing progress.

Ancker and Kaushal believe that people will be healthier only when everyone has access to real-time electronic healthcare information, which can be easily shared between providers. But proving that these technologies will improve outcomes isn’t easy, in part because they’re still relatively new and their use remains variable. Yet that’s exactly what Kaushal is trying to do. While she calls the ubiquitous adoption of electronic records “inevitable,” she stresses that the current reliance on systems that don’t seamlessly communicate with one another—including the use of paperwork, phones, and fax machines—puts patients at risk. Because doctors in large, well-funded practices and urban or suburban areas are more likely to have electronic records that are interoperable than those who are in rural areas or serve poor populations, a digital divide might develop that further widens the healthcare gap between haves and have nots, Kaushal wrote in *Health Affairs* in June. Weaker communication between providers and less reliable documentation of test results and clinical observations, which are also more common when electronic systems aren’t interoperable, are also of concern.

Looking ahead, both Ancker and Kaushal say that compensating providers for adopting electronic systems, improving interfaces to make them more useful to doctors, making systems interoperable among providers, and getting patients up to speed with how to access their health information is key to improving care. When it comes to numbers, like Gawrys’s hemoglobin A1c or cholesterol stats, patient portals might include a picture or illustration along with the figure instead of a simple graph. The good news is, they’re optimistic that improvements like these will soon come to pass. “If I had a crystal ball, my expectation is that in ten years we will be viewing healthcare much like other industries, including banking and travel,” Ancker says. “We’ll expect information to be electronic—and for our providers to have it all available to us, wherever we are.” ■

Agents of Change

Healthcare policy researchers aim to improve the system from a variety of fronts

Research Network: Big Data at Work

Rainu Kaushal, MD, MPH, who has twin toddlers at home, calls it her “third baby”: the New York City Clinical Data Research Network. With more than \$15 million to date from the independent, nonprofit Patient-Centered Outcomes Research Institute, which was created under the Affordable Care Act, the network connects six academic medical centers and sixteen other organizations in New York City, bringing together 40 million medical encounters on over 4 million unique patients to advance patient-centered research and knowledge about specific diseases and conditions, as well as to improve health systems.

“When it comes to research, being patient-centered means not only developing studies that are important and interesting, but within those studies, allowing patients to guide the specific questions that you ask,” Kaushal says. Among those the New York City group is trying to answer: how a person’s neighborhood affects their glucose control and health; how factors like energy level and emotional well-being are affected by bariatric surgery; and how cystic fibrosis patients use social media to communicate.

Outside researchers, too, will be able to query the NYC-CDRN for use of this data, stored at the New York Genome Center. But to gain access, they’ll need to demonstrate that the work will focus on the needs of patients at every step of the process. “The research studies that we approve must be interesting to investigators and also to patients,” Kaushal says. “For this reason, among others, I believe it is going to change the landscape of research and healthcare delivery.”

National Policy: Theory Meets Practice

One of the department’s investigators approaches his research from a powerful perspective: that of a veteran doctor. Larry Casalino, MD, MPH, PhD, the Livingston Farrand Professor of Public Health and Chief of the department’s Division of Healthcare Policy and Economics, was a family physician in full-time private practice for twenty years. “Those years help me to understand the perspectives of community-based physicians—the problems they face and the joys of patient care they experience,” he says. “This helps me to frame important questions for research.”

Casalino’s work focuses on how the United States can improve the way healthcare is funded and organized, issues addressed heavily in the Affordable Care Act. He has written editorials in high-impact medical journals like the *New England Journal of Medicine* on such topics as the Center for Medicare and Medicaid Innovation (created and funded with \$10 billion by the Affordable Care Act) and Accountable Care Organizations (ACOs), which make it easier for doctors and hospitals to provide coordinated, high-quality care to Medicare patients. ACOs and creative initiatives from the Innovation Center, Casalino says, could change the lives of thousands of doctors, tens of thousands of healthcare workers, and millions of patients.



Larry Casalino, MD, MPH, PhD

Individual Patient Decisions: Comparing Costs

“If we had a way of figuring out how to match each patient with the right medication, we’d have better outcomes,” notes Bruce Schackman, PhD, the Saul P. Steinberg Distinguished Professor of Psychiatry and Public Health and a professor of healthcare policy and research. “But once we have this information, how do we determine if the value of that better treatment is worth the money that society spends on it? Those are the questions that I’m interested in addressing.”

Most recently, Schackman’s work has resulted in funding for a major project: CHERISH (Center for Health Economics of Treatment Interventions for Substance Use Disorder, HCV, and HIV). The multi-institution effort, announced in August, seeks to address a stark disparity: although a 2013 tally found that an estimated 7.6 million Americans ages twelve or older needed drug abuse treatment, only 1.5 million received it. Why? The most common reason was lack of insurance coverage and an inability to afford the costs.

With \$5.8 million from the National Institute on Drug Abuse, CHERISH aims to serve as a nationwide resource for health economics research on substance use by developing and disseminating evidence that informs policy on drug treatment, as well as on hepatitis C and HIV care for substance users. To that end, it will foster collaboration among researchers, administer pilot grants, and conduct training and outreach for policymakers.

Precision Medicine: Harnessing Genomic Data

Jyotishman Pathak, PhD, who came to WCM in October from the Mayo Clinic, is focused on making big changes to what’s inside each patient’s personal electronic health records. In addition to the typical clinical data—weight, medical history, lab test results, and the like—the chief of the division of health informatics is working to incorporate individualized genomic information so that physicians can make smarter decisions about the drugs, doses, and other interventions that they prescribe. “If both you and I are diagnosed with a certain disease, say cancer, it is quite likely that our response to existing therapies will vary due to our underlying genetics,” says Pathak, who has more than \$8 million in NIH support for multiple projects to study the implementation of pharmacogenomics using electronic health records. “And it shouldn’t just be about asking whether a patient will respond to one treatment over another, but also understanding the appropriate dosing regimen to increase drug efficacy and minimize the risk of side effects. I firmly believe that informatics has a crucial role to play in achieving this ambitious goal of implementing precision medicine for routine clinical care.”

Ideally, Pathak would like to have everyone’s genetic information incorporated into their health records as soon as possible, but he knows that the technology is still too expensive for that to be a reality. There are additional challenges around managing this “real” big data, he says, including security and ethical concerns. Certain groups, though—including those at an increased risk for cancer, heart failure, and some rare diseases—might benefit the most from the incorporation of genomic data within electronic health records for personalized clinical decision-making. Further, he says, the availability of such massive amounts of data on individual patients could help investigators and computational scientists build smarter prediction models and risk profiles—which could ultimately lead to better healthcare for everyone.

His Best Shot



**For three decades,
Stephen Hoffman, MD '75,
has pursued a single goal:
a malaria vaccine**

BY BETH SAULNIER



While studying malaria at the Naval Medical Research Institute in the early Nineties, Stephen Hoffman, MD '75, offered himself up as a test subject. As a means of understanding the mechanisms of host defense, Hoffman rolled up his sleeve, inserted his arm into a containment box, and let himself be bitten by thousands of mosquitos carrying *Plasmodium falciparum*, the parasite that causes the disease.

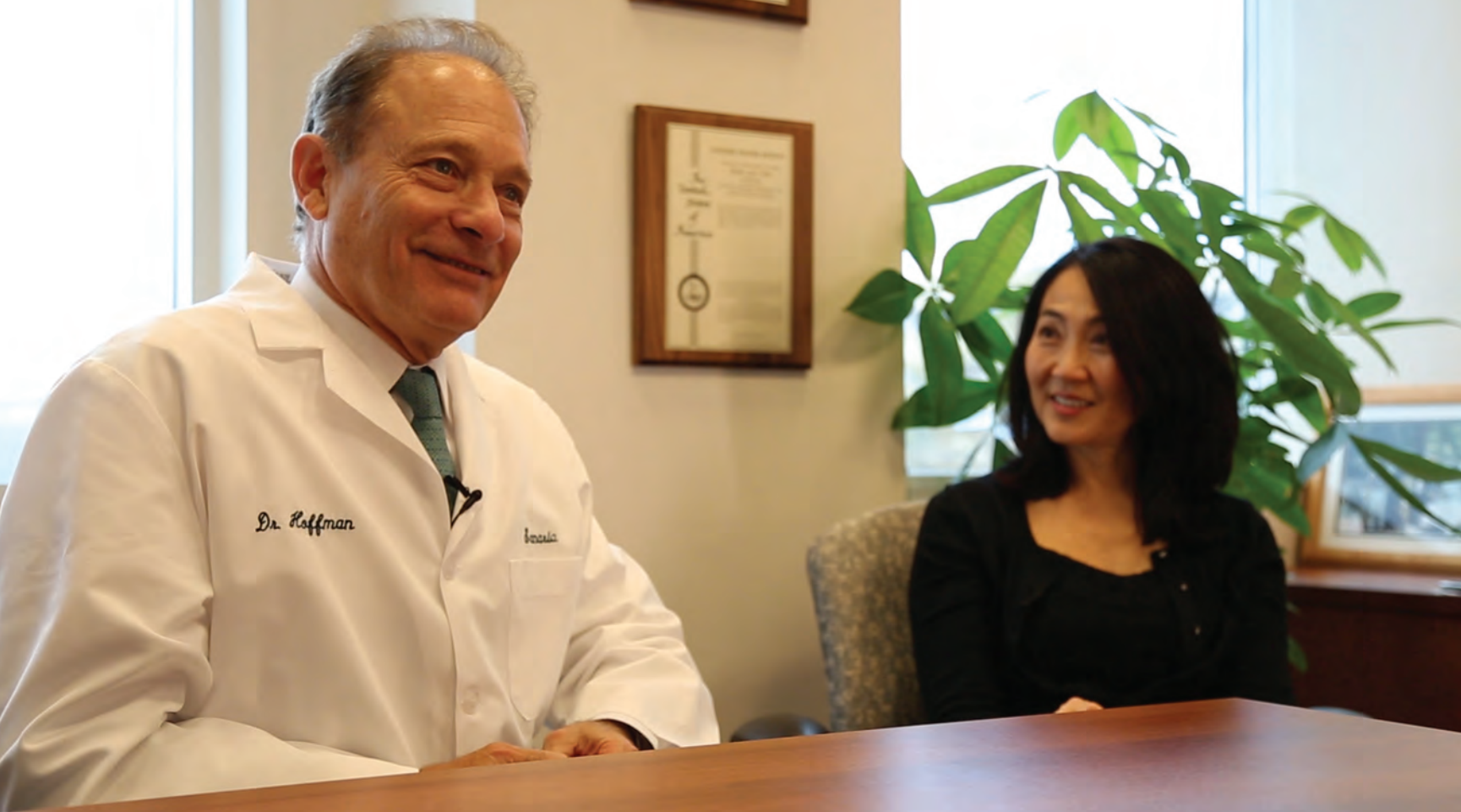
But these weren't just any insects: they'd been irradiated to weaken the *P. falciparum* sporozoite, the form of the parasite that infects the host. A few months later, he and fourteen fellow volunteers again let themselves be bitten—this time, by mosquitos carrying the parasite in its virulent form. Thirteen of those hardy souls—Hoffman included—never got sick.

The idea that a weakened (or “attenuated”) version of *P. falciparum* could confer immunity lasting months or years wasn't new; that understanding dated back to the Seventies. But though Hoffman and his colleagues were hard at work trying to develop a malaria vaccine, they didn't consider the attenuated sporozoite concept a contender. After all, the sporozoites would have to be painstakingly harvested from the insects' miniscule salivary glands—in quantities sufficient to produce a vaccine, and without transmitting other potential pathogens to humans. Other avenues seemed much more promising.

Fast forward to the early Aughts: after two decades in the vaccine trenches, Hoffman had retired from the military and was working for Celera Genomics, the biotech firm famous for sequencing the human genome. Reviewing the reams of data from his Navy days, he was drawn back to those irradiated mosquitos. At a scientific meeting, he floated the idea. “I asked people in the room, >



Injection sites (clockwise from far left): Hoffman, then a Navy officer, getting an experimental vaccine at Walter Reed Army Medical Center in 1986; preparing to administer his company's current vaccine to a volunteer during a recent trial in Equatorial Guinea; and an *Anopheles* mosquito, the genus that transmits the disease



Team effort (from top): Hoffman with his wife, molecular biologist Kim Lee Sim, PhD, an executive vice president at Sanaria; examining blood smears in Indonesia in the mid-Eighties

“What do you think about making this a vaccine?” and you could hear a pin drop,” he recalls. “Nobody thought it was possible.”

Hoffman has spent the past decade and a half proving them wrong. Now, his Maryland-based biotech firm, Sanaria, is in the midst of clinical trials on an attenuated sporozoite vaccine that has shown strikingly high efficacy rates of as much as 100 percent. “Steve is totally driven by the goal of developing a malaria vaccine. You can see it in his eyes; he is the most focused person you will ever want to meet,” says Anthony Fauci, MD ‘66, director of the National Institute of Allergy and Infectious Diseases, the NIH agency that has long been one of Sanaria’s funders. “He has defied conventional wisdom multiple times and has always turned out to be correct. Whether he is going to get to the goal line, I do not know—but I think he is, actually. Knowing him, his incredible perseverance, and his innate capabilities, I think he will get there. If anybody is going to do it, Steve is.”

Sanaria has held seven trials so far, with a dozen more—in the U.S. and Europe as well as in such African countries as Mali, Tanzania, Kenya, Ghana, and Burkina Faso—imminent or under way. In June, the company announced that a series of trials in Equatorial Guinea, comprising thousands of subjects and running through 2018, would be funded by \$48.5 million from that nation’s government and three American oil companies. “It has been an extraordinary journey,” Hoffman says. “We were told when we started that it was impossible to make this vaccine; we’ve made it. We were told that it was going to be impossible to administer it; we’ve shown that it’s easy. We were told that it would be impossible to get it out to the people who need it most; we’re showing that these challenges can be overcome.”

A Moving Target

Unlike some infectious diseases—say, measles—surviving malaria doesn’t confer lifetime immunity. However, each successive infection manifests less severely. Adults who grew up in malarial regions generally don’t get sick enough to go to the hospital—but infants and small children suffering their first few bouts are

exquisitely vulnerable. According to the World Health Organization, the disease took the lives of more than 400,000 people in 2015, the majority of them under five years of age. “In the last fifty years or so, malaria has been limited to tropical areas. And within the past decade, combined efforts—insecticide-treated bed nets, socioeconomic development, and new drugs—have driven it down by around half,” notes Kirk Deitsch, PhD, a professor of microbiology and immunology at Weill Cornell Medicine who has studied the disease for decades. “But that’s still hundreds of thousands of kids dying every year.”

And malaria is an ever-moving target. *P. falciparum* is devilishly challenging: it has a multi-stage life cycle that involves not only the mosquito but the human liver and bloodstream. As each new generation of drugs beats it back, the parasite evolves to dodge it. “What we have lacked, historically, has been a vaccine to avoid the problem of drug resistance,” Deitsch says. “That’s where Steve’s work comes in—to circumvent this continuous, up-and-down relationship that the human population has with malaria.”

Hoffman’s commitment to battling malaria traces, in part, to a faculty member who influenced so many WCM students of his era: Ben Kean, MD, the legendary professor of tropical medicine. Inspired by Kean’s mentorship, as well as that of distinguished public health professor Walsh McDermott, MD, Hoffman and a classmate spent a summer in Colombia, studying diarrhea in malnourished infants. That experience prompted the pair to take a year off to travel around South America—to gain an understanding not only of the developing world, but of themselves. “Today, that’s not unusual,” he notes. “In 1972, it was unheard of.”

Hoffman came down with amoebic dysentery three times; in Ecuador, he spent ten days in the hospital with typhoid fever—refusing the first medication offered to him because its adverse side effects had been drilled into him in pharmacology class. “His focus and commitment very early in his career were remarkable,” says Warren Johnson, MD, the B.H. Kean Professor of Tropical Medicine, one of Hoffman’s faculty advisers. After completing a family practice residency at UC San Diego—a choice Hoffman made because he believed the discipline would have the broadest application abroad—he heard about a group of doctors in Indonesia doing compelling research on infectious diseases such as typhoid fever, cholera, and malaria. But there was a catch: they were in the Navy. “I had a beard and a ponytail and had been protesting the Vietnam War,” he recalls. “I didn’t have it in my mind to join the U.S. military. But in the spring of 1980, I cut off my ponytail, took the oath of office, and went directly to Jakarta.”

There, he and his colleagues did groundbreaking research—including a double-blind, placebo-controlled trial on identifying and treating patients at high risk of dying from typhoid. In 1984, the *New England Journal of Medicine* published the results, documenting a drop in mortality from 55 percent to 10 percent. Brimming with confidence, he developed a similar approach for treating malaria—but the death rates didn’t budge. Says Hoffman: “I had many tens, perhaps hundreds, of children with malaria die whom I was taking care of.”

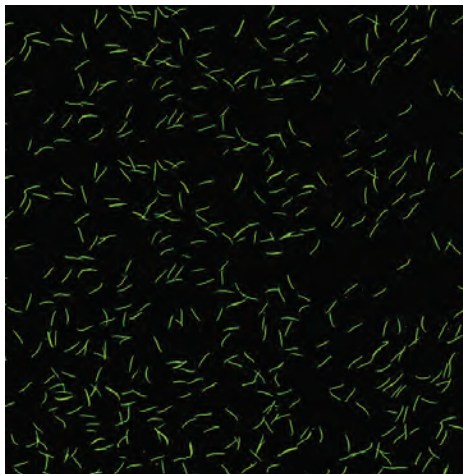
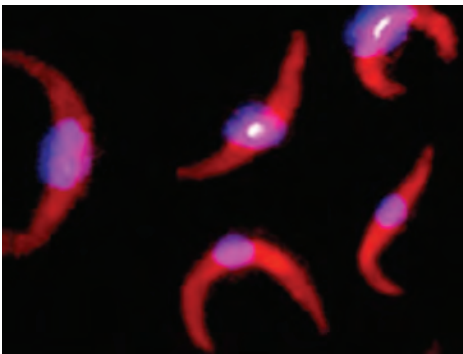
Those losses spurred him to return to the U.S. to focus on malaria research—and follow the path that ultimately led to the founding of Sanaria and the current vaccine trials. With the latest WHO figures tallying 214 million new cases of malaria worldwide in 2015, the stakes are almost unthinkably high. “Whoever develops the first effective malaria vaccine will go to Stockholm for their prize,” says Henry Murray, MD ’72, the Arthur R. Ashe Jr. Professor of Medicine, who invited Hoffman to campus for the >

‘It has been an extraordinary journey. We were told when we started that it was impossible to make this vaccine; we’ve made it.’

World traveler: Before he cut off his ponytail and joined the Navy, Hoffman (far right) and classmate Roger Hicks, MD ’75 (far left), studied disease in Colombia.



'He has a great idea, and he hasn't given up. He has followed where the science led him. When there are naysayers, he continues to move ahead.'



Invading force: Two views of the weakened *Plasmodium falciparum* sporozoite, the basis for Sanaria's vaccine

2014 B. H. Kean-Boxer Family Foundation Lecture in Global Health. "He is just as likely as anyone else to do this. He has been laboring in the vineyards for more than twenty years on this concept and has shown nothing but tenacity, creativity, and professionalism. I have great admiration for him—it's just that, like for anyone else, it's a tough nut to crack."

Great Expectations

When Hoffman started tackling that challenge in the mid-Eighties, he and his Navy colleagues mainly focused on developing a "subunit" vaccine, one that targets specific proteins on the sporozoites' surface. Expectations were heady. "In 1984," he says with a wry laugh, "we thought we were going to win the Nobel Prize in the next two years." In 1986—the first of two times he volunteered as a test subject—he received the experimental subunit vaccine himself. A few months later, he was exposed to malaria and was so confident he'd be protected that he jetted off to a conference in San Diego. Shortly thereafter, he recalls, "I called my wife and told her I had the flu. She said, 'No, you idiot; you have malaria.' I was in denial, because we thought we were going to solve malaria right then and there."

After working on the vaccine effort from various angles for years, Hoffman left the Navy and went to Celera—though he never stopped thinking about malaria, and convinced the company to aid the fight by sequencing *Anopheles*, the genus of mosquito that transmits the disease. When he concluded that the attenuated sporozoite angle was promising—despite the fact that many in the scientific community considered it untenable—he founded Sanaria in summer 2003 with a \$550,000 grant from the NIH. Even the start-up's name cast it in opposition to the disease: malaria translates as "bad air" in Italian, while Sanaria roughly means "healthy air."

The company's first home was an 800-square-foot storefront next to a carpet shop in a shopping complex outside of Washington that, Hoffman notes, "was later described in *National Geographic* as a 'dismal strip mall.' " The effort got a major boost four years later with \$30.7 million in grants from the Bill & Melinda Gates Foundation that allowed it to build a manufacturing facility. But its initial clinical trial stumbled; the vaccine only protected 12.5 percent of subjects, a far cry from the 80 percent goal. By 2010 the Gates Foundation had dropped out and money was drying up. But Hoffman was convinced that the problem wasn't the vaccine; it was the delivery method. And indeed, studies at the NIH in nonhuman primates showed that when it was injected into a vein—rather under the skin or in the muscle—the vaccine worked.

Hoffman pitched his colleagues on one more clinical trial; it was approved by the FDA, and the National Institute of Allergy and Infectious Diseases funded and conducted it. In August 2013, *Science* published the results that Hoffman had longed for: of the six volunteers who'd received five doses of the vaccine intravenously, every one was protected. Even in the group that got four doses, six out of nine didn't get sick. "This was big time; this was big news," Hoffman says. "However, it's one clinical trial, with a small number of subjects, and you have to reproduce it."

Tackling a 'Tall Order'

While Sanaria's concept has shown great promise, it still faces some logistical hurdles. Administering the vaccine intravenously—especially to the youngest patients, the target population given their mortality risk—takes training. And the vaccine must be kept extremely cold, even as it's transported to remote tropical regions. Hoffman says that both issues have proven manageable, and that the ongoing trials will bear that out. "He has a great idea, and he hasn't given up," says Linnie Golightly, MD '83, associate professor of medicine in microbiology and immunology. "He has followed where the science led him. When there are naysayers, he continues to move ahead. Even when other people don't have his vision, he brings them to the table." A decade ago, when Golightly



sought to launch a study in Ghana on the causes of cerebral malaria—work that is ongoing—Hoffman offered contacts and advice. She has been known to laud him during parasitology lectures to her second-year students, even showing a slide of him in the Sanaria lab. “It’s people like Steve that inspire us all,” she says. “He’s a fabulous scientist, a wonderful doctor, and a champion for finding ways to solve a complex, worldwide menace.”

Sanaria isn’t alone in pursuing a malaria vaccine. Among the others in development, one—a subunit vaccine developed by pharma giant GlaxoSmithKline and trade-named Mosquirix—is farther along in the pipeline, having gotten scientific (though not regulatory) approval in Europe last summer. But it has come under fire for its relatively low efficacy, having been found to reduce infection in African infants by only about a third, even after four doses—raising questions, Deitsch says, as to whether resources are better spent on proven preventives like bed nets. “The attenuated sporozoite vaccine that Steve’s been working on is, in principle, much more effective,” he says. “Even with the logistical challenges, it’s much better than every other vaccine that anyone else is trying.”

Sanaria currently aims—and even Hoffman admits this is “a tall order”—to have a version of its vaccine licensed by the FDA in mid-2018. That one would be geared toward travelers and military personnel, who don’t require long-lasting protection. “The second goal, and the more important one,” he says, “is to have a vaccine that could immunize entire populations, to halt transmission of the parasite and eliminate malaria.” And if that comes to pass, how will it feel for Hoffman to realize his life’s work? “It’s hard to even fantasize about what that might mean—to be able to stand there with a vial of licensed vaccine,” he says. “I can’t begin to think about the numbness and elation, at the same time. If I go back to the day I decided that I wanted to be a doctor, never in my wildest dreams did I think I’d be pursuing something with that great an impact.” ■

Small wonder: Sanaria lab staff dissect mosquitos to obtain the weakened *P. falciparum* sporozoite.

‘It’s hard to even fantasize about what that might mean—to be able to stand there with a vial of licensed vaccine.’

Notebook

News of Medical
College and Graduate
School Alumni



PROVIDED

Spencer Kubo, MD '80

Dear Alumni,

Happy New Year!

Among the Alumni Association's over-arching goals is to provide support for student activities and student-led programs with the hope that each participant will "feel the love" and support of previous Weill Cornell Medicine graduates. Thanks to the generosity of our alumni community, today's students have unique opportunities to supplement their learning beyond the classroom. Over the past few years, your annual dues have made a variety of activities and programs possible.

From hosting a welcome reception during the first-year **Student Orientation Week**, to sponsoring complimentary **Cap and Gown Portrait Sessions** at graduation, the Alumni Association aims to be present in students' lives at Weill Cornell Medicine from their first day of school until commencement. Since 2009, our **Alumni to Student Knowledge (ASK)** sessions have provided a unique forum for students and alumni to discuss educational, career, and lifestyle decisions in a relaxed, friendly environment moderated by WCM Alumni Association Board member Paul Miskovitz, MD '75. We also support the **Weill Cornell Youth Scholars Program**, an annual four-week summer enrichment program that exposes 25 underprivileged and underrepresented high school juniors to the rigors of medical training, while developing the self-discipline necessary for academic success.

The Alumni Association supports numerous student organizations and initiatives, such as the **Latino Medical Student Association (LMSA)**, which is devoted to community service, improving the health of the Latino community through education, and increasing recruitment of Latinos into the health profession. **Camp Phoenix**, founded by WCM students in 2000, is staffed by student volunteers who facilitate the healing of emotional scars in pediatric burn survivors by providing an authentic camp experience in a safe and supportive environment. **Motivating Action through Community Health Outreach (MACHO)** is a student-run volunteer program that empowers youth in underserved communities by teaching them the practical skills necessary to take control of their health and their lives through proper nutrition, fitness, and personal development. The **Weill Cornell Community Clinic (WCCC)** is a student-led initiative with the goal of providing high-quality and equitable health care to uninsured individuals in New York City.

We hope this information will inspire you to renew your dues annually, and to remain an active participant in the Alumni Association. Your support of today's students sends a powerful message about how central alumni are in the life of the institution.

One final note: I hope you will mark the dates of September 23 and 24, 2016, for Reunion. We broke all attendance records with 391 attendees at Reunion 2014, but Stuart Mushlin, MD '73, Chair for Reunion 2016, is looking to exceed that record!

Warm regards,

*Spencer Kubo, MD '80
President, WCM Alumni Association
spencer.h.kubo@gmail.com*

Off duty (left to right):
Andrew Rivera '17,
Molly Ketcham '16,
Sandeep Raj '16,
Dawit Jowhar '17,
Isabel Cuervo '19, and
André Belarmino '19
in the student lounge



1950s

Irving Blatt '49, MD '52: "Looking for info about my WCM Class of 1952."

Ames L. Filippone '50, MD '53: "I'm sad to report that Barb, my wife of 57 years, died in October following a stroke. We met in the animal research lab, and after working together for six months I took her out to a coffeehouse one night, and therein began the tale."

Calvin Kunin, MD '53, is well and continues to enjoy bird and travel photography. In 2015 he made his 21st annual visit to Taiwan, where he serves as an advisor to young investigators at infectious diseases units in Taipei, Tainan, Kaohsiung, and the National Health Research Institute. Dr. Kunin has fond and remarkably vivid memories of his classmates and teachers at Weill Cornell Medicine and NewYork-Presbyterian Hospital. He and his wife, Ilene, live in Columbus, OH, and spend the winters in Tucson, AZ.

Sidney Goldstein, MD '56: "We are well in Detroit and still busy with cardiology research and patient care. I was just given the Lifetime Career Award from the Heart Failure Society of America."

Mildred D. Rust, MD '56: "I'm living independently in a continuing care retirement community, with mild-to-moderate Parkinson's disease. I just recovered from hip

replacement. I'm active in church, visit with needy members, sing in the women's chorus, play Scrabble and Dominoes, and solve Merl Reagle's crosswords. Both daughters are healthy and active with family and in their professional lives."

Bernie Siegel, MD '57: "I have a new book out, *Love, Animals, and Miracles*—stories involving human and animal interactions and lessons we can all learn."

Ann H. Kazarian, MD '58: "Unfortunately, macular degeneration is taking its toll, and this will probably be my last class note. I've been retired now for ten years; I'm back in Connecticut since 2011 with family after spending six years north of Dallas with my daughter, Ann Elizabeth Morgan, and her family. I am proud to be the third generation of physicians, following both my father and paternal grandfather. Our daughter has followed my mother into nursing, spending most of her career in the ICU after realizing she did not like a more administrative role as a nurse manager."

David M. Lowell, MD '58: "I've been retired from Waterbury Hospital as a pathologist and from Yale University School of Medicine as a clinical professor of pathology since 2010. I'm enjoying the relaxing life, reading and traveling."

John T. Queenan, MD '58: "In

October, **Edward Wallach, MD '58,** was honored at the dedication of the Richard W. TeLinde and Edward Eliot Wallach Professorship in Gynecology and Obstetrics at Johns Hopkins University School of Medicine. Ed has had a brilliant career as a clinician, researcher, and educator. He has made major contributions in research in ovarian physiology and infertility. He was professor and chair at Johns Hopkins University from 1984–94 and has served on the faculty for three decades training many physicians and scientists who later became prominent leaders in reproductive medicine. Ed was appointed by the American Fertility Society to serve as the second chair of an ethics committee created to oversee in vitro fertilization (IVF) and related technologies. In 1995, he was elected to the Institute of Medicine of the National Science Foundation. After graduating from WCM, Ed and I spent our PG1 year as interns on the Cornell Division II at Bellevue and Memorial Sloan Kettering. I can confidently say that he was the most caring physician I have experienced in my career."

Michael H. Stone '54, MD '58: "I just came back from giving a series of lectures on forensic subjects at the first International Congress of Forensic Investigation in Quito, Ecuador, for which I was the keynote speaker. In mid-November, I went to Stockholm to

'I had the privilege of diagnosing the first case of Ebola in the US. As a consequence, I was on three nationally broadcast press conferences.'

— Edward Goodman '64, MD '68

give talks on serial killers and on borderline personality disorder. In between these activities, my wife and I go often to the Metropolitan Opera, of which we are patrons."

John Baldwin, MD '59, having finished a wonderful and fun career in vascular and thoracic surgery in Monterey, CA, moved some years ago with his wife, Jeannie, to the High Sierra, where they enjoy deep snowy winters and outdoor summers. Each June for the past decade, he has served as a guide for ocean game fish in Alaska, which requires no night calls and a ton of male bonding. "My best to all the great classmates," he writes.

Ed Krawitt '55, MD '59: "I'm still living in Shelburne, VT, where we have been since 1971, except for sabbatical stays in Manchester, England, and Lyon, France. I'm no longer seeing patients or teaching at the University of Vermont or Dartmouth College, but am still involved in PG education. I gave a talk in April 2015 at the annual PG course of the American Gastroenterological Association in Washington, DC, co-organized and moderated a symposium in London, England, in September 2015, and lectured in Bologna, Italy, in October 2015, all on autoimmune liver disease. I also consult on data safety and management with pharma."

1960s

Carl Becker, MD '61: "My wife, Dr. Susan Koethe, retired from the Medical College of Wisconsin at the end of May. Her son, Dr. John R. Koethe, is an assistant professor of internal medicine at Vanderbilt Medical School and lives in Nashville with his wife, Annie, and 3-year-old daughter, Lauren. Rather than face another winter in Wisconsin and wanting to be closer to John and his family, we purchased a condominium in Franklin, TN, about twenty minutes south of Nashville. We plan to winter down there and migrate north to Door County, WI, for the late spring, summer, and fall. When we babysat Lauren for a week in August, the heat index in Nashville was 106 degrees. The only Weill Cornell Medicine graduate I know in Nashville is **Bill Schaffner, MD '62**, who was also a classmate of mine at Yale, but we certainly would like to meet others. Our interests are art museums, music including opera, sailing, biking, and hiking. We discovered that we can easily pursue all of these in the Nashville area."

Franco M. Muggia, MD '61: "I'm the lead author on the article 'Platinum Antitumor Complexes: 50 Years Since Barnett Rosenberg's Discovery,' which is in press in the *Journal of Clinical Oncology*. My interest in anti-cancer drug development was spurred by exposure to the work of Joseph Burchenal and David Karnofsky during medical school. It was reinforced during my internship at the Bellevue Second Medical

(Cornell) Division and its four-month rotation at Memorial Sloan Kettering Cancer Center. Much of the subsequent clinical studies of cisplatin and second-generation platinum compounds took place at MSKCC. From 1975 to 1979 I was fortunate to be involved in overseeing the clinical development of cisplatin by the National Cancer Institute, culminating in its approval by the FDA in 1979. Beyond its historical interest, this recent publication highlights how understanding the remarkable anti-tumor actions of cisplatin and its analogs promises to lead us toward additional therapeutic advances."

William Schaffner, MD '62, received the John Snow Award from the Epidemiology Section of the American Public Health Association during the APHA annual meeting in Chicago in November. In October, he was selected as the 2015 recipient of the Levi Watkins Faculty Award of the Vanderbilt University School of Medicine, which recognizes outstanding contributions in fostering opportunity for members of underrepresented minorities in educational and research programs.

Barton D. Schmitt, MD '63: "The American Academy of Pediatrics has published the 15th edition of my book *Pediatric Telephone Protocols*. It's also available in software from cleartriage.com. I continue to see patients two days a week at Children's Hospital Colorado. My favorite subject is teaching accurate diagnostics."

James Bernstein, MD '64: "Eniware, which I founded three years ago, is launching the first portable sterilizer that uses no electricity, heat, or water; it's for use in the developing world, disaster zones, and refugee camps, and by militaries and veterinarians. There is a recent TED talk about it on YouTube."

Anne Gershon, MD '64, an authority on varicella diseases, received the Infectious Diseases Society of America's 2015 Alexander Fleming Award for Lifetime Achievement. Her studies were crucial in the US licensure of the live attenuated varicella vaccine in 1995 and its safety and efficacy in children with leukemia in remission and in HIV-infected children. She was one of the first to highlight the effect of herpes simplex virus infection in newborns. Dr. Gershon was until recently director of the Division of Pediatric Infectious Diseases and professor of pediatrics at Columbia University College of Physicians and Surgeons. She is also an attending physician at NewYork-Presbyterian Hospital.

Gus Kappler '61, MD '65: "After 45 years, I recently self-published *Welcome Home From Vietnam, Finally*, my recollections and analysis of my experience as a trauma surgeon at the 85th Evacuation Hospital in Phu Bai in 1970-71. Ninety-six photographs reinforce the written word. Some images are quite graphic. My wish is to relate a truthful accounting of war and equip the reader

in better understanding war's devastating effects on body, mind, and soul and how easily we in recent decades have ignored these historical lessons. The book is available at Amazon, Barnes & Noble, and the Xlibris online bookstore."

Edward Goodman '64, MD '68: "Having assumed the job of hospital epidemiologist at Texas Health Presbyterian Hospital of Dallas in 2011 after almost 37 years in private practice, I had the privilege of diagnosing the first case of Ebola in the US. As a consequence, I was on three nationally broadcast press conferences. The good news is that I was published in the August 2015 *Annals of Internal Medicine*. I also received a leadership award from the Dallas County Medical Society and the Presidential Award from the Texas Medical Association, and was an invited speaker at the Sixth George H. W. Bush China-U.S. Relations Conference. All of this is an example of making lemonade from lemons."

1970s

Richard A. Lynn, MD '71: "Just heard from **Lou Rambler, MD '71**, who is officially retired from his radiology practice and looking forward to spending more time down in Palm Beach Gardens with Mollie and perfecting his almost perfect golf game. I was with Betty and **Henry Pitt '67, MD '71**, at the American College of Surgeons in Chicago. Henry is the chief quality officer of Temple University School of Medicine. **Bob Lauren '67, MD '71**, continues as chief of neurology at Washington Hospital Center in D.C. **Carl Sadowsky, MD '71**, continues with his global research involvement in the Alzheimer's world. I saw **John Perlmutter, MD '71**, and his wife, Barbie, a few months ago with their family when they were vacationing in South Florida. He is still practicing ophthalmology full time in St. Louis. If anyone is going to be in the South Florida area on Saturday, February 27, or Monday, February 29, Weill Cornell Medicine will be here on its annual Palm Beach Weekend, and the alumni breakfast with Dean Glimcher is a wonderful opportunity for all of us to intermingle. **Lew Drusin, MD '64**, has come each year. Monday at The Breakers is a health symposium and reception. A good time to vacation down here and renew old ties."

Robert Riesenfeld, MD '72: "In 2008, I retired from a Northern California Kaiser Permanente hospitalist program I helped create. Since then I have taught medical students at UC Berkeley and been a teacher's

aide at Berkeley High. I have five marvelous grandchildren and occupy my time with golf and tap dancing. WCM was a tremendous education. Regards to all."

Roger Gingrich, MD '74: "I recently retired from the cancer center at the University of Iowa and moved from Iowa City to Barrington, NH. I built a lakeside 'Energy Star' solar-powered home. I do no medicine. I make wine, sip wine on my deck with Patty, read, woodwork, grandparent, help my son-in-law with his marine service business, relax, and enjoy every minute of life that comes my way."

Gene Resnick, MD '74: "Since the clinical research company I helped start was acquired by ICON plc in 2014, I have been enjoying half-time consulting for the company on development strategy and FDA interaction for a variety of oncology clients. There is a lot of time left for visits with our grandsons Blake, 3, and Reese, 6 months, in Nashville, with son Matthew, who is on the GU oncology faculty at Vanderbilt, and his wife. Our other son, Brad, is in private equity, and his wife is a fourth-year vet student at the University of Pennsylvania. We travel as much as we can. Last January was spent in Buenos Aires to avoid some of the Northeast winter, and this March

we'll be in South Africa, along with a few golf trips to Florida and Palm Springs. I am midway through my second four-year term on the Cornell University Board of Trustees, engaging on a number of committees, tech transfer, and entrepreneurial initiatives. I spend a good bit of time at Weill Cornell Medicine, which has changed a lot from the early 1970s, with new facilities and very high energy. The students I meet are so smart; how did we ever get admitted? I played golf with **David Fulton, MD '74**, and **Peter Stone, MD '74**, this past summer, and welcome hearing from classmates (with or without a golf invite)."

Thomas M. Anger, MD '75: "I am adjusting to retirement well. I teach at Lurie Children's and take vocal classes at Old Town School of Folk Music. I just finished another CD of original songs. I have also become an avid cyclist. Son Tom, his wife Lori, and two wonderful grandchildren, ages 3 and 6, live in Columbus, OH. We see them often."

Roger Hicks, MD '75: "I am now the treasurer of the Urgent Care Association of America. I was elected to its board of directors in 2011 and re-elected in 2014. I have owned and operated Yubadocs Urgent Care since opening it in August 2000."

Robert A. Linden '71, MD '75: "I'm remaining busy post retirement. If there was one thing I missed in all my years in our



Collaborative environment: MD-PhD candidates Raul Martinez-McFaline (left) and Margaret Fabiszak in the Belfer Research Building. Martinez-McFaline is also the student representative to the Board of Overseers.



Medical practice: Maria Boboila '16 (left) with Pouya Jamshidi '16

'I'm loving life in Colorado, working as a pediatric hospitalist in the Rocky Mountain Area.'

— Elizabeth Anne Wuerslin, MD '81

busy internal medicine/geriatrics primary care office in Niantic, CT, it was teaching. Thus, I have signed on to the Yale School of Medicine/Yale-New Haven Hospital faculty and teach eighth-year MD/PhD students in the hospital's Wednesday evening primary care clinic. I'm also on the UConn med school staff mentoring its students at migrant farm worker clinics throughout the northern part of the state. My 'full-time job,' however, is now heading up my Cornell fraternity's (Sigma Nu) alumni property association. This puts me in charge of not only an aging, 100-year-old historical building, but also 70 college students. Talk about liability; it makes medical malpractice exposure seem like a speck on the radar screen. I'm also in charge of running my brother's and my family's two rental houses on St. John, USVI: On a Clear Day and the Honeymoon Cottage. If you're having a bad day, gaze at them on the Internet. They will cheer you up. Finally, it was fun seeing **Sue Lagarde, MD '75**, win the 2015 Healthcare Leader and Innovator Award presented by the Connecticut State Medical Society at its annual House of Delegates meeting in September. Congratulations to Sue."

Gregory T. Everson, MD '76: "In June 2015, Linda and I traveled with friends/colleagues through Turkey. We visited some of the usual sites—Istanbul, Ephesus, the Mediterranean coast—and that certainly was interesting and great. But I would say the true highlight of the trip was the visit to eastern Turkey—Gobeke Tepe, Urfa, and Diyarbakir. Gobeke Tepe is a mound excavated relatively recently and is one of the earliest examples of ceremonial/religious human activity, preceding the formation of communities. The Turkish government had just opened a large new museum in Urfa highlighting the artifacts found at Gobeke Tepe. In addition, Urfa

has connections to stories related to Abraham including the cliffside where purportedly his enemies pushed him into fire, God changing the fire to water and filling it with fish in the nick of time so that Abraham was saved and also able to feed the multitudes. We were in Diyarbakir during the Turkish election returns. This is a predominantly Kurdish city, and the Kurds had won seats in Parliament, so celebratory gunfire was in order. Our band of 11 Americans were having dinner in the central courtyard of a caravanserai while the gunfire was all around us. Definitely one of my more memorable meals."

Vincent de Luise, MD '77: "I still teach at Yale and at WCM, where I am also involved in the Music and Medicine Initiative. I am playing a lot more clarinet, in chamber recitals here and in Europe. I lecture on musicians and their pathography, and am continuing to curate a humanities curriculum for compassion and empathy skills in medical school pedagogy. Family is happy and hale. Life is good."

Theresa P. Jackson, MD '78: "For the past year, I have been conducting a group mentoring program for pre-med high school students here in East Ramapo/Ramapo-Rockland County, NY. The program has been a success, with one student accepted to an accelerated program/medical school here in New York City, and three others on their way to undergrad. I received much support from other Weill Cornellians, including **R. Ernest Sosa, MD '78**, **Hans Gerdes, MD '83**, and **Gerald Hoke, MD '83**, among others, who gave of their time on 'specialty day' for these youngsters. The formal program may not be continuing due to lack of funding, but at least the fundamental pre-med message has been imparted and received by these students. Though I am still retired with a chronic cardiac condition, I remain available to mentor any other young student in this community expressing a genuine, self-generated interest in medicine as a life/career choice."

Robert Schultz, MD '78: "My latest book, *From Both Ends of the Scalpel*, explores the Patient Protection and Affordable Care Act, its real aim, and the indispensable ingredient that is being overlooked in its implementation. I analyze the sacred doctor-patient relationship—invaluable to the successful treatment of disease—and view it through the eyes of the doctor, the patient, the policymaker, the hospital administrator, and the uninsured. I look at health and disease, and marvel at the wondrous placebo phenomenon."

Thomas J. O'Dowd, MD '79: "I got together with classmates **Bill Schickler, MD '79**, and **Steve Werns '75, MD '79**, for a weekend at the Jersey Shore for a mini-reunion. All are well, albeit grayer. Steve Werns has three children under 9. Oh boy! **Steve Luminais, MD '79**, **Betsy Kindwall Luminais, MD '80**, and Nancy and I went to

France in September.”

Harley A. Rotbart, MD '79: “I’ve had the delight and privilege recently of reconnecting with many of our WCM classmates as part of a remarkable philanthropic project. My new book, *Miracles We Have Seen: America’s Leading Physicians Share Stories They Can’t Forget*, is a collection of 85 essays that attest to the awe and wonderment many of us have been fortunate to experience during our careers as physicians. Stories recount impossible cures, breathtaking resuscitations, extraordinary awakenings, spectacular serendipities, and recovery from unimaginable disasters. Still other essays tell of physicians’ experiences in which the ‘miracle’ was more emotional than physical, yet also made a lasting impact on everyone involved. The book is being published by HCI Books, publisher of the original *Chicken Soup for the Soul* series, and 100 percent of net author proceeds from sales are being donated to 65 worthy charities designated by the essayists. From our **Class of 1979**, powerful and inspiring essays were contributed by: **Kenneth Adams, Dale Adler, Robert Buys, Clara Escuder, Harvey Guttman, Frank Richards, Bruce Ring, Harley Rotbart, Ann Schongalla, Paul Skudder, Anthony Suchman, Bauer Sumpio, and Adrienne Weiss-Harrison.** Also contributing essays were three distinguished WCM faculty: Philip Barie, MD, Michael Lockshin, MD, and **Carol Storey-Johnson, MD '77.** The book is due on store shelves in fall 2016.

1980s

Elizabeth Anne Wuerslin, MD '81: “I’m loving life in Colorado, working as a pediatric hospitalist in the Rocky Mountain area. I travel abroad on cleft lip and palate trips when able. Come and ski in Steamboat Springs.”

Katherine P. Holden, MD '82: “After 30 years in pediatric and adolescent medicine (five in private practice followed by 25 with the Student Health Service at Vassar College after the birth of our sons), I’ve retired. I expected to be bored and lonely, as my husband is still working full time in ob/gyn and our sons have moved away, but I seem to be busier than ever. So far, so good. Our older son is pursuing a PhD in molecular biology at Columbia and our younger son is completing an undergraduate degree at Tisch in music performance at NYU, so we get to see them on a regular basis.”

James Auran, MD '83: “I was just appointed chief of the Department of Ophthalmology

at Harlem Hospital, where I will supervise Columbia University ophthalmology residents as well as run the department. More importantly, my daughter Emily has joined me at Columbia (where I will continue to practice part time), having started her first year of medical school.”

Miriam H. Alexander, MD '84: “After almost 20 years at Johns Hopkins, I have joined the Yale New Haven Health System as the medical director for occupational health and wellness. Our daughter is busy with our two grandchildren, one son is marrying a medical student, and our other son is starting college in New York City. Josh and I are commuting up and down I-95.”

Edward Chaum, PhD '86, MD '87: “For the past 15 years I have been the Plough Foundation Professor of Retinal Diseases and more recently the director of research at the University of Tennessee, Hamilton Eye Institute. My laboratory supports a portfolio of grants focused on understanding retinal diseases including molecular genetics, drug trials, and novel nanoplatforms for clinical research and patient care. I have also become a serial entrepreneur, translating our research into start-up companies including Hubble Telemedical (acquired by Welch Allyn in 2015), Nanophthalmics, Infusense (medical devices), Focal Point, and Ipax Pharmaceuticals. My wife, Patti, owns a specialty baking business. We have two daughters: Lacey is a sophomore at Penn, and Danielle is a high school junior and professional actress in Memphis.”

Joseph Fins, MD '86: “I gave the David Kopf Lecture on Neuroethics at the Society for Neuroscience in Chicago in October 2015. My talk was entitled ‘Giving Voice to Consciousness: Neuroethics, Human Rights, and the Indispensability of Neuroscience.’”

B. Sonny Bal, MD '87: “I slowed down clinical practice to focus on running Ametica Corporation, a company that manufactures silicon nitride ceramics for biomedical applications; I was appointed CEO and president in late 2014. Also, busy with medicolegal consulting and education, as lawyer and partner in BalBrenner, a firm that I co-founded. Need to finish up multiple projects, including completing multi-engine flight training as a pilot. Life stays busy.”

Paul Kirchgraber, MD '88: “My new position as vice president and global general manager at Covance Central Labs

keeps me very busy. I get lots of frequent flyer miles, which my wife enjoys using. We’re enjoying our eighth year in Indiana.”

Theresa Rohr-Kirchgraber, MD '88: “I’m living in Indiana and enjoying primary care and instituting new programs to improve patient flow and health. My year as president of the American Medical Women’s Association is moving right along. Join us in Miami for the annual meeting.”

Abigail Falk, MD '89: “I have just accepted a position at Advanced Interventional and Imaging Institute. This is an exciting opportunity to perform all interventional radiology skills at an outpatient center.”

Leonard N. Girardi, MD '89: “I was named chairman of the Department of Cardiothoracic Surgery and cardiothoracic surgeon-in-chief at NYP/Weill Cornell.”

Antonia S. New, MD '89: “I am the residency training director and vice chair for education in psychiatry at Mount Sinai.”

Gerald J. Ortiz '85, MD '89: “My daughter, Alexandra Michelle Ortiz '14, is heading to Vanderbilt Law School, Class of 2018.”

1990s

Eric Salk, MD '92: “As national medical director of CrowdRx, I had the privilege of being co-medical director of acute medical services at the Burning Man Festival in Black Rock City, NV, this year. An amazing experience.”

Adam Cifu, MD '93: “I am a general internist and a professor of medicine at the University of Chicago.”

Avram Mack, MD '98: “After a decade at Georgetown, I recently became the associate

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'I've had the great fortune to join my fellowship director in his private practice and truly love my job.'

— Chandra M. Ivey, MD '01

chairman for quality and safety in the Department of Psychiatry at the Children's Hospital of Philadelphia. I've focused on raising psychiatrists' awareness and interest in safety and quality, and my work was recognized by the Association for Academic Psychiatry's educator award for 2015."

2000s

Joshua Dines, MD '01: "I continue to serve as an assistant team physician to the New York Mets. It was exciting that they were in the World Series with my wife's hometown team, the Kansas City Royals. Additionally, last year was the first year that I was named as a sports medicine consultant to the New York Rangers hockey team. Right now I'm in Qatar, where I visit quarterly to work as a visiting surgeon/shoulder specialist at Aspetar Hospital, which is the first specialized orthopaedic and sports medicine hospital in the Gulf region and is affiliated with



In the lab: MD-PhD candidate Diana Grace Wang

WCM's Qatar campus."

Chandra M. Ivey, MD '01: "I practice laryngology in New York City, on the Upper West Side. I've had the great fortune to join my fellowship director in his private practice and truly love my job. On a more personal note, I continue to grow with my husband, Mike Marsallo, and our two children, Maddock, 6, and Caitlin, 4. We just made the transition to commuter life, and the children started school in Westchester County. I recently reconnected with some Weill Cornell alumni friends and am so proud of all of the wonderful things we have been up to as a class. I live a life of possibility and love for humanity, and am blessed to be supported by my parents, in-laws, sister, sister-in-law, and nieces and nephews, all in New York State. As I sit here with my daughter, I realize I have always been trying to get somewhere, achieve, and be someone. I am happy to report that place is right here, and being a mother, wife, surgeon, and partner with my patients is exactly who I wanted to be."

Raymond Soccio, MD '05, a graduate of the Tri-Institutional MD-PhD program, was promoted to assistant professor of medicine in the Perelman School of Medicine at the University of Pennsylvania. He is a member of the Division of Endocrinology, Diabetes, and Metabolism and the Institute for Diabetes, Obesity, and Metabolism. His laboratory will study metabolic nuclear receptors, focusing on potential applications to precision medicine.

2010s

Benjamin Angarita, MD '10, received the American College of Psychiatrists' Laughlin Fellowship, awarded to the top ten young psychiatrists in the US and Canada who are "deemed likely to make a significant contribution to the field." Dr. Angarita served as chief resident of the physician-scientist track in the Department of Psychiatry at Mount Sinai and has appeared on television on "Saturday Today" in New York. He is currently in his final year of his child and adolescent psychiatry fellowship at Mount Sinai and works part time as an adult psychiatrist at Park Avenue Doctors. He attended the wedding of classmate **Garvey Rene, MD '10,** in Bermuda in October.

Erica O. Miller '06, MD '11: "I finished up my med-peds residency at the University of Rochester and am now an adult cardiology fellow, also at the University of Rochester. My husband, Jesse, will be graduating from internal medicine residency here and starting a job in primary care."

Eleni Greenwood, MD '12: "I matched for a fellowship in reproductive endocrinology and infertility at UCSF. I'm grateful for my Weill Cornell training, which inspired me to pursue REI in the first place."

In Memoriam

ALUMNI

'45 MD—Andrew L. Morgan of Puako, HI, September 29, 2015; urologist; served in the US Army Medical Corps in World War II; the Morgan Lounge at Queen's Hospital in Honolulu is dedicated to him and his father; avid fisherman; hunter; boater; active in professional affairs.

'46 MD—Walter Miller of Seattle, WA, October 30, 2015; clinical professor of medicine and surgery, University of Washington; attending physician, Harborview Medical Center; consultant for pulmonary diseases, US Public Health Service Hospital; member of the teaching staff at Providence Medical Center and Swedish Hospital; director of tuberculosis control, King County Health Department; staff physician, Firland Sanatorium; specialist in pulmonary diseases at St. Charles Hospital, London, Hillingdon Hospital, London, the Chest Clinic, Uxbridge, and Nayland Sanatorium, Suffolk; flight surgeon in the Royal Navy.

'47 MD—Frances Thomsen Nye of Norwich, VT, November 23, 2013; psychiatrist at Mary Hitchcock Memorial Hospital and the V.A. Hospital in White River Junction, VT; peace advocate; volunteer with Witness for Peace in Nicaragua and South Africa; member of the Iona Community; helped create the Dresden Interstate School District; helped establish the library at Marion Cross Elementary School; supporter of LGBT rights; gardener; outdoorswoman; avid reader; active in civic, community, and religious affairs.

'55 MD—Paul Stucki of Winslow, ME, October 10, 2015; orthopaedist; veteran; award-winning painter; hunter; fisherman; gardener; pianist; active in religious affairs.

'51 BA, '57 MD—Bruce Boselli of Sayre, PA, November 12, 2015; specialist in internal medicine; served at the Guthrie Clinic, where he founded and was chief of the hematology and oncology department; treasurer, Guthrie Clinic board of directors; president of the Robert Packer Hospital staff; also worked at the University of Vermont Medical Center; veteran; lifelong New York Yankees fan; founding member, Valley Philosophical Society; tennis player; golfer; fisherman; birder; studied the American Civil War and Mark Twain; active in civic, community, and professional affairs. Wife, Shirlee Zettle Boselli, BS Nurs '56.

'65 MD—Jeremy J. Kaye of Nashville, TN, July 4, 2015; professor emeritus and chair of radiology and radiological sciences at Vanderbilt University School of Medicine; former director and chief radiologist in the Department of Radiology at Weill Cornell Medicine and New York Medical College; former chair of the

Department of Radiology at St. Vincent's Hospital and Medical Center; veteran; author; lecturer; visiting professor at more than 65 medical centers nationwide; examiner for the American Board of Radiology; president, International Skeletal Society; editor, *Skeletal Radiology*; active in community and professional affairs.

'78, MD '82—Lori Altshuler of Manhattan Beach, CA, November 5, 2015; psychiatrist; the Julia S. Gouw Endowed Chair in Mood Disorders at UCLA; established the UCLA Mood Disorder Research Program; chief of bipolar disorders, Brentwood V.A. Hospital; fellow in biological psychiatry at NIMH; did pioneering work in magnetic resonance imaging to assess changes in the brains of patients with psychiatric disorders; author; elected to the "Best Doctors in America" seven times; active in professional affairs.

FACULTY

Joan Martinson May of Nyack, NY, October 12, 2015; assistant dean for Student Affairs at Weill Cornell Medicine; instrumental in the foundation of the Learning Collaborative, a center that provides continuing education to seniors. Those who wish to honor her memory may contribute to the Joan May Scholarship for International Studies, a fund at Weill Cornell Medicine.

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Quick Thinking

PhD students sum up their theses—in three minutes or less



Fast talker: PhD candidate Robert Frawley, WCM's first Three-Minute Thesis champ

There were about 180 people in Uris Auditorium that afternoon in mid-November, and nearly all of them were research scientists. So when Robert Frawley—a PhD candidate in physiology, biophysics, and systems biology—opened his super-short speech about his spinal research with an inside joke, he knew he was preaching to the choir. “I said, ‘Anyone can get lower back pain and degenerative disk disease. It comes from heavy lifting, having bad posture...’”—he wound up to the punch line—“... and loading ninety-six-well plates in the lab for six years!”

Frawley got a laugh from his fellow bench scientists—the plates are standard lab equipment used to store and transfer samples—but ultimately, he took home the title for explaining his research in terms that any educated layperson could understand. The sixth-year grad student was the first-place finisher in Weill Cornell Medicine’s inaugural Three-Minute Thesis competition, which challenges aspiring PhDs to summarize their research quickly, succinctly, and engagingly. “In talking about your work, you need to be able to grab people’s attention, especially if you’re talking to non-specialists,” says event organizer David Christini, PhD, the Graduate School’s associate dean for programmatic development and a professor of biomedical engineering in medicine. “You might have the opportunity for a longer conversation, but you hook them—or not—relatively early. So it’s really valuable to be able to put your work into its important context and quickly express how exciting it is.”

Founded at Australia’s University of Queensland in 2008, Three-Minute Thesis—3MT for short—has become a global phenomenon, with competitions at some 200 universities worldwide. The rules are simple. Entrants—who must be PhD candidates who have joined their thesis lab—get 180 seconds to describe their research. They can use a single slide; no animations, props,

video, or music is allowed. “3MT is not an exercise in trivializing or ‘dumbing-down’ research,” noted the announcement for WCM’s competition, which was also open to the Gerstner Sloan Kettering Graduate School. “It forces students to consolidate and crystallize their ideas and research discoveries.”

WCM’s first-ever 3MT drew a respectable sixteen entrants; after an initial round, ten made it to the finals, which were judged by a panel of faculty, staff, and students from WCM and Gerstner. Frawley garnered top honors for describing his work, which involves developing a therapy to augment spinal fusion surgery for lower back pain. Second place went to another WCM student, Srivarsha Rajshekar, who gave a disquisition entitled “Heterochromatin: Loose it and Lose it!”; Gerstner’s Marta Kovatcheva took third, for her talk on the molecular mechanisms of cancer drugs that inhibit the protein CDK4, which promotes cell growth. “Scientists communicate with each other fairly well, through our technical journals,” Frawley observes. “But for our funding sources and for the public, we really do have to communicate better, and contests like this highlight the ability to be

‘It’s essential so that science doesn’t stay in its ivory tower, but can really be accessible, so more people understand what we’re doing in the lab.’

able to share our ideas on a slightly simpler level. It’s essential so that science doesn’t stay in its ivory tower, but can really be accessible, so more people understand what we’re doing in the lab.”

For the 3MT winners, the contest offered more than bragging rights. Not only did each of the three top finishers earn a \$500 grant, but both Frawley and Rajshekar took home an additional \$500 when they tied for the audience-choice award. “At the end, I made an awful pun—which everyone expected of me,” Frawley admits with a rueful chuckle. “I’m known for my puns, unfortunately.” His orthopaedic groaner? “I said, ‘The technique isn’t perfect yet,’ ” he recalls, “but we’re *boning up* on our biochemistry.”

— Beth Saulnier

ABBOTT



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