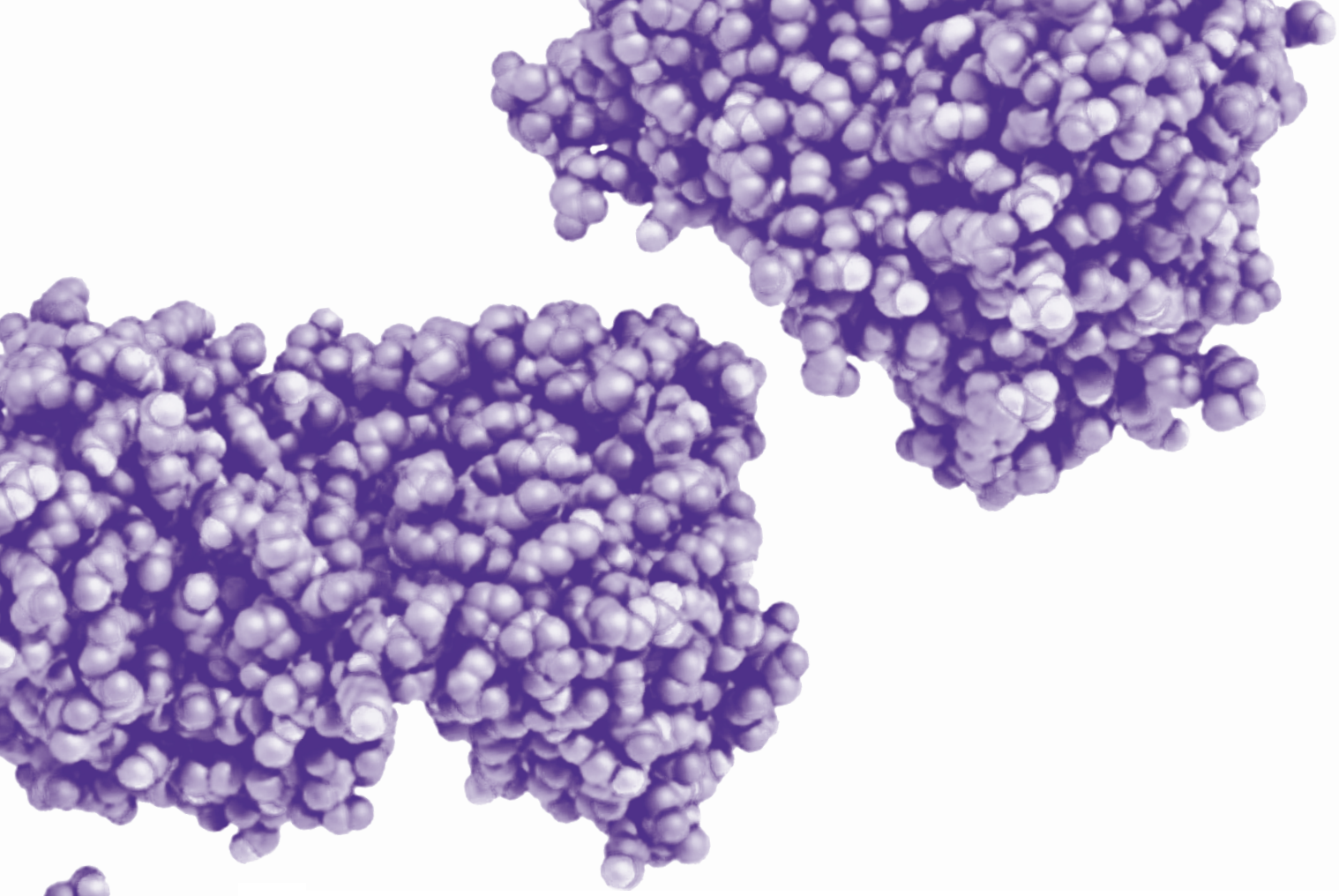
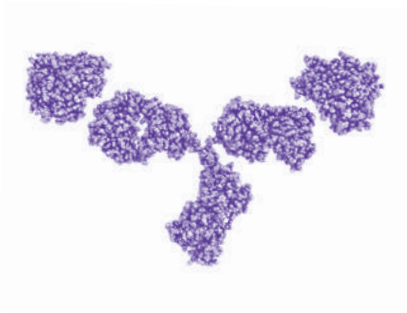


INNOVATION

2010 RESEARCH REPORT

NYU Langone Medical Center



Cover: A rendering of the Remicade molecule, an antibody, targeting a compound called tumor necrosis factor alpha. The drug is a highly effective therapy for rheumatoid arthritis and half a dozen other autoimmune diseases and is used by over a million people worldwide. Remicade is based on the research of Jan T. Vilcek, MD, PhD, professor of microbiology at NYU Langone Medical Center, and Junming Le, PhD.

Molecular model of Remicade and contributing graphics by Timothy Cardozo, MD, PhD, and David Almond, Dept. of Pharmacology; and G. Glenn Gregorio, PhD, Skirball Institute of Biomolecular Medicine.

These are unparalleled times in medical science. Opportunities abound for breakthroughs and advances in knowledge, new therapies, and cures. At NYU Langone Medical Center, our individual and institutional DNA is characterized by a unique spirit of innovation that is reflected across all of our missions: patient care, research, and medical education.

Contents

Letter from the Dean and CEO and the Vice Dean for Science

What is innovation? Some say it's the ability to harness imagination and the inspiration to produce something unique. For Nobel Prize-winning biochemist Albert Szent-Gyorgyi, it was about "seeing what everybody has seen and thinking what nobody has thought." To us, it is that mysterious and intangible combination of curiosity, observation, reflection, and imagination.

At NYU Langone Medical Center, our individual and institutional DNA is characterized by a unique spirit of innovation that is reflected across all of our missions: patient care, research, and medical education. We strive to develop better ways to diagnose and treat disease. And we are committed to rapidly bringing those advances to the bedside to improve patient care and public health.

Our researchers have been at the forefront of devising creative and effective solutions to some of the world's most complex healthcare issues. In the last three decades our researchers have garnered more than 530 patents, and nearly 60 percent of them have been licensed. We have ranked first among U.S. universities in income from technology licensing for the past four years. Our extraordinary record puts us in a leadership position in what has become an increasingly important role for academic medical centers: the transformation of laboratory research into new diagnostics, medicines, and devices.

Our dynamic culture is attracting the best minds from around the world. When scientists from diverse backgrounds come together, they bring with them unique perspectives and insights from their individual experiences and fields. They work in numerous interdisciplinary, multifaceted hubs. And we continue to build new centers and establish stronger infrastructure for innovation:

– CLINICAL AND TRANSLATIONAL SCIENCE INSTITUTE, funded by the NIH, serves as a focal point for nurturing innovative solutions to some of medicine's most challenging problems.

– OFFICE OF COLLABORATIVE SCIENCE enhances existing core facilities and invests in new cutting-edge technologies to accelerate discovery.

– SIX CENTERS OF EXCELLENCE promote translational research, bringing together distinguished researchers and clinicians who share a common focus on a specific medical challenge: to improve and extend the lives of people who suffer from various diseases, among them Alzheimer's disease and other dementias, addiction, multiple sclerosis, skin cancer, urological disease, and musculoskeletal diseases.

– CENTER FOR HEALTH INFORMATICS AND BIOINFORMATICS transforms biomedicine through breakthrough computational methodological research, best practices services, state-of-the-art infrastructure, and cutting-edge education.

– NEUROSCIENCE INSTITUTE, inaugurated this past year by an extraordinary $100 million gift from the Druckenmiller Foundation, builds on our long-standing expertise in basic and clinical neuroscience.

– "i³" (ICUBED) PROGRAM explores the dynamic interactions involving inflammation, immunity, and infection, three areas of expertise at the Medical Center and areas that influence a wide range of diseases, from cancer to malaria.

In the pages that follow, you will have the opportunity to learn about some of our successes and meet some of the exceptional men and women at NYU Langone. We are immensely proud.

Robert I. Grossman, MD
The Saul J. Farber Dean and
Chief Executive Officer

Vivian S. Lee, MD, PhD, MBA
Vice Dean for Science
Senior Vice President and
Chief Scientific Officer

A Culture of Innovation

Everywhere you turn these days, it seems NYU Langone Medical Center is involved in innovation.

We have dramatically re-imagined our entire medical education program to enable our students to more than keep pace with a rapidly evolving medical landscape. Borrowing Lean Management principles from business and industry, our hospitals are methodically studying every one of their processes to improve the quality of care they deliver to our patients.

And we are rethinking and rebuilding our entire campus, brick by brick, to house our activities in the most efficient, state-of-the-art green facilities.

Continuous Positive Airway Pressure (CPAP) Device

Our innovators have helped create next-generation prosthetic hips, dental implants, and sleep apnea-alleviating devices like the one called CPAP featured here.

Advancing Discoveries

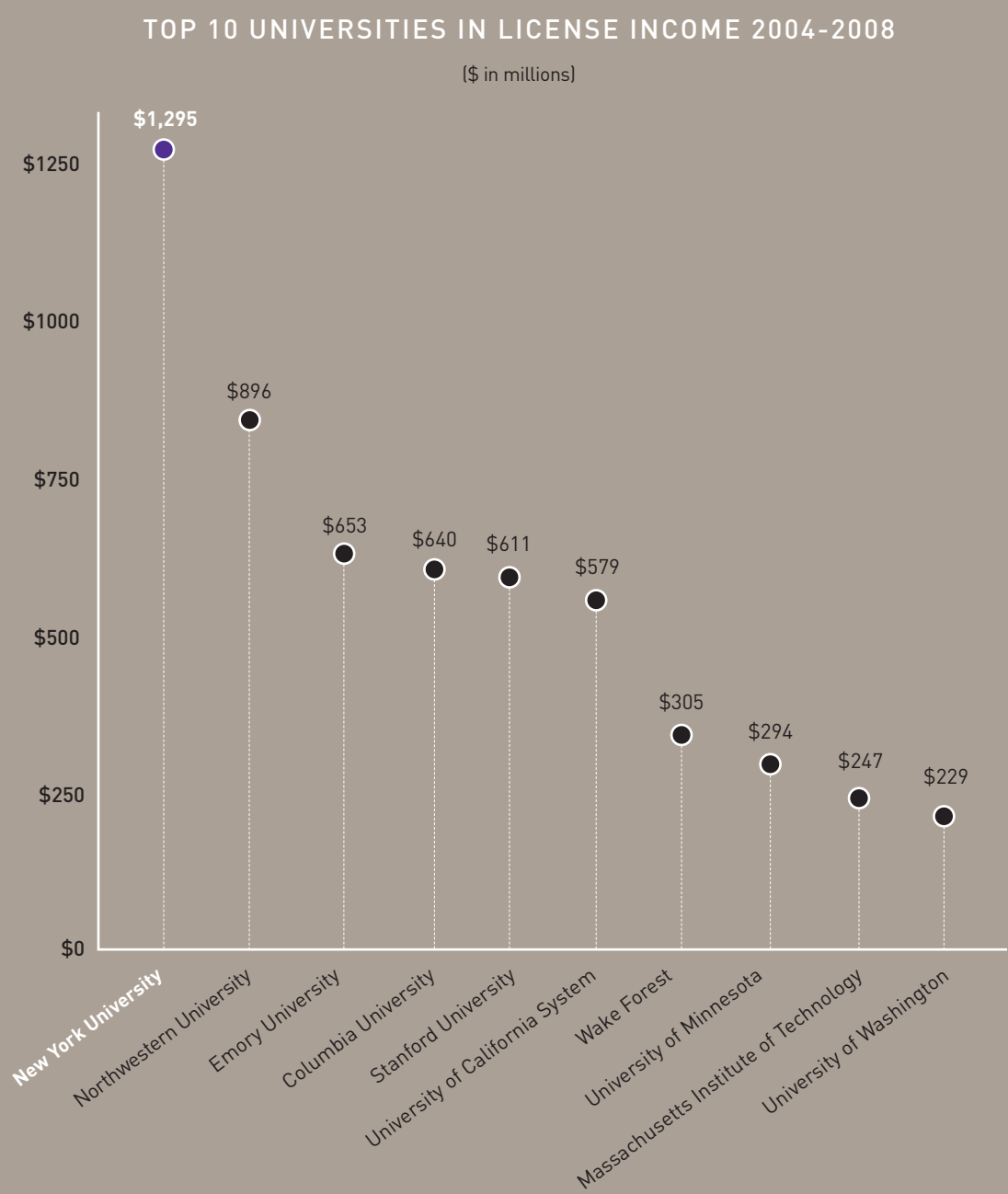
In the research arena, innovation is flourishing.

These are unparalleled times in medical science. Opportunities abound for breakthroughs and advances in knowledge, new therapies, and cures for disease. For NYU investigators, creativity and out-of-the-box thinking are part of our culture. And our innovative drive is reflected in our statistics. Compared to the national average, NYU researchers are securing more than twice as many patents as other universities and launching almost twice as many startup companies per research dollar spent. In the last three decades, our researchers have garnered more than 530 patents, and nearly 60 percent of them have been licensed.

Making Great Discoveries

In 2009 our scientists advanced the boundaries of knowledge with seminal papers published by leading peer-reviewed journals including *Science, Nature,* and *Cell*. Among many other findings, they identified the molecular signature for melanoma, using a powerful technique called DNA microarray; they zeroed in on a little-known microbe in the gut that may play a major role in immunity; and they observed the changes taking place at the junctions where nerve cells communicate in the wake of learning a new task. Combining unconventional problem-solving with creative thinking to generate breakthroughs, our researchers are continually

Our total license income over the five-year period 2004-2008 was approximately $1.3 billion, first among the nation's universities.



Source: Association of University Technology Managers

advancing state-of-the-art technologies. They have made significant contributions in such diverse areas as computational drug discovery, parallel MRI, and two-photon laser-scanning microscopy.

Transforming Clinical Care

As an integrated academic medical center, we are proud of the transfer of our discoveries into the medical marketplace, where patients all over the world can benefit. Perhaps the best-known example of a product based on our laboratory research is Remicade, a highly effective therapy for rheumatoid arthritis and half a dozen other autoimmune diseases, used by over a million people worldwide. The blockbuster drug, which accounted

Finding Creative Approaches

Once viewed as little more than a toxic ingredient of cigarette smoke and smog, nitric oxide is now known as a powerful biological compound, thanks in large part to the creative research of Evgeny A. Nudler, PhD, the Julie Wilson Anderson Professor of Biochemistry. While previous studies had tagged nitric oxide as a key regulator of many functions, from blood pressure to brain signaling, Dr. Nudler's research recently revealed how the compound can protect bacteria from antibiotics, extend the life of roundworms, and damage human heart tissue during a heart attack. All of these findings have the potential to be translated into medicines that save lives. Dr. Nudler's success is based in part on his avid curiosity and on giving his lab personnel the freedom to take risks and explore bold ideas.

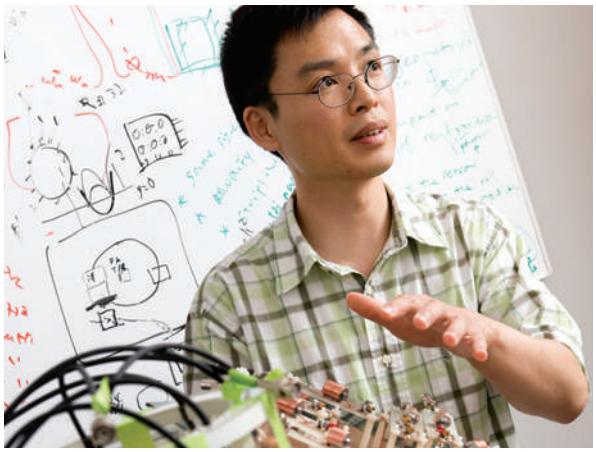
Taking a Novel Path to Drug Discovery

Tim Cardozo, MD, PhD, assistant professor of pharmacology, received a 2008 Director's New Innovator Award from the National Institutes of Health for his pioneering method for drug discovery and design. Instead of physically screening thousands of different drug candidates, Dr. Cardozo allows the detailed three-dimensional structure of target proteins to guide his efforts. By scrutinizing a protein's chemical structure, his team finds niches, pockets, or other sites that might provide a precise fit for inhibitory drugs. Dr. Cardozo is using this computer-assisted approach in collaborative studies to identify new drugs to treat cancer, infectious diseases, and neurological conditions, and to develop a vaccine against AIDS.

for nearly $6 billion in sales last year, is based on the research of Jan T. Vilcek, MD, PhD, professor of microbiology, and Junming Le, PhD.

Our innovators have had a major hand in the development of Sutent, a drug for the treatment of kidney cancer and gastrointestinal stromal tumor, Zinecard to reduce the effects of chemotherapy, and Oracea to mitigate the effects of acne-like rosacea. Other NYU researchers have helped create next-generation prosthetic hips, dental implants, and sleep apnea-alleviating devices — among the two dozen products the University has helped bring to market. Another 13 are in clinical trials, designed to fight everything from cancer, angina, and Alzheimer's disease to malaria and addiction.

Building a Better MRI



Yudong Zhu, PhD, assistant professor of radiology, has played a central role in creating the new medical imaging field of parallel radio-frequency transmission, and has amassed more than a dozen patents in the process. Typically, coils are used in magnetic resonance imaging, or MRI, to generate a magnetic field. Then radio-frequency pulses of energy are sent through that field to create a scanned image of the human body. Instead of using one magnetic coil to send out one long continuous pulse of energy, Dr. Zhu devised an alternative method that employs multiple coils to independently transmit shorter pulses. The solution has dramatically cut down on image distortion at higher magnetic field strengths, providing faster, more consistent, and higher quality scans that take into account each patient's unique anatomy.

Reaching Out for Better Health

Gbenga Ogedegbe, MD, MPH, director of the Center for Healthful Behavior Change, does not wait for patients to come to NYU. He goes directly to the community. Dr. Ogedegbe recently established community partnerships with trusted neighborhood institutions to help residents improve their health. His group, led by Joseph Ravenell, MD, assistant professor of medicine, has already worked with Harlem barbershops to help African American men control their blood pressure and improve colorectal cancer screening. Recently, Dr. Ogedegbe launched a new initiative with churches throughout New York City that engages pastors to act as partners in improving the health of their African American congregants.

Investing in the Future

Many critical steps are necessary to bring discoveries from the bench to the bedside. The recruitment and retention of talented entrepreneurial researchers is key. To attract these faculty, we have one of the most progressive inventor's policies among the country's academic medical centers and universities. Compared to almost all other leading institutions, we share with our inventors a higher percentage of net royalties from the commercialization of their inventions.

By any measure, technology transfer at NYU Langone Medical Center, under the leadership of Abram Goldfinger, executive director, has been stunningly successful. Over the five-year period 2004-2008, NYU's license income has been approximately $1.3 billion, first among the nation's universities. And over the past few decades, more than $1 billion in capital has been raised to support the formation of 50 companies based on NYU inventions.

To support our pipeline, we are focusing on the earliest stages of research, which are often the most difficult. This is the time when researchers are attempting to develop key proof-of-principle concepts for new inventions. The Medical Center's Applied Research Support Fund advances promising innovations and recently increased its annual awards from $50,000 to $75,000. To date, an investment of $1.6 million has yielded $15.2 million in licensing income alone, with another $9.2 million in corporate research funding. Separately, we have begun establishing our own $20 million venture capital fund to bridge the daunting gap between federal funding of basic research and what's needed to translate those discoveries into interventions.

Expanding Opportunities

Innovation can be enhanced through a rich intellectual environment with outstanding investigators who bring diverse perspectives. At NYU we are building strong interdisciplinary research networks through our Centers of Excellence, established in 2008 to promote collaborations and translational science; our new Neuroscience Institute, launched by an extraordinary $100 million gift from the Druckenmiller Foundation; and our new "i³" (iCubed) program, which explores the growing number of intersections of immunity, inflammation, and infection across all corners of our campus. Central to our efforts to develop translational research is our Clinical and Translational Science Institute, working in partnership with New York City's Health and Hospitals Corporation.

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Products in Clinical Trials

- DNA-based Drug for Angina
- Drugs for Parkinson's Disease
- Alzheimer's Disease Drugs
- Anticancer Compounds
- Antiaddiction Drug
- Imaging Device for Central Nervous System Diseases
- Malaria Vaccine
- Wound-healing Compound

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Products on the Market

- Remicade (Rheumatoid Arthritis, Crohn's Disease, Ankylosing Spondylitis, Ulcerative Colitis, Psoriasis)
- Sutent (Kidney Cancer and Gastrointestinal Stromal Tumor)
- Zinecard (to Reduce Chemotherapy Side Effects)
- Oracea (Rosacea)
- HIV Diagnostics
- Vascular Stent
- MRI Equipment
- CPAP Device for Sleep Apnea
- Hip Prosthesis
- Anesthesia Monitor
- Embolism Coil
- Dental Implant

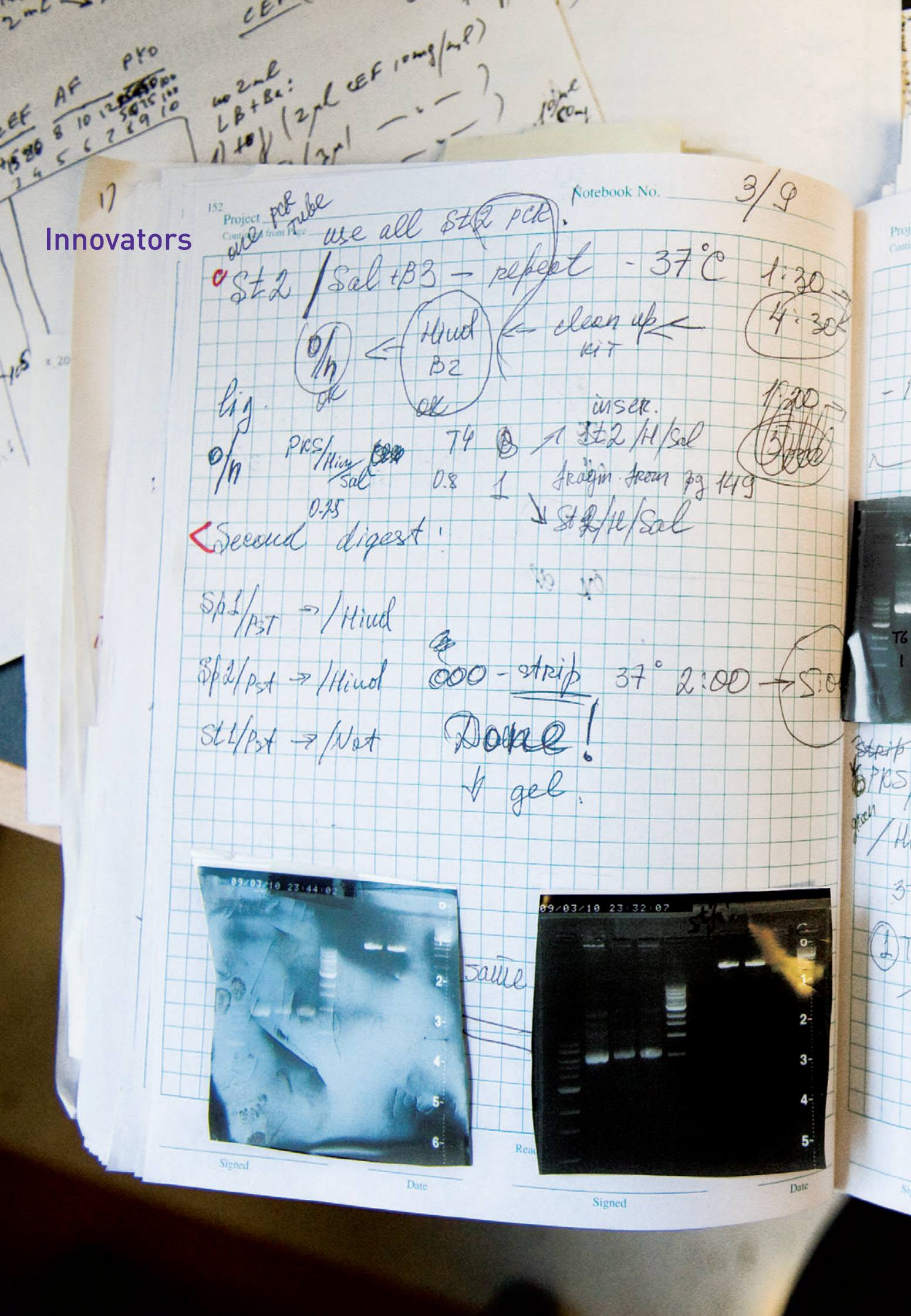
Abram Goldfinger (far left), executive director of the Office of Industrial Liaison/ Technology Transfer, discusses the patenting of research discoveries with his colleagues. Compared to the national average, our researchers secure more than twice as many patents as other universities.

And for technological expertise, NYU plans to merge with Brooklyn's Polytechnic Institute of New York, which will greatly expand the opportunities for in-house collaborations in engineering and technology with the School of Medicine. Researchers there are developing fluorescent probes to detect unstable proteins associated with Alzheimer's disease, detailed computer models of human motion to assist prosthetic design and robotic surgery, and even an iPhone application that measures exercise levels.

Never Resting

Above all, innovation means never being satisfied with the status quo. For Eva Hernando, PhD, assistant professor of pathology, that has meant negotiating with industrial partners to help develop inhibitors to a tiny piece of cancer-linked RNA, or microRNA. Groundbreaking research from her lab suggests the approach might yield a desperately needed therapy for metastatic melanoma. For Steven Abramson, MD, senior vice president and vice dean for education, faculty and academic affairs, and a professor of medicine and pathology, it has meant licensing his team's surprising discovery that low doses of tetracycline-like compounds might offer an alternative treatment for inflammation. And Dr. Vilcek, who left the Czech city of Bratislava to join NYU as an assistant professor in 1965, is still searching for breakthroughs beyond Remicade.

Innovators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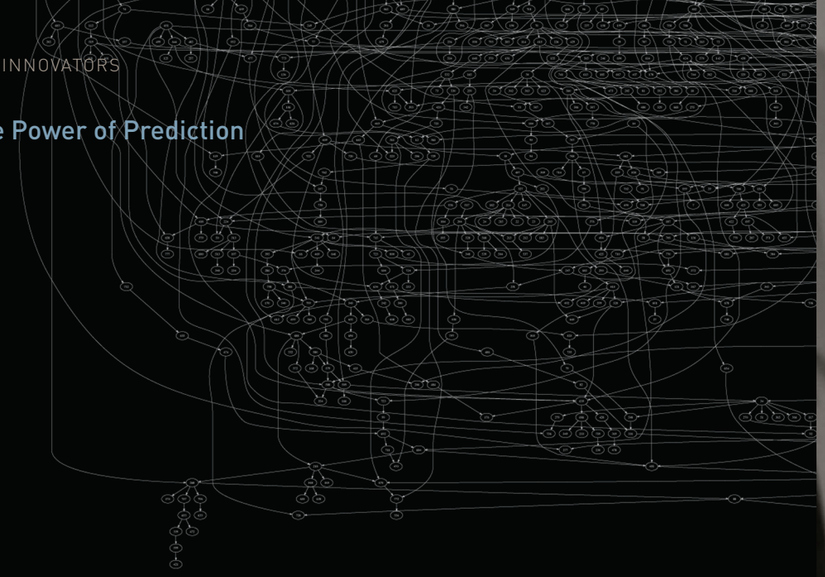
We would like to introduce you to some of the extraordinary men and women at NYU Langone Medical Center who personify innovation. Their interests range from the laboratory to the bedside, from the classroom to the doctor's office, and from the fields of parasitology and immunology to radiology and environmental medicine. These men and women are true innovators.

The Power of Prediction



Constantin F. Aliferis, MD, PhD

Director of the Center for Health Informatics and Bioinformatics

No two patients are alike. So how do physicians hope to make accurate predictions about sickness and health?

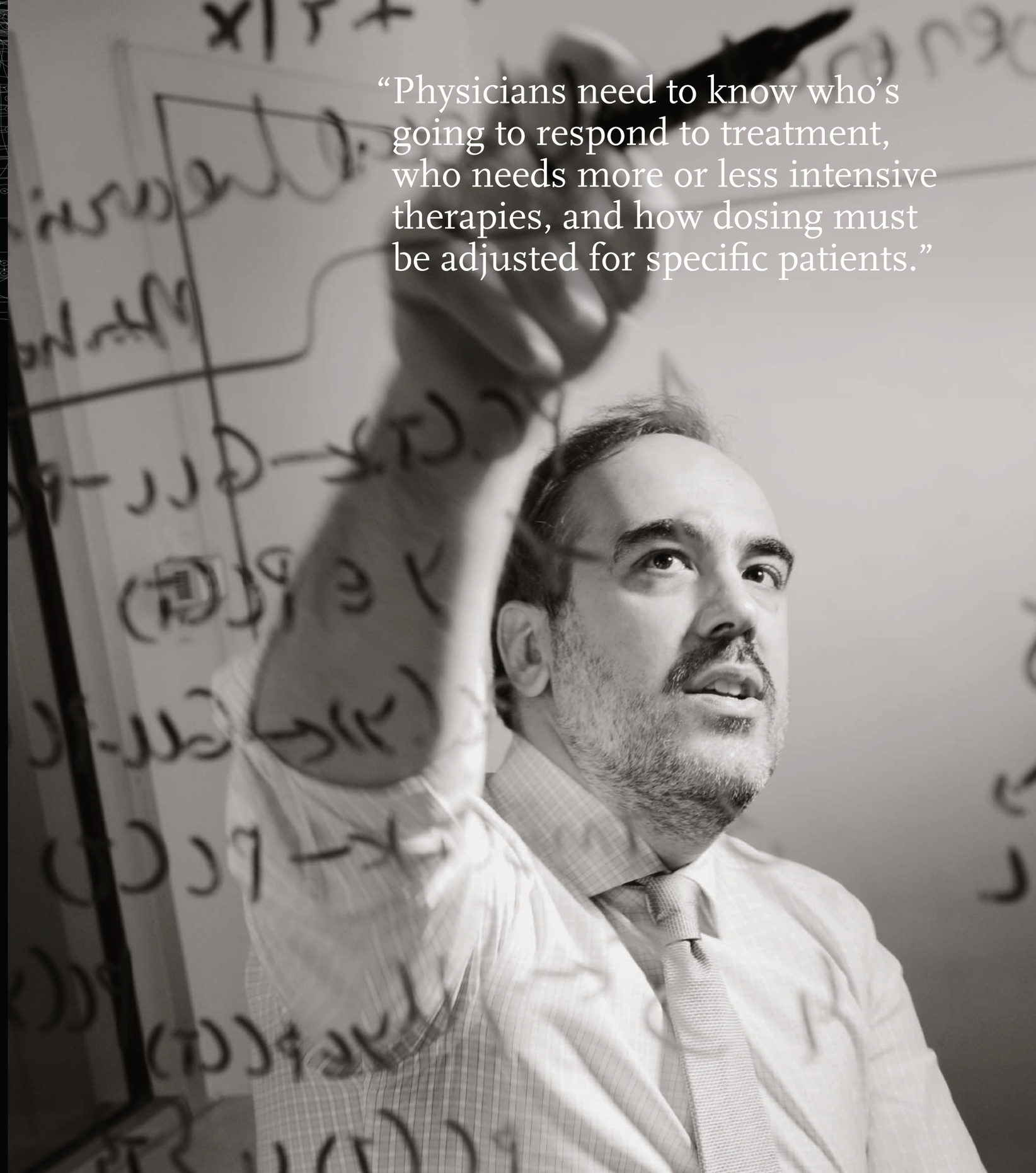
Constantin Aliferis, MD, PhD, associate professor of pathology, is among an influential group of researchers that is advancing the science of predictive medicine. As a central part of that work, Dr. Aliferis and his colleagues are harnessing the power of bioinformatics, from which complex computer-based models of disease can analyze more than one million variables per patient.

"Physicians since ancient times have wanted to predict clinical events," says Dr. Aliferis, director of the Center for Health Informatics and Bioinformatics. "They need to know who's going to respond to treatment, who needs more or less intensive therapies, and how dosing must be adjusted for specific patients. This is the essence of personalized medicine, and now we have the molecular biology and computational tools to help medicine fulfill these fundamental goals."

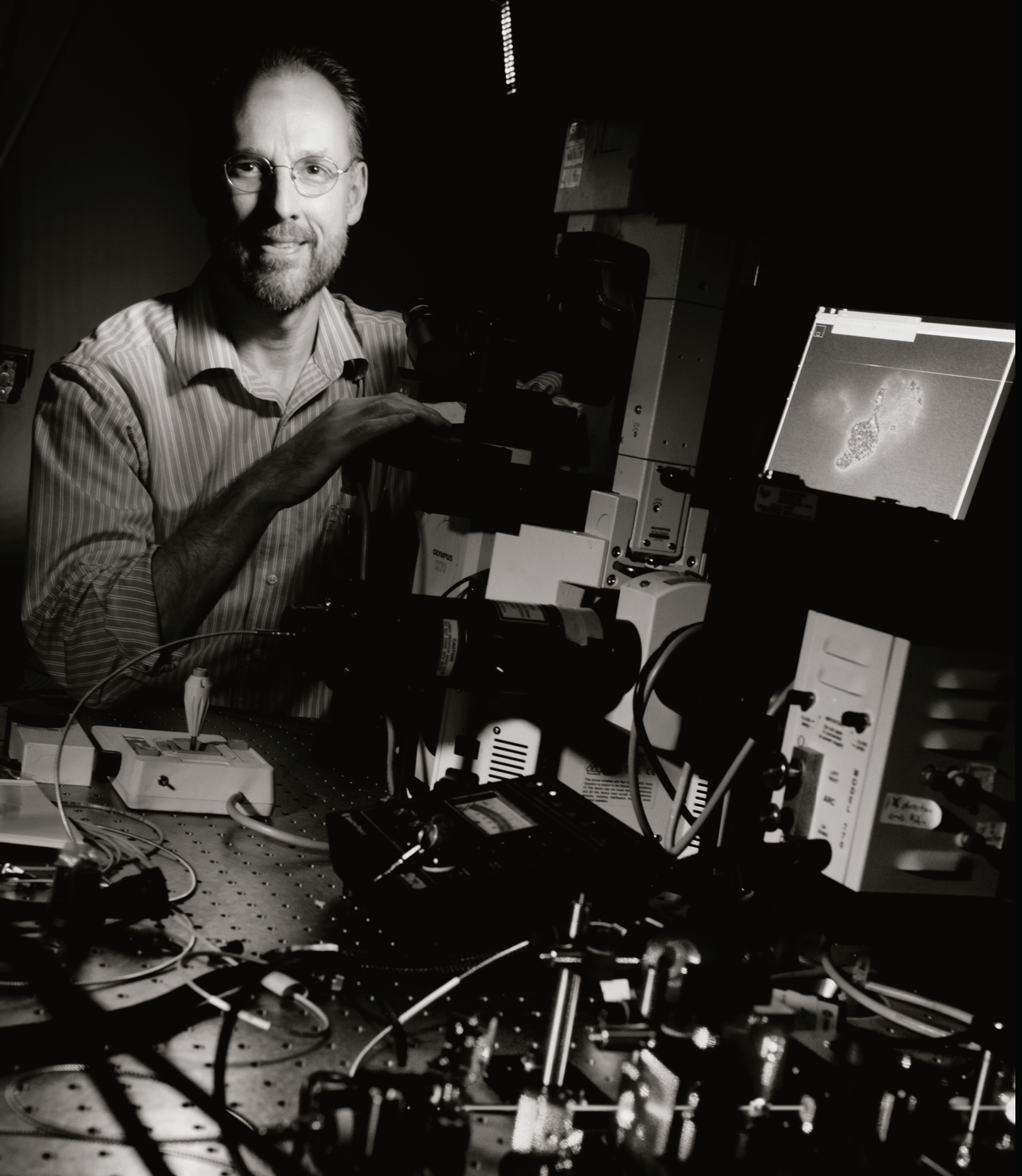
The key is to create robust, math-based programs that let clinical researchers delve into specific disease pathways and build predictive models for target populations. The cutting-edge algorithms and computer programs constructed by Dr. Aliferis and his collaborators do just that and are used by thousands of researchers in more than 50 countries.

Among their many contributions, Dr. Aliferis and his team have used their own techniques to predict deaths from pneumonia and acute respiratory distress syndrome, shed light on critical pathways of lung cancer, and predict clinical lab test results in order to help reduce excessive medical resource use and lower healthcare costs. Based on his team's research, La Jolla, California-based Prediction Sciences has commercialized a protein-based signature for diagnosis of the onset of stroke.

Once a highly ranked trainer in the ancient Olympic Greek mixed martial art of Pankration, Dr. Aliferis now provides invaluable research training to other scientists. He and his team helped establish the Best Practices Integrative Informatics Consultation Service, which assembles groups of experts to advise researchers on their research goals. In the last three months of 2009 alone, the unique service provided 25 formal consultations to projects at NYU Langone Medical Center—another clear demonstration of the increasing relevance of informatics in medicine.



"Physicians need to know who's going to respond to treatment, who needs more or less intensive therapies, and how dosing must be adjusted for specific patients."



Calling on the Immune System

"You can see something beautiful at the end, if you have that patience."

Michael Dustin, PhD

Muriel G. and George W. Singer Professor of Molecular Immunology and Professor of Pathology

Until recently, researchers knew little about how our immune system physically summons the forces needed to beat back viral and bacterial invaders. Fortunately, many of the gaps have been filled through the trailblazing research of Michael Dustin, PhD.

Dr. Dustin has pioneered multiple imaging techniques to directly observe how complicated immune cell interactions relay messages about perceived threats. "Sometimes, imaging is the only way that you can really start to get at how this dialogue is taking place," he says.

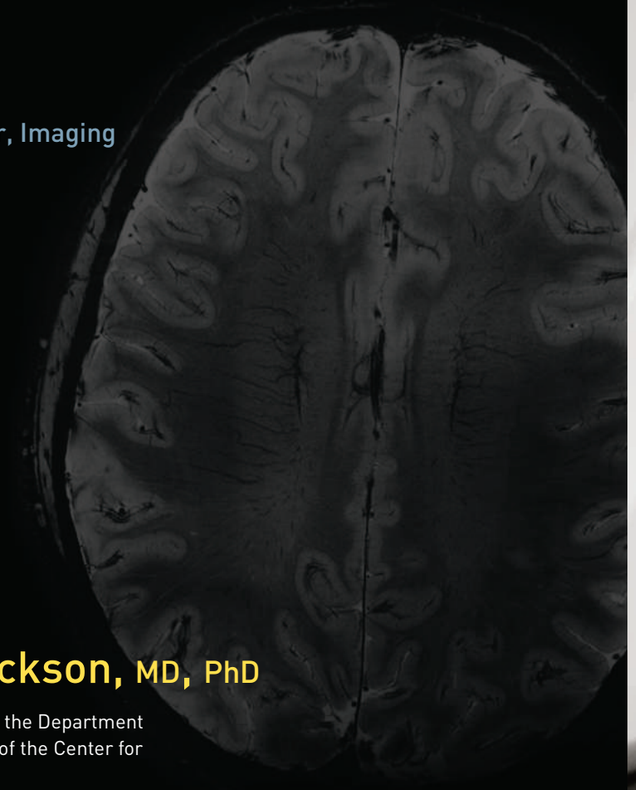
Through cutting-edge methods such as two-photon laser scanning microscopy and total internal reflection fluorescence microscopy, Dr. Dustin has illuminated the physical contacts needed to activate our infection-fighting T-cells. In the process, he has helped describe a key feature of immune-cell communication, a region he named the immunological synapse. His lab has shown how this tight interface forms between T-cells and other members of the immune system called antigen-presenting cells, and how it handles the exchange of information needed to mount the right immune response.

Other T-cells send messages via the immunological synapse to help rein in the immune system, a safety feature designed to prevent inflammation associated with autoimmune disorders such as rheumatoid arthritis. But these regulatory T-cells, as they're known, can be foiled by interfering enzymes. Recently Dr. Dustin's lab discovered how an investigational drug blocks one enzyme from meddling with regulatory T-cell messaging. The unique process could help prevent autoimmune disorders, and may help explain and improve upon the mechanism of other anti-inflammatory drugs in development.

"Our goal is to understand these communication processes as basic immunology and cell biology," he says. "But we're always hoping that some of the things we're doing will end up impacting patient care."

If diligence is required to decipher the immune system's strategy, so is patience—a trait Dr. Dustin regularly calls upon during his bird-watching and photography outings to New York City's Jamaica Bay Wildlife Refuge. "You can see something beautiful at the end," he says, "if you have that patience."

Parallel, and Faster, Imaging



Daniel Sodickson, MD, PhD

Vice Chair for Research in the Department of Radiology and Director of the Center for Biomedical Imaging

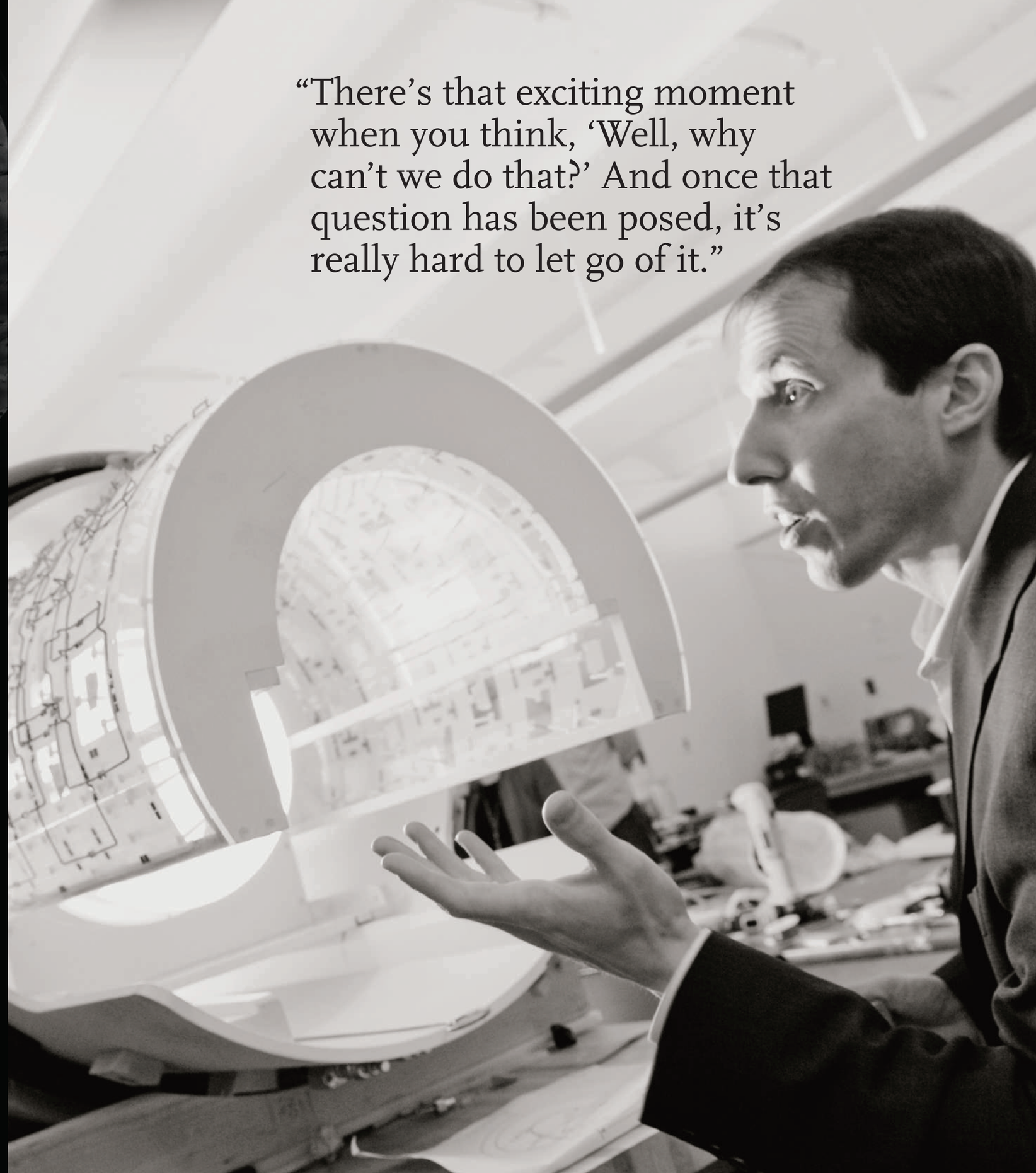
During a cardiology internship 14 years ago, Daniel Sodickson, MD, PhD, associate professor of radiology and physiology and neuroscience, asked a simple question that changed his life: "Why can't we image the heart any faster?" Back then, radiologists were taking sequential pictures of the body with magnetic resonance imaging, which uses a strong magnetic field to map body tissues. The process was akin to feeding sheets of paper into a fax machine and waiting for each line-by-line scan.

Within just a few weeks, Dr. Sodickson had figured out how to simultaneously gather data from six separate detectors on an MRI machine. Instead of one long scan, he arranged each detector, known as a coil, to focus on a specific body region for a shorter time period. A mathematical formula combined the six partial images into a seamless whole. In the process, he created the field of parallel MRI.

His first innovation has dramatically sped up everyday exams, and commercial MRI scanners now come standard with parallel-imaging capability. NYU Langone Medical Center owns one of the few versions studded with an array of 128 detectors. With such "turbocharged" technology, Dr. Sodickson and colleagues are developing a five-minute comprehensive cardiovascular examination, which can provide the same structural and functional profile of a patient's heart that used to take an hour.

Dr. Sodickson is also devising a new imaging technique that uses distortions created by the electrical properties of a patient's body to spot tumors, whose electrical properties differ greatly from those of normal tissue.

Dr. Sodickson nearly chose to follow his other passion, literature, and he describes his own thought processes as "more lyrical than logical." Nevertheless, he relishes the challenge of brainstorming a solution with colleagues and recognizing the glimmer of potential. "There's that exciting moment when you think, 'Well, why can't we do that?'" he says. "And once that question has been posed, it's really hard to let go of it."



"There's that exciting moment when you think, 'Well, why can't we do that?' And once that question has been posed, it's really hard to let go of it."

Making a Difference in Children's Lives

"Our programs are helping parents and early childhood teachers to be more effective and to work together to improve outcomes for high-risk children."

Laurie Miller Brotman, PhD

Corzine Family Professor of Child and Adolescent Psychiatry

Academic underachievement, mental health problems, trouble with the law: When Laurie Brotman, PhD, the Corzine Family Professor of Child and Adolescent Psychiatry, began studying aggressive behavior in children two decades ago, studies routinely pointed out the many risks to younger siblings of antisocial or delinquent kids from poor urban communities. But no one, she realized, was focusing on early childhood interventions. "It seemed like an area where we could really make a big contribution," she says.

Since then Dr. Brotman's research has demonstrated that teaching parents to become more involved in the early years can prevent delinquency among high-risk youth as they reach adolescence. She and her collaborators have also shown that behavioral family interventions can also affect health by normalizing a child's level of the hormone cortisol in response to stress, and by preventing obesity.

Building on her initial findings, Dr. Brotman and colleagues have developed a culturally informed family and school intervention for families of young children living in underserved, urban communities. ParentCorps, as it is known, consists of a 14-session series for parents, preschoolers, and their siblings. The program helps parents learn and implement effective behaviors, such as rewarding positive behavior, setting appropriate limits, and providing consequences for misbehavior.

A related professional development and consultation program, TeacherCorps, supports early childhood teachers in managing children's behavior in the classroom and in communicating effectively with parents.

The programs have been evaluated in two randomized controlled trials in 18 public elementary schools in Brooklyn with nearly 1,200 African American and Afro-Caribbean families. The overall result: children are less aggressive in the classroom, get along better with others, and perform better on achievement tests.

"Our programs are helping parents and early childhood teachers to be more effective and to work together to improve outcomes for high-risk children."

"Every project and every step has been a defining moment."

Danny Reinberg, PhD

Professor of Biochemistry
Howard Hughes Medical Institute Investigator

Early in his career, Danny Reinberg, PhD, professor of biochemistry, identified the numerous factors that make up the transcription machinery in human cells. This machinery performs the first of two steps in converting genes into proteins that perform the tasks necessary for nearly all cellular functions.

Dr. Reinberg, a Howard Hughes Medical Institute Investigator, followed that landmark feat by reconstituting the entire process in a test tube, thereby defining the basic mechanism of action. This work provided the basis for studying chromatin, the spool-and-thread combination of DNA wrapped around certain proteins, which forms the structure of our chromosomes. Dr. Reinberg's later work showed how a variety of physical modifications to chromatin can loosen or tighten portions of DNA, determining how accessible it is to the cell's transcription machinery.

Such modifications help determine which genes are turned on through transcription and perhaps explain how disease results from a faulty mechanical switch. Over the years, Dr. Reinberg has become a leading expert in this field, known as epigenetics, the study of how genes are activated or deactivated by modifications to chromatin. Such changes in gene expression can be passed on to future generations.

"What inspires me is that I just love what I do," he says. The son of German immigrants to Chile during World War II, he became passionate about biochemistry while still a teenager.

To study transcription and epigenetics in a living organism, Dr. Reinberg is leading a ground-breaking collaborative project to study two divergent species of ants, and has recently completed sequencing the entire genomes of these ants. With the genetic codes as a starting point, the research may clarify the basis of ants' social behavior, colony hierarchy, and the extraordinary ability of some species to switch roles from worker to queen.

The project promises to fill another chapter in what Dr. Reinberg says has been a richly rewarding career. "Every project and every step," he says, "has been a defining moment."

Reimagining Education

"I believe that good teachers create environments in which students or others can learn deep and complex things through self-discovery."

Adina Kalet, MD

Co-Director, Program for Medical Education Innovation and Research

Over the past two decades, Adina Kalet, MD, associate professor of medicine and surgery, has helped to reinvent medical education by freeing the learning process from its often inflexible and ineffective confines. Her research identifies and measures the clinical skills necessary for good students to become great doctors, and it has influenced NYU School of Medicine's new curriculum for the 21st century.

Along with a better integration of clinical medicine and basic science, the new curriculum aims to clearly establish expectations but not to dictate learning methods. The transformation closely follows the teaching philosophy of Dr. Kalet. "I believe that good teachers create environments in which students or others can learn deep and complex things through self-discovery," she says.

Dr. Kalet has played an instrumental role in developing the curriculum's web-based surgery modules, a project run by Thomas Riles, MD, the Frank C. Spencer Professor of Surgery. She is now testing whether the multimedia modules really make a difference in the students' knowledge and reasoning skills. "They're just fancy and expensive textbooks unless we can prove that they really enhance learning in a way that affects patient care," she says.

One of the most important learned skills, she believes, is communication. The daughter of a Holocaust survivor, Dr. Kalet grew up in a Jewish refugee family with frequent health concerns. During her childhood, she says, "We had many opportunities to see how physicians were either masterful or terrible. And much of that turned on whether or not they could communicate clearly."

As she reimagines medical education, Dr. Kalet is helping to enhance interactions between physicians and their patients. The Merrin Master Clinician Fellowship Program, which she created with Mitchell Charap, MD, the Abraham Sunshine Associate Professor of Clinical Medicine, identifies doctors with excellent teaching skills and gives them the time and resources to help their colleagues reclaim the lost art of bedside observations, such as stethoscope-aided heart exams. "The program is transforming what people are learning at the bedside," Dr. Kalet says, "which is bringing back a model that worked so well in a different time and place, and modernizing it."

Dangerous Metals

Max Costa, PhD

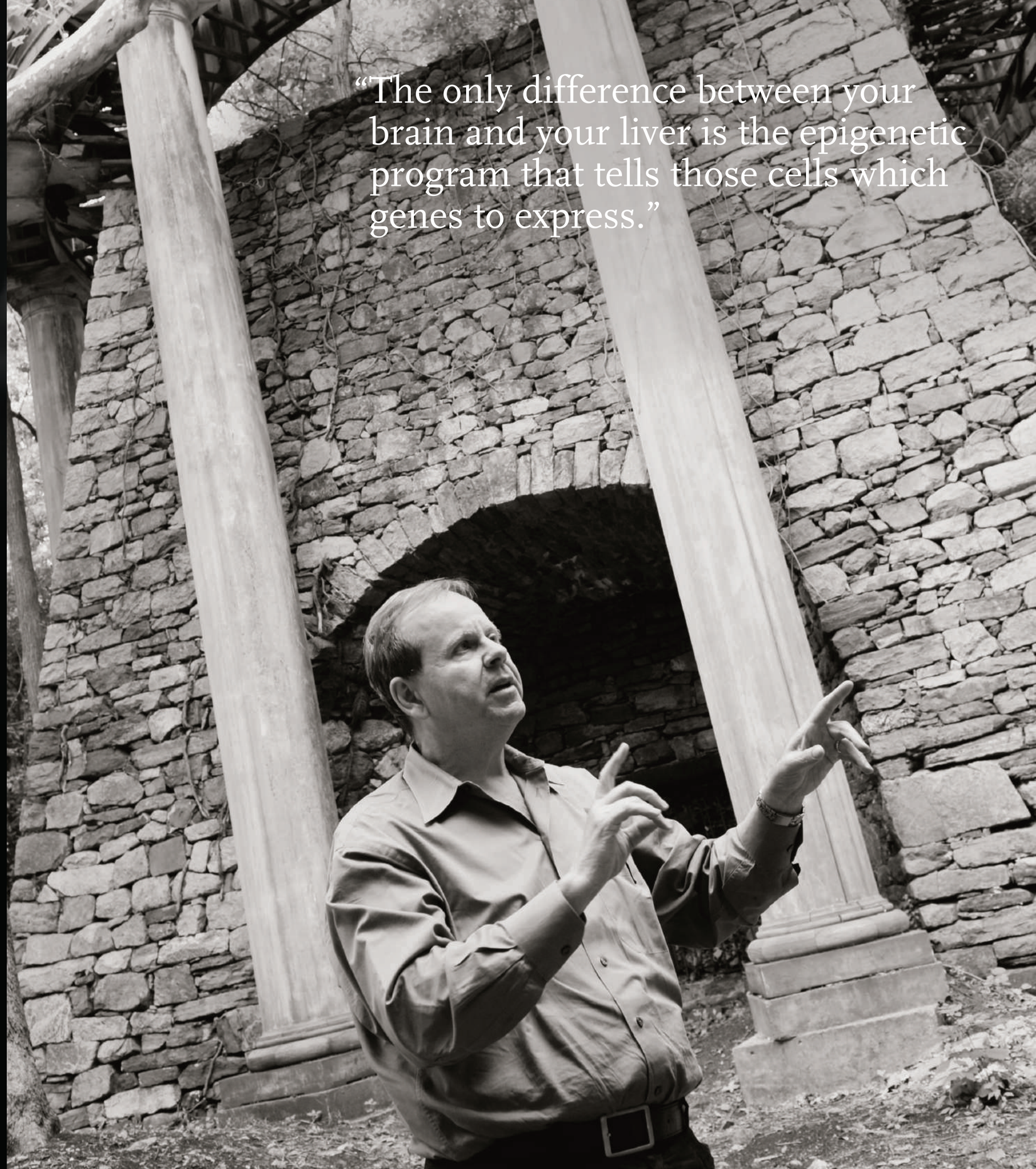
Chair of the Department of Environmental Medicine

Although such heavy metals as nickel, chromium, and arsenic are relatively simple molecules, compounds containing them are among the most potent carcinogens. When Max Costa, PhD, chair of the Department of Environmental Medicine and professor of pharmacology, began his research career in the 1970s, scientists puzzled over how metals so seemingly straightforward could wreak so much havoc. Through the years, Dr. Costa's research has helped overturn conventional wisdom by demonstrating that nickel exposure does not cause cancer by inducing mutations in DNA.

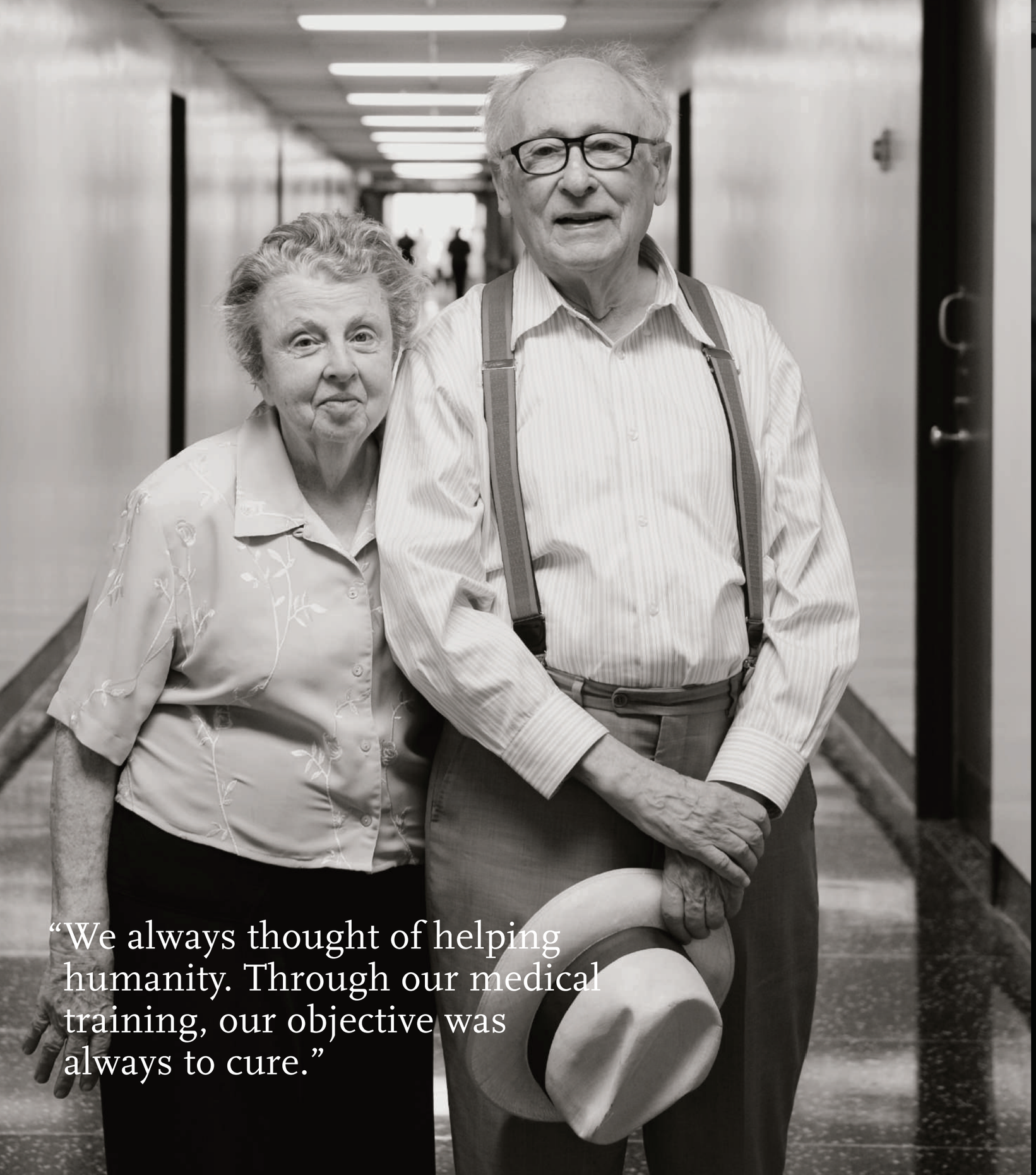
Instead, Dr. Costa discovered that nickel acts through a process known as DNA methylation, which disrupts genes by adding a chemical molecule directly onto DNA and also onto the compact fibers of histone proteins that the DNA wraps around. The discovery marked his entry into the field of epigenetics, which studies how genes can be turned on and off in response to changing conditions rather than through alterations to actual DNA sequence. "The only difference between your brain and your liver is the epigenetic program that tells those cells which genes to express," Dr. Costa says.

His work suggests that nickel causes that programming to go haywire. Using sophisticated molecular tools, Dr. Costa's lab recently uncovered a gene that is turned up an astounding 120-fold after exposure to nickel. The body's faulty response, he says, can spur a selection process for aggressively growing cells.

In 1993 Dr. Costa served as an expert witness in the landmark lawsuit against California's Pacific Gas and Electric Company over chromium-contaminated drinking water, a case spearheaded by single mother-turned-crusader Erin Brockovich. Litigation has likewise shuttered nickel and chromium refineries across the U.S., but Dr. Costa recently measured extreme nickel exposure in the white blood cells of nickel refinery workers in China. Disturbingly, the lung cancer incidence of the workers is four times higher than in the general Chinese population.



"The only difference between your brain and your liver is the epigenetic program that tells those cells which genes to express."



"We always thought of helping humanity. Through our medical training, our objective was always to cure."

Vanquishing a Longtime Enemy

Ruth S. Nussenzweig, MD, PhD

C.V. Starr Professor of Medical and Molecular Parasitology

Victor Nussenzweig, MD, PhD

Hermann M. Biggs Professor of Preventive Medicine,
Department of Pathology

Nearly 60 years ago Dr. Ruth S. and Dr. Victor Nussenzweig, then second-year medical school classmates in Brazil, were determined to cure cancer with a parasite.

Victor now laughs at how their first "crazy" project together never came close to fruition. But the pioneering researchers, constant collaborators, and husband and wife team, have played a huge role in pulling off a feat that scientists once deemed impossible. Based in large part on their decades of work, the first-ever malaria vaccine could be available within a few years.

Roughly one million people die from malaria every year, most of them children in Africa under the age of five. Pharmaceutical giant GlaxoSmithKline is now testing its Mosquirix vaccine on 16,000 infants and children in seven African countries, in partnership with the PATH Malaria Vaccine Initiative funded by the Bill & Melinda Gates Foundation. Preliminary results suggest it offers up to 50 percent protection, a level that would represent a watershed moment in the global fight against malaria. Altogether, there are three vaccines being tested against malaria, and all are based on the Nussenzweigs' research.

"We always thought of helping humanity," Victor says. "Through our medical training, our objective was always to cure." Their first project, in fact, led to a dye-based method that prevented a life-threatening parasitic infection known as Chagas disease from being transmitted through blood transfusions.

Malaria parasites, such as *Plasmodium falciparum*, are transmitted to humans through the bite of an infected mosquito. The complicated life cycle of the parasite and its genetic variation once cast serious doubt on whether it could ever be targeted by a vaccine. But building on some early breakthroughs at NYU, the Nussenzweigs made a series of crucial discoveries.

"Ruth really made the observation that got the ball rolling," Victor says. She immunized mice by injecting them with the infective stage of malarial parasites, called sporozoites, inactivated with just the right dose of gamma irradiation. It worked, and resulted in a landmark *Nature* paper in 1967.

Victor, Ruth, and collaborators at NYU subsequently searched for the malaria protein responsible for this protective immunity and eventually found and characterized what the lab named circumsporozoite protein, or CSP. This protein, found on the surface of sporozoites, is now the basis for every vaccine effort.

The Nussenzweigs have not stopped looking for a better target. A graduate student in their lab is investigating whether other proteins might also contribute to protection and help boost vaccine effectiveness. Creativity, passion and, most of all, an audacious streak, are prized traits. As Victor says, "You have to have students who want to cure cancer."

Rationalizing Care

"I find it very motivating to try to make a difference."

R. Scott Braithwaite, MD

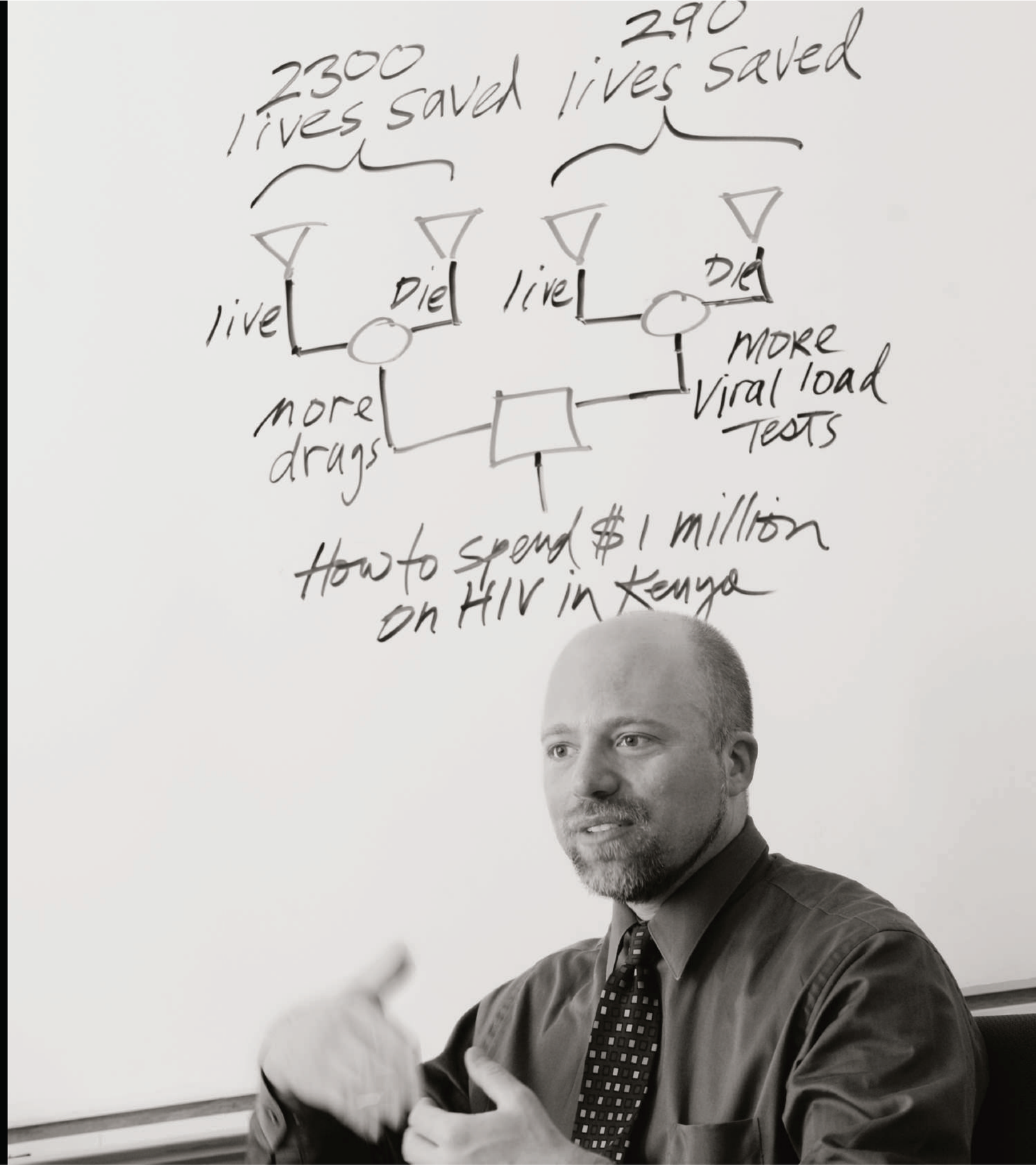
Associate Professor of Medicine

Many industries have well-established methods for distinguishing high-value services, those that deliver the biggest benefits to consumers. "But the health-care system itself has never had a rational way of asking, 'What do we need more of? What do we need less of?'" says R. Scott Braithwaite, MD, associate professor of medicine. That conundrum is inspiring his innovative research aimed at helping make better use of existing medical resources.

The big challenge, he says, is to construct a reasonable estimate of a medical service's value. The ultimate goal is to link that estimate to incentives that reward high-value and cost-effective care. Studies have already suggested that interventions such as lowering high blood pressure and preventing kidney failure among diabetics hold so much value that they actually save money in the long run.

Dr. Braithwaite is especially interested in diseases that disproportionately contribute to preventable illness and death and to glaring disparities in how patients fare. He has used his mathematical modeling, for example, to calculate when people diagnosed with HIV should begin their treatment regimen, and how those patients can take their medications more effectively. He is also examining the value of an NYU-led research project that uses barbershops to encourage African American men, among the hardest hit by cardiovascular disease, to be treated for high blood pressure.

In one of Dr. Braithwaite's most recent studies, he and his team estimated that if patients were required to pay 30 percent of the cost for low-value services—or only minimally beneficial care—but nothing for high-value care, the U.S. health-care system could save enough money to cover every uninsured person. More importantly, he says, a wholesale reordering of priorities could save lives and needless suffering. "Because there are just so many people with diabetes who get amputations unnecessarily, so many people who die of strokes unnecessarily, so many people who get HIV unnecessarily," he says, "I find it very motivating to try to make a difference."



Inflammatory Paradigms

George Miller, MD

Assistant Professor of Surgery and Cell Biology

Employing his unique skills as a liver and pancreatic surgeon, George Miller, MD, assistant professor of surgery and cell biology, has embarked on an unusually successful career as a clinician-scientist. The liver and pancreas are notoriously difficult organs to access, and special training is needed to harvest the mouse cells critical to his demanding laboratory work.

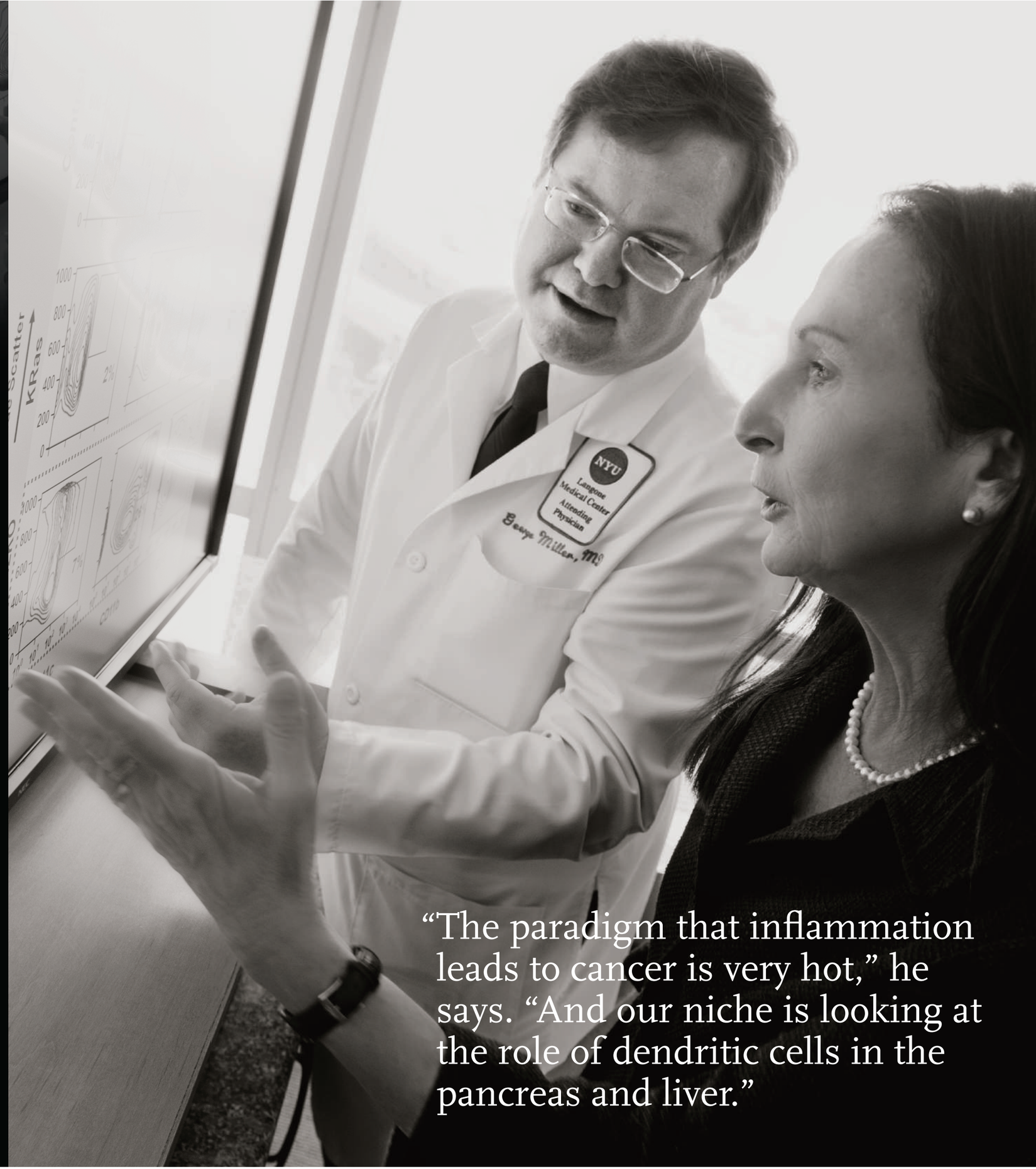
But his approach is paying off with new findings suggesting how immune cells known as dendritic cells may be the driving force behind the inflammation linked to cancer and a scarring process that can result in liver cirrhosis. "The paradigm that inflammation leads to cancer is very hot," he says. "And our niche is looking at the role of dendritic cells in the pancreas and liver."

Dendritic cells are responsible for bringing foreign particles to the attention of T-cells so that the invaders can be destroyed. But in the process, inflammation can arise. After a liver injury, for example, Dr. Miller and collaborators found that activation of dendritic cells can initiate inflammation that leads to fibrosis, or scar tissue growth that often progresses to cirrhosis. "So targeting these cells would be a novel approach to combating or preventing liver fibrosis in patients who are susceptible, like patients with viral hepatitis or alcoholism," he says. "But the key is to find a way to shut down these cells."

A keen sense of organization has been key for managing his own demanding schedule, allowing him to spend time with his family, coach Little League baseball in the summer, and run marathons—eight so far.

Dr. Miller credits much of his success in the laboratory to strong relationships forged with other NYU Langone Medical Center researchers, including mentoring from Dafna Bar-Sagi, PhD, professor and chair of biochemistry. Her invaluable insights and advice, he says, have helped his lab generate an abundance of new ideas. "I recognized from the outset that the guy is just phenomenal," Dr. Bar-Sagi says. The two labs now work closely together, with Dr. Miller supplying clinical insights and Dr. Bar-Sagi offering biochemical expertise.

His "go for it" mindset and bold experiments, she says, could make a big impact on pancreatic cancer.



"The paradigm that inflammation leads to cancer is very hot," he says. "And our niche is looking at the role of dendritic cells in the pancreas and liver."

New Research Faculty

We are immensely proud of the strides that have been made by our researchers. NYU Langone Medical Center continues to attract the best and brightest faculty from around the world, researchers who share our passion, energy, and commitment to excellence.

Last year, NYU Langone recruited a group of researchers with diverse interests who are at the cutting-edge of their fields.

JIYOUNG AHN, PHD, is an assistant professor in the Department of Environmental Medicine's Division of Epidemiology, and a member of the Population Science Program at the NYU Cancer Institute. Her research focuses on how genetic and dietary factors are related to the risk of cancer, with particular emphasis on prostate and breast cancer risk. She plans to lead epidemiologic investigations on diet, genetics, and cancer survivorship and is interested in identifying prostate cancer early detection markers for predicting prostate cancer aggressiveness. She received undergraduate and graduate degrees in nutritional biochemistry from Yonsei University in South Korea. She received her PhD in Nutritional Epidemiology from Cornell University and completed her post-doctoral research fellowship in the National Cancer Institute's Intramural Research Program in the Division of Cancer Epidemiology and Genetics. She has earned numerous awards including the NCI-Outstanding Research Paper Award in 2008 and 2009 and the NCI-Fellowship Achievement Award for outstanding accomplishments. She is a pianist and has been a choir singer for the last 10 years.

ALEXANDER V. ALEKSEYENKO, PHD, is an assistant research professor in the Center for Health Informatics and Bioinformatics and in the Department of Medicine's Division of Clinical Pharmacology. His research goal is to harness next generation sequencing technologies for applications in medical and basic science. Specifically, he is working to understand the contribution of microbiomic diversity to common disease through the utilization and development of evolutionary and ecological statistical models and stochastic processes. He completed his undergraduate degree in computer science at Case Western Reserve University, and received his PhD in biomathematics from the University of California, Los Angeles School of Medicine. He completed postdoctoral training in bioinformatics and phylogenetics at the European Bioinformatics Institute in Cambridge, United Kingdom, and in statistics at Stanford University. He is a self-described fishing addict and enjoys both surf and deep-ocean fishing.

MELISSA A. BENDER, MD, is an instructor of medicine in the Division of Infectious Diseases and Immunology and a faculty member in the Division of General Internal Medicine's Section on Value and Comparative Effectiveness. Her research focuses on using computer simulation models to optimize the care of HIV- and HIV/TB-infected patients in resource-limited settings. She received her undergraduate, public health, and medical degrees from Harvard University. She completed her residency in internal medicine at Massachusetts General Hospital, and she was a clinical and research fellow in the combined Massachusetts General Hospital and Brigham and Women's Hospital Infectious Disease Fellowship Program. Prior to joining the faculty at NYU, she was an instructor of medicine at Harvard Medical School and a junior faculty member in the Division of Infectious Diseases at Massachusetts General Hospital. She is fluent in Spanish and has provided health care in Bolivia and Mexico.

JEFFREY S. BERGER, MD, is assistant professor of medicine in the Division of Cardiology and Hematology, assistant professor of surgery in the Division of Vascular Surgery, and director of Cardiovascular Thrombosis. His clinical interests focus on the detection and management of individuals with complex thrombotic disorders of the cardiovascular system. He researches platelet function and idiopathic thromboembolic disease, the clinical and platelet response to antithrombotic agents in cardiovascular disease, and clinical and biological mechanisms of platelet physiology, reactivity, and response to platelet-directed therapies. He completed a graduate degree in clinical research at the Albert Einstein College of Medicine, and received his MD from the Sackler School of Medicine at Tel Aviv University. He was resident and chief resident in internal medicine at Beth Israel Medical Center. He completed a fellowship in vascular medicine and thrombosis and hemostasis at the University of Pennsylvania, cardiology training at Duke University, and a cardiovascular clinical research fellowship at the Duke Clinical Research Institute. He enjoys playing golf and tennis and gave up his pursuit of playing professional tennis to study and practice medicine.

R. SCOTT BRAITHWAITE, MD, is an associate professor of medicine in the Department of Medicine's Division of General Internal Medicine, chief of the Section on Value and Comparative Effectiveness, and a staff physician at Bellevue Hospital. His research focuses on the intersection of health services research and the decision sciences. He uses a variety of research tools to estimate the benefit that health care is delivering, to get more "bang" from the health care "buck." He completed his undergraduate degree in physics from the Massachusetts Institute of Technology, and a graduate degree in clinical research at the University of Pittsburgh. He received his MD from the State University of New York (SUNY) at Stony Brook, did his internal medicine residency at the University of Washington, and did a research fellowship in decision analysis and medical decision making at Tufts University. He is an American College of Physicians Fellow and a Robert Wood Johnson Physician Faculty Scholar. He recently helped his wife collect more than 50 pounds of obsidian from a northern Nevada desert so that she can create jewelry and wind chimes from it.

TRACY BUTLER, MD, is an assistant professor of neurology in the Comprehensive Epilepsy Center. Her research uses positron emission tomography, functional and structural magnetic resonance imaging, and complementary electrophysiological techniques to investigate neuropsychiatric and neuroinflammatory aspects of human epilepsy. She graduated with honors from Amherst College with undergraduate majors in philosophy and neuroscience. She completed medical school, neurology residency, and fellowship training in epilepsy and clinical neurophysiology at Columbia University. She also was an NIH-sponsored research fellow in cognitive neuroimaging at the Functional Neuroimaging Laboratory in the Department of Psychiatry at Weill Cornell Medical College. She is a member of several professional organizations including the Organization for Human Brain Mapping and the American Epilepsy Society. In her spare time, she enjoys running slowly through New York's Central Park.

JOAN E. DURBIN, MD, PHD, is an associate professor in the Department of Pathology, director of pediatric pathology, and director of experimental pathology. She works with pediatricians and pediatric surgeons to obtain tissue diagnoses for childhood tumors and diseases. In addition, she works with obstetricians and geneticists to determine the causes of fetal loss. Her laboratory studies the pathogenesis of respiratory syncytial virus infection, which is the most frequent cause of respiratory infections in children, but has defied all attempts at successful vaccination. Her research focuses on how this virus defeats innate immune mechanisms, and her lab is working on the development of a safe and effective respiratory syncytial virus vaccine. She received her undergraduate degree in chemistry from the University of Detroit, her graduate degree in microbiology from the University of California, Davis, and her MD and PhD in microbiology from the University of Medicine and Dentistry of New Jersey-Rutgers Medical School. She completed her anatomic pathology residency and postdoctoral training at NYU Langone Medical Center. During her time as a faculty member at Ohio State University, she developed a love for the design and maintenance of flower gardens, a hobby that will probably not survive her move back to New York City.

CARLOS FERNÁNDEZ-HERNANDO, PHD, is an assistant professor in the Departments of Medicine and Cell Biology. His research focuses on the mechanisms that control cholesterol metabolism and the discovery of novel pathways that regulate the progression of atherosclerosis. He received his undergraduate degree in chemistry and his PhD in biochemistry and molecular biology at Universidad Autónoma de Madrid in Spain. He completed postdoctoral training in biochemistry at Hospital Ramón y Cajal, in Spain, and in pharmacology at Yale University School of Medicine. He was an associate research scientist at Yale University before coming to NYU. He was recently awarded the prestigious Irvine H. Page Young Investigator Award from the American Heart Association. He enjoys sports, specifically basketball, and, of course, Spanish food with a good Rioja red wine.

LAWRENCE FU, PHD, is an assistant research professor in the Department of Medicine's Division of Clinical Pharmacology and co-director of the Evidence-Based Medicine Information Retrieval and Scientometrics Laboratory in the Center for Health Informatics and Bioinformatics. His research interests include information retrieval, machine learning, and scientometrics. He is focused on developing improved methods for evaluating the quality of scientific literature using machine learning techniques. He published one of the first papers that demonstrates the feasibility of predicting long-term citation counts for biomedical articles using only information available at the time of publication. He completed an undergraduate degree in computer science at Princeton University and received his graduate degree and PhD in biomedical informatics from Vanderbilt University. He is a member of the American Medical Informatics Association. He grew up in Los Angeles and is an avid Lakers, Dodgers, Kings, and Raiders fan.

P'NG LOKE, PHD, is an assistant professor in the Department of Medical Parasitology. His research is focused on better understanding the mechanisms by which macrophages regulate immune responses, especially in the context of helminth infection. He studies a population of helminth-induced immuno-suppressive macrophages that are dependent on Th2 cytokines, also called alternatively activated macrophages. He completed his

undergraduate degree in biology at the University of Oxford and received his PhD in parasite immunology from the University of Edinburgh in the United Kingdom. He completed postdoctoral fellowships at the University of California, Berkeley, in immunology and at the University of California, San Francisco, in parasite immunology. He has earned numerous honors and recognitions, including the Ruth L. Kirchstein National Research Service Award, the Wellcome Traveling and Prize Fellowships, and the Young Investigator Award from the American Society of Tropical Medicine and Hygiene. He is originally from Malaysia and started a program in the Bay Area to train Malaysians to become bio-entrepreneurs.

MICHAEL PETER MILHAM, MD, PHD, is a Leon Levy Assistant Professor in the Department of Child and Adolescent Psychiatry and the associate director of the Phyllis Green and Randolph Cowen Institute of Pediatric Neuroscience at the NYU Child Study Center. His research focuses on examining the neural basis of psychiatric illness in children and adolescents. In particular, he studies how differences in the brain's functional and structural connectivity may underlie a variety of disorders, ranging from Attention Deficit Hyperactivity Disorder (ADHD) to autism to mood and anxiety disorders. He received his undergraduate degree in biological sciences and computer sciences with honors from Duke University. He received his PhD in cognitive neuroscience from the University of Illinois at Urbana-Champaign and received his MD from the University of Illinois at Chicago. He completed both his adult psychiatry residency and his child and adolescent psychiatry residency at NYU Langone Medical Center. He enjoys hard rock music, particularly Pearl Jam, and plays the guitar.

KATHRYN MOORE, PHD, is an associate professor in the Departments of Medicine and Cell Biology. Her current research focuses on understanding the pathways that promote chronic inflammation in atherosclerosis and Alzheimer's disease, in particular the role of innate immunity and cholesterol metabolism in these age-related diseases. She received her PhD from McGill University for her research on host-pathogen interactions. She completed her postdoctoral studies at Harvard Medical School, focusing on the mechanisms of inflammation in lupus and atherosclerosis, and a clinical fellowship at Harvard Medical School-Brigham and Women's Hospital. She has received numerous awards, including the Claflin Distinguished Scholar Award, the Ellison New Scholar in Aging Award, and the American Heart Association's Special Recognition Award in Vascular Biology. She is also an accomplished decorative painter who specializes in creating distinctive wall finishes for the home such as Venetian plaster, faux marble, and murals.

OWEN A. O'CONNOR, MD, PHD, is professor of medicine and pharmacology, deputy director for clinical research and cancer treatment, and director of the Division of Hematology and Medical Oncology at the NYU Cancer Institute. His research focuses on the discovery and development of promising new drugs for the treatment of lymphoma. His work has led to the US FDA approval of three unique drugs, including bortezomib, SAHA (vorinostant), and pralatrexate (he was a co-inventor), which became the first drug ever approved by the US FDA for the treatment of relapsed and refractory peripheral T-cell lymphoma. He received his undergraduate degree in environmental biology from Manhattan College, his PhD in biochemical toxicology and chemical carcinogenesis from the Nelson Institute of Environmental Medicine at NYU, and his MD from the University of Medicine & Dentistry of New Jersey. He completed his residency at Cornell University Medical Center-The New York Hospital, a fellowship in medical oncology at Memorial Sloan-Kettering Cancer Center, and another fellowship in clinical pharmacology at Cornell University Medical Center. When he is not in the laboratory at NYU, he can be found in his laboratory at home — the kitchen — where he enjoys developing new recipes and cooking.

JENNIFER PHILIPS, MD, PHD, is an assistant professor in the Department of Medicine's Division of Infectious Diseases and Immunology and in the Department of Pathology. Her research focuses on how *Mycobacterium tuberculosis* evades eradication by the host. Her lab employs genome-wide, high throughput strategies to identify host factors that influence the outcome of infection. Their goal is to characterize how these factors intersect bacterial virulence strategies. She completed her undergraduate degree in biochemistry at Columbia University. She received her PhD in biochemistry and biophysics and her MD from the University of California, San Francisco. She completed an internal medicine residency at Brigham and Women's Hospital, and an infectious disease fellowship in the joint program at Massachusetts General Hospital-Brigham and Women's Hospital. She has received numerous honors, including the Michael Saperstein Medical Scholar Award from NYU's Department of Medicine, the Maxwell Finland Award for Excellence in Research from the Massachusetts Infectious Disease Society, and the Clinical Scientist Development Award from the Doris Duke Charitable Foundation.

JENNIFER K. PULLIUM, MVB, DIPLOMATE ACLAM, is an associate professor in the Department of Pathology and director of the Division of Laboratory Animal Resources. Her recent research is focused on reproductive organ transplantation as a way to maintain preservation of unique genotypes, and she has also worked on using animal models of HIV sexual transmission and prevention. As an undergraduate, she attended Emory University majoring in biology and philosophy, her veterinary degree is from University College in Dublin, Ireland, and she completed her laboratory animal residency at Emory University. She has earned numerous honors and awards, including the Henry and Lois Foster Award for Academic Excellence in Laboratory Animal Medicine. She has been a member of numerous professional societies, including the American Veterinary Medical Association, American Association of Laboratory Animal Science, American College of Laboratory Animal Medicine, Association of Laboratory Animal Practitioners, the American Society of Andrology, and the Society for the Study of Reproduction. She is an artist who works with oil, watercolor, and metal, and is a talented skeet shooter.

NIELS RINGSTAD, PHD, is an assistant professor in the Molecular Neurobiology Program at the Skirball Institute of Biomolecular Medicine and Department of Cell Biology. He studies the molecular mechanisms of neurotransmission and neuromodulation using behavioral genetics of the roundworm *Caenorhabditis elegans*, which has a small and well-studied nervous system that uses a large number of conserved neurotransmitters to generate behaviors. His lab seeks to identify molecular mechanisms of neurotransmitter action, both in the context of a chemical synapse and in the context of neurotransmitters acting on circuits to create behavioral states. He received his undergraduate degree in biology from Harvard University, and his PhD in cellular and molecular physiology from Yale University. He was a Howard Hughes Medical Institute (HHMI) fellow of the Life Sciences Research Foundation in the MIT Biology Department, where his postdoctoral work focused on the molecular genetics of nervous system function. In his spare time, he plays the oboe and tries to keep up with his two sons.

BO SHOPSIN, MD, PHD, is an assistant professor in the Department of Medicine's Division of Infectious Diseases. He studies the molecular basis underlying the adaptive changes in *Staphylococcus aureus* that take place during infection. He completed his undergraduate degree in biology at Indiana University, and received his PhD in microbiology and his MD from the NYU School of Medicine. He completed his medicine residency and infectious diseases fellowship at NYU's Bellevue Hospital. Before becoming a doctor, he pursued a lifelong interest in motorsports by taking a year off to complete the Mechanic/Racing Training Program at the Bridgestone Racing School. He spent this time building and maintaining Formula 2000 cars and competing in their open-wheel racing series.

ALEXANDER STATNIKOV, PHD, is an assistant professor in the Department of Medicine's Division of Clinical Pharmacology, director of the Computational Causal Discovery Laboratory, and benchmarking director of the Best Practices Integrative Informatics Consultation Service at the Center for Health Informatics and Bioinformatics. His research is focused on developing, testing, and applying computational causal discovery methods for molecular, clinical, imaging, and multimodal data of high dimensionality. He is also working on building, optimizing, and validating molecular signatures and other predictive models for personalized medicine. He has an undergraduate degree in mathematics and a graduate degree in applied mathematics from Case Western Reserve University. He received a second graduate degree and his PhD in biomedical informatics from Vanderbilt University. When he is not in the lab, he may be found relaxing in a Russian *banya.*

JING WANG, MD, PHD, is an assistant professor in the Department of Anesthesiology's Division of Pain Medicine and assistant director of the Pain Medicine Fellowship. He studies the interaction between chronic pain and the reward system, with a focus on the emotional consequence of chronic pain, and how neuropathic pain is processed in the spinal cord. He received his undergraduate degree in biochemistry from Harvard and then obtained both his MD and PhD in neurobiology from Columbia University. He completed a residency in anesthesiology at Columbia University, and then completed a fellowship in pain medicine at the Johns Hopkins University. He came to the United States from China at age 16, and enjoys playing soccer and scuba diving.

Appointed Department Chairs

DAVID L. KEEFE, MD, is the new Stanley Kaplan Chair of Obstetrics and Gynecology. He is a fertility specialist whose research focuses on reproductive aging and stem cells, and he treats patients at the NYU Fertility Center. As chair, he plans to build on the department's tradition of clinical and teaching excellence, and plans to make NYU a leader of research on reproduction and women's health. His own research was the first to establish the value of polarization light microscopy for noninvasive evaluation of human eggs. His group also discovered a role for telomere shortening in egg aging. This work resulted in several U.S. patents to improve IVF. He received an undergraduate degree from Harvard College and his medical degree from Georgetown University. He completed residency training in psychiatry at Harvard and an NIH-funded fellowship in reproductive biology at Northwestern before completing a residency in obstetrics and gynecology and fellowship in reproductive medicine at Yale. He has published over 100 peer-reviewed papers and served as scientific chair of the Annual Meeting of the American Society for Reproductive Medicine, as well as on the editorial boards of the journals *Human Reproduction* and

Journal of Assisted Reproductive Technology and Genetics. He is a reviewer for the *American Journal of Obstetrics & Gynecology* and the *New England Journal of Medicine*. He serves on the national board of Resolve, the National Infertility Association.

JOHN G. GOLFINOS, MD, is the new chair of the Department of Neurosurgery. He is an expert on the treatment of acoustic neuromas, metastatic brain tumors, skull base tumors and neurofibromatosis Type 2. As chair, he will create a multidisciplinary Brain Tumor Center that will serve both adults and children and will lead the expansion of the department's expertise in cerebrovascular and endovascular surgery and complex procedures of the spine. He will also significantly expand the department's academic program, increasing the number of residents the department trains each year and intensifying its research efforts in brain tumors and in areas such as epilepsy. At NYU, he has partnered with the Department of Radiation Oncology to open New York's first Gamma Knife Stereotactic Radiosurgery Center, offering minimally invasive treatment options for brain tumors. He co-founded the Neurofibromatosis Center and has also launched neurosurgical clinical trials in conjunction with colleagues in neuroradiology, neuro-oncology, and radiation oncology. He is a member of the NYU Cancer Institute and has worked closely with oncologists on metastatic tumors in the brain. He received his undergraduate degree in biology from Princeton University and his MD from Columbia University. He completed his residency and chief residency in neurosurgery and a fellowship in molecular biology research at the Barrow Neurological Institute in Phoenix, Arizona. He is a member of the American Association of Neurological Surgeons and the president-elect of the New York Neurosurgical Society.

CHARLES R. MARMAR, MD, is the new chair of the Department of Psychiatry. He is internationally recognized for his expertise in post traumatic stress disorder and has worked in areas ranging from combat-related conditions in veterans, including those from Iraq and Afghanistan, to groups as disparate as refugees and earthquake victims. As chair, he will continue to expand the department's role in team science, including its participation in the Center of Excellence on Brain Aging, the Center of Excellence on Addiction, the Neuroscience Institute, and programs at the Manhattan VA. He received both his undergraduate degree and his MD from the University of Manitoba in Winnipeg, Canada. He completed additional training in psychiatry and neuropharmacology, including serving as chief resident at the University of Toronto, and as a postdoctoral fellow in traumatic stress and grief at the University of California, San Francisco. He has served on multiple committees and scientific advisory groups at the national level, for both the Veterans Administration in Washington, D.C., and for the National Institute of Mental Health. He is an editorial board member for the *Journal of Psychotherapy Research and Practice* and the *Journal of Traumatic Stress*, and is a reviewer for the *Journal of Clinical Psychiatry*, *Biological Psychiatry*, *American Journal of Psychiatry* and the *Journal of Psychiatric Research*. He has also served as the president of both the Society of Psychotherapy Research and the International Society for Traumatic Stress Studies.

J. THOMAS ROLAND, JR., MD, is the new chair of the Department of Otolaryngology and the Mendik Foundation Associate Professor of Otolaryngology. He has trained cochlear implant surgeons and performed cochlear implants in many Middle Eastern, East African, Asian, and Latin American countries in an effort to expand the reach of current technologies and procedures. As chair, he will focus on enhancing resident education and the recruitment of nationally and internationally renowned specialists, pursuing more integrated translational and basic science research, and advancing the Medical Center's reputation for its state-of-the-art ENT patient care. He completed his undergraduate degree at the University of Pennsylvania and received his MD from Temple University School of Medicine. At NYU, he completed his surgical residency, otolaryngology residency, and a fellowship in otology/neurotology. Also at NYU, he has served as director of otology/neurotology, director of otology/neurotology fellowships, and as co-director of both the NYU Neurofibromatosis Type 2 Center and the NYU Cochlear Implant Center, one of the largest such centers in the world. In addition, he is a member or fellow of multiple prestigious national and regional societies, including the American Academy of Otolaryngology-Head and Neck Surgery, American Laryngological, Rhinological and Otological Society (Triological Society), the North American Skull Base Society, and the New York Otologic Society. He is widely published and is on the editorial boards for *Audiology/Neurotology*, *Laryngoscope*, *Otology and Neurotology* and *Cochlear Implants International*.


NYU Langone Medical Center
Tisch
Hospital
The University Hospital
of NYU

Published Research

One clear benchmark of scientific excellence: publication in highly regarded, peer-reviewed journals. Our scientists continue to publish in the most prestigious scientific and medical journals. Research work published in these high-impact publications is listed in the following pages.

In 2009 our faculty published 4,197 articles in peer-reviewed journals. On these pages is a small selection of studies that appeared in high-impact journals.

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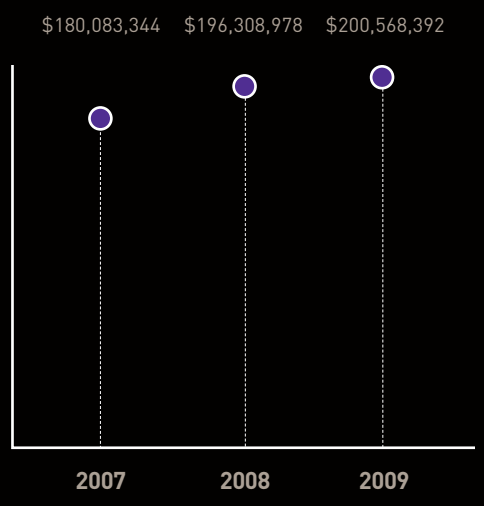
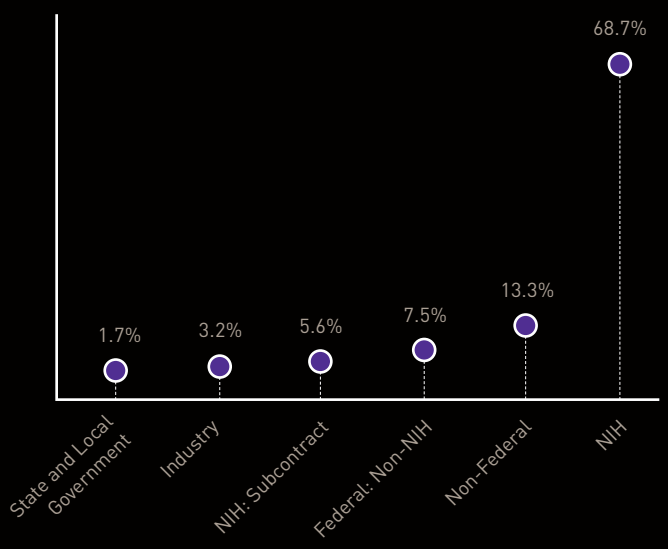
GRANT REVENUE (2007–2009)



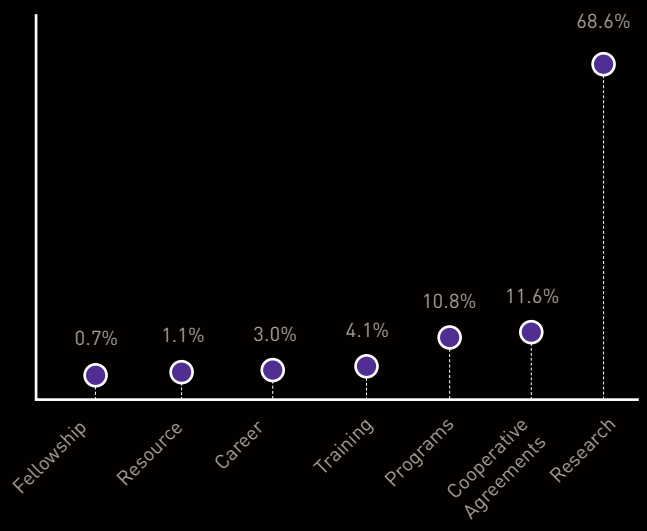
FY09 AWARDS BY FUNDING SOURCE

GRAND TOTAL: 1034



FY09 NIH AWARDS

GRAND TOTAL: 431



Stimulus: $61 Million in Federal Stimulus Grants and Contracts Obligated as of May 2010 under the American Recovery and Reinvestment Act

Funding
Fiscal Year 2009

New 2009 Federal Funding (over $100,000)

JUDITH A. ABERG The virologic and serologic outcomes of Hepatitis B Virus (HBV) - Human Immunodeficiency Virus-1 (HIV) co-infection in persons enrolled in A5001, AIDS clinical trials group longitudinal linked randomized trials (ALLRT) protocol receiving mono or dual HBV *NIH (National Institutes of Health)* $464,969

STEVEN B. ABRAMSON Regulation of chondrocytes by extracellular matrix proteins *NIH* $1,800,930

IANNIS AIFANTIS The role of the SCF/FBW7 ubiquiting ligase complex in hematopesis and leukemia *NIH* $1,707,713

ALAN A. ARSLAN Inflammatory markers in circulation and ovarian cancer risk *NIH* $381,376

ERIKA BACH Elucidating the molecular mechanisms that regulate stem cell numbers in vivo *NIH* $1,784,860

JOEL G. BELASCO Prokaryotic RNA metabolism *NIH* $1,440,752

NINA BHARDWAJ Induction of immunity by non-replicating HIV-1 *NIH* $516,084

MARTIN J. BLASER Evaluation of the cutaneous microbiome in psoriasis *NIH* $563,425

JAMES A. BOROWIEC Regulation of RPA activity in DNA repair *NIH* $1,337,831

ORALEE BRANCH Malaria: immunology and genetics in low transmission *NIH* $997,195

HAROLD BREM Division of wound healing and regenerative medicine *NIH* $730,935

JUDITH S. BROOK A longitudinal study of the predictors of smoking in women in late midlife *NIH* $2,951,730

TIMOTHY J. CARDOZO Chemical biology design for malaria *NIH* $1,133,886

JANE M. CARLTON Advanced research on the sexually transmitted female "nuisance" pathogen trichomonas vaginalis *NIH* $464,938

KENNETH D. CARR CNS mechanisms that modulate reward *NIH* $846,563

KENNETH D. CARR Postdoctoral training in research on abused drugs *NIH* $1,134,363

WILLIAM L. CARROLL Cancer center support grant *NIH* $5,123,756

F. XAVIER CASTELLANOS Research training in translational developmental neuroscience *NIH* $1,665,409

F. XAVIER CASTELLANOS Functional and structural connectivity in adult Attention-Deficit Hyperactivity Disorder (ADHD) *NIH* $1,752,930

JOHN D. CHELICO Web services for preventive health *NIH* $398,121

YU CHEN Association of periodical disease with gastric cancer precursor lesions *NIH* $437,465

WILLIAM A. COETZEE Conditional knockout mice lacking K (ATP) channel subunits *NIH* $464,916

MITCHELL D. COHEN WTC dust size and alkalinity as factors in first responder chronic lung ailments *NIH* $1,815,657

ANTONIO J. CONVIT Diabetes, cognition and the brain *NIH* $2,043,727

MAX COSTA Carcinogenic metals and their interactions with other toxicants *NIH* $1,200,398

NICHOLAS J. COWAN Role of alpha tubulin mutations in lissencephaly *NIH* $826,238

PAMELA COWIN The role of hedgehog signaling in breast cancer *DOD (Department of Defense)* $506,131

BRUCE N. CRONSTEIN Congressionally-mandated health information technology grants *HRSA (Health Resources and Services Administration)* $882,988

BRUCE N. CRONSTEIN The pharmacology of dermal fibrosis *NIH* $1,849,584

BRUCE N. CRONSTEIN Institutional Clinical and Translational Science Award *NIH* $30,282,570

JEREMY DASEN Transcriptional control of motor neuron identity and connectivity *NIH* $1,483,124

Methodology Note: This list on pages 51–55 includes only grants and gifts that were both new to the institution in Fiscal Year 2009 and were equal to at least $100,000 in that first year. The amount shown is the full value for that specific grant or gift.

New 2009 Federal Funding (over $100,000)

MONY J. DE LEON Clinical correlates of longitudinal PET changes in AD *NIH* $3,445,140

LYNN E. DELISI Brain structural MRI studies of people who abuse cannabis and develop schizophrenia-like psychosis *NIH* $817,407

ADRIANA DI MARTINO Development of anterior cingulate connectivity in autism *NIH* $480,935

MICHAEL L. DUSTIN Physiological chemistry of integrin function *NIH* $253,688

BRIAN D. DYNLACHT The role of PRB and co-repressors in transcriptional regulation *NIH* $1,572,605

BRIAN D. ELBEL Influence of calorie labeling on food choice *NIH* $616,818

EDWARD A. FISHER Molecular regulation of apoprotein B degradation *NIH* $1,651,655

UTE FREVERT Imaging preerythrotic plasmodium stages in naive and immune individuals *NIH* $832,905

VILMA GABBAY The role of omega-3 fatty acids in neuroplasticity in adolescent depression *NIH* $482,491

ESTHER P. GARDNER Neural mechanisms of cutaneous spatial integration *NIH* $2,351,695

LAWRENCE B. GARDNER Mechanisms and significance of nonsense mediated RNA decay regulation in erythropoiesis and thalassemia *NIH* $1,695,000

JORGE A. GHISO Exfoliation syndrome: development of a cell culture model of fibril formation *NIH* $466,125

JORGE A. GHISO Cerebral amyloidosis and dementia *NIH* $1,737,375

TERRY GORDON Development of biomarkers for chronic beryllium disease in mice *DOE (Department of Energy)* $300,003

GABRIELE GRUNIG Muscularization of pulmonary arteries induced by an adaptive immune response *NIH* $412,529

JOHN GRAHAM HAY Spread of replicating adenovirus in pancreatic tumors *NIH* $365,220

JOSEPH A. HELPERN Quantitative MRI of microstructure and iron homeostasis in ADHD brain *NIH* $1,020,464

TONY HUANG Role of deubiquitination in Fanconi anemia cancer susceptibility pathway *NIH* $1,772,540

E. JANE HUBBARD Control of onset meiosis in C. elegans *NIH* $181,469

KAZUHIKO ITO Fine particles and out-of-hospital cardiac arrest in NYC *NIH* $819,632

DANIEL C. JAVITT The Conte Center for Schizophrenia Research *NIH* $2,147,397

PAMELA BUTLER KAHN Methods for sensory assessment in schizophrenia *NIH* $1,562,014

ADINA L. KALET Randomized trial of educational outcomes of web initiative in surgical education *NIH* $2,206,017

STUART D. KATZ Studies on genetics in heart failure *NIH* $166,965

HANNAH L. KLEIN Mechanisms of DNA motor proteins in genome maintenance *NIH* $3,545,310

KARINE KLEINHAUS Psychiatric disorders following intrauterine stress *NIH* $896,342

MICHELLE KROGSGAARD Biophysical analysis of functional T-cell discrimination among classes of self-ligands *NIH* $701,437

SUMAN LAAL TB diagnosis based on promiscuous PE-PGRS epitopes *NIH* $465,063

JUAN JOSE LAFAILLE Characterization of lymphocytes that suppress EAE *NIH* $422,709

MARIANA LAZAR Microstructural characterization of white matter in schizophrenia *NIH* $464,802

PENG LEE MicroRNA in prostate cancer racial disparity *DOD* $633,750

RUTH LEHMANN Training program in developmental genetics *NIH* $874,600

LOURDES O. LINARES Promoting sibling bonds in foster care *CDC (Centers for Disease Control and Prevention)* $899,943

DAN R. LITTMAN Ligands and cofactors required for RORgt function in the immune system *NIH* $2,112,709

SUSAN K. LOGAN An androgen receptor coactivator regulated in prostate *NIH* $1,758,565

CARRIE L. MASIA CBT for social anxiety disorder delivered by school counselors *NIH* $3,352,998

PAOLO G. MIGNATTI Physiological role of MT1-MMP-mediated, proteolysis independent signaling in vivo *NIH* $381,608

PAOLO G. MIGNATTI Non-proteolytic interactions of TIMP-2 and MT1-MMP *NIH* $1,706,675

MOOSA MOHAMMADI Mechanisms of FGF receptor regulation and signaling *NIH* $5,387,916

IAN J. MOHR Control of translation in herpes virus infected cells *NIH* $1,421,070

MARIE E. MONACO The role of fatty acid metabolism in estrogen receptor negative breast cancer *DOD* $633,978

GREGORY E. MORLEY Intercellular communication and cardiac arrhythmias *NIH* $1,825,998

EVAN P. NADLER The role of TGF-beta in the pathogenesis of experimental biliary atresia *NIH* $766,800

JEREMY F. NANCE Zeiss 510 confocal microscope *NIH* $438,028

JEREMY F. NANCE Genetic control of C. elegans gastrulation *NIH* $464,854

BHAGAVATHI A. NARAYANAN Chemopreventive effect of NSAIDS against prostate cancer *NIH* $142,400

THOMAS A. NEUBERT Protein mass spectrometry core facility for neuroscience *NIH* $400,000

RICHARD P. NOVICK Molecular biology of TSST-1 and other superantigen toxins *NIH* $2,376,561

NICOLE NOYES A systems biology approach to mammalian early embryogenesis *NIH* $1,484,726

HARRY OSTRER Genome-wide association study to identify SNPs and CNPs associated with development of radiation injury in prostate cancer patients treated with radiotherapy *DOD* $608,140

ZHIHENG PEI Foregut microbiome in development of esophageal adenocarcinoma *NIH* $1,080,286

MARY C. PERRIN Epigenetics and female reproductive cancers *NIH* $696,600

QINGSHAN QU Mechanisms of ambient particulate matter associated with cardiovascular diseases: a feasibility study *NIH* $423,150

ANDREW E. RASMUSSEN K23 award to study intergenerational conflict among West African forced migrants *NIH* $538,485

RAVINDER R. REGATTE Novel method for imaging cartilage *NIH* $418,369

MALCOLM S. REID Clinical laboratory evaluations of aprepitant for the treatment of opioid dependence *NIH* $1,119,644

DANNY REINBERG Initiation of transcription of protein coded genes *NIH* $534,374

MINDONG REN Barth Syndrome: a model for investigating the role of cardiolipin in mitochondria *NIH* $1,348,071

DANIEL B. RIFKIN TGF-B and inflammation in gastric cancer *NIH* $372,900

DANIEL B. RIFKIN Graduate program in cellular and molecular biology *NIH* $870,280

DANIEL B. RIFKIN Mechanisms for latent TGF-beta 1 activation in vivo *NIH* $1,806,474

PAMELA C. ROEHM Mechanism of neurotrophin latency response in a HSV1 vestibular neuritis mode *NIH* $1,043,250

WILLIAM N. ROM Longitudinal studies of HIV-associated bacterial pneumonia *NIH* $3,978,959

JOHN ROTROSEN Multi-site controlled trial of cocaine vaccine (5 of 6) New York University treatment site *NIH* $1,228,875

BERNARDO RUDY Expression and function of K channel genes in the CNS *NIH* $4,181,439

MARTIN SADOWSKI Peptoid antagaonists of the ApoE/AB interaction as a novel anti-AB therapy *NIH* $540,000

MARTIN SADOWSKI Developing therapeutic antibodies for human prion disease *NIH* $760,688

HERBERT H. SAMUELS Training in pharmacological sciences *NIH* $870,280

ROBERT J. SCHNEIDER Ionizing radiation control of inflammatory cytokine mRNA stability and expression *NIH* $1,352,108

SUSAN L. SMITH Mechanisms of telomere function *NIH* $250,000

DANIEL K. SODICKSON Parallel magnetic resonance imaging: new techniques and technologies *NIH* $743,469

REGINA M. SULLIVAN Ontogeny of olfactory hedonic encoding *NIH* $1,754,716

NAOKO TANESE Role of the Huntington's disease protein in post-transcriptional gene silencing *NIH* $1,689,261

JESUS TORRES-VAZQUEZ Molecular and cellular mechanisms of vascular patterning by PlexinD1 signaling *NIH* $2,359,116

DERYA UNUTMAZ Mechanisms of intrinsic resistance to HIV infection in primary human T cells *NIH* $465,375

MICHAEL D. WEIDEN HIV activation in secondary pulmonary infection *NIH* $722,147

THOMAS M. WISNIEWSKI Therapeutic approaches for prion disease *NIH* $370,052

DAVID ZAGZAG Intranasal drug delivery to inhibit glioma angiogenesis and invasion *NIH* $481,691

ANNE ZELENIUCH-JACQUOT Vitamin D, related genes and breast cancer risk *NIH* $5,042,608

EDWARD ZIFF Calcium permeable AMPA receptors: signaling, toxicity and control *NIH* $1,844,117

EDWARD ZIFF Role of CGK11 in AMPA receptor transport *NIH* $2,573,202

New 2009 Nonfederal Funding (over $100,000)

SUSAN ABRAMOWITZ Women, children, families and young people *New York State Department of Health* $358,267

IANNIS AIFANTIS Brain and CNS infiltration by acute leukemia cells: a molecular dissection *The Dana Foundation* $200,000

FELICIA B. AXELROD The Dysautonomia Center *Dysautonomia Foundation, Inc.* $558,075

CLAUDIO BASILICO Microbiology research *Anonymous* $100,000

JEFFREY S. BERGER Sex-related factors in platelet physiology, reactivity and response *American Heart Association* $396,000

NINA BHARDWAJ Inducing tolerance in SLE through modulation of apoptotic cells *Alliance for Lupus Research* $200,000

NINA BHARDWAJ Phase II study of CTLA4 blockade and low-dose cyclophosphamide in patients with advanced malignant melanoma after failure of at least one prior therapy *Cancer Research Institute, Inc.* $688,927

MARTIN J. BLASER Modulation of the intestinal microbiome by dietary cellulose ethers microbiota *Dow Chemical Company* $180,000

JAMES A. BOROWIEC Regulation of BRCA2 activity by replication protein A phosphorylation *Breast Cancer Alliance, Inc.* $100,000

LAURIE MILLER BROTMAN The Harris Obesity Prevention Effort (HOPE) *J. Ira & Nicki Harris Family Foundation* $4,000,000

WILLIAM L. CARROLL Young Investigator Award, The Stephen D. Hassenfeld Children's Center for Cancer and Blood Disorders *Pediatric Cancer Foundation* $117,500

F. XAVIER CASTELLANOS Early development of brain connectivity in autism *Autism Speaks, Inc.* $575,016

F. XAVIER CASTELLANOS Research, Child Study Center *Linda and Richard Schaps* $100,000

MOSES V. CHAO Assay and supporting antibody reagent development for the discovery of small molecule TrkB receptor *CHDI Foundation, Inc.* $165,368

LISA A. DAILEY Functional identification of transcriptional determinants of the ES cell state and early lineage commitment *New York State Department of Health* $933,689

RAMANUJ DASGUPTA A novel small molecules screen for inhibitors of the Wnt/B catenin *American Cancer Society, Inc.* $766,800

GREGORY DAVID Repressed chromatin as a barrier to oncogenic transformation *American Cancer Society, Inc.* $720,000

MONY J. DE LEON The preclinical diagnosis of Alzheimer's disease *Anonymous* $447,345

MICHAEL L. DUSTIN CXCR6 and central nervous system injury *NYS Spinal Cord Injury Research Board* $648,000

ANNA FERRARI The Prostate Cancer Research Fund *Martin and Sondra Rappaport* $460,000

GORDON J. FISHELL The directed differentiation of embryonic stem cells into specific cortical interneuron subtypes *New York State Department of Health* $900,000

GORDON J. FISHELL The integration of interneurons into cortical microcircuits *Simons Foundation* $150,000

EDWARD A. FISHER The Lipid Treatment and Research Center, Division of Cardiology *Lauren Tessler Corrigan and Patton R. Corrigan* $100,000

GLENN I. FISHMAN The Cardiovascular Genetics Program *Dina and Raphael Recanati Family Foundation* $2,000,000

GLENN I. FISHMAN Embryonic stem cell derived cardiac conduction system cells *New York State Department of Health* $1,080,000

GEORGE L. FOLTIN New York City Pediatric Disaster Coalition *Long Island Jewish Medical Center* $349,692

SILVIA C. FORMENTI Genetic and molecular markers for targeted treatment of locally advanced breast cancer *Breast Cancer Research Foundation* $250,000

FRITZ FRANCOIS Gastric leptin secretion in Barrett's metaplasia *Robert Wood Johnson Foundation* $420,000

SPIROS G. FRANGOS Safer Streets NYC *New York State Governer's Traffic Safety Committee* $122,242

JACQUELINE A. FRENCH Assessment of narrow spectrum AED in photosensitivity model *Epilepsy Foundation* $125,000

SHARON L. GARDNER Phase I study of peptide vaccination *Cancer Research Institute, Inc.* $354,710

GABRIELE GRUNIG Therapeutic vaccine for protease-induced lung disease *Mercia Pharmaceuticals* $316,978

ALEXES HAZEN The Institute of Reconstructive Plastic Surgery Fund *Judy Angelo Cowen Foundation* $100,000

JOSEPH HERBERT Validation and implementation of a new severity-based MS classification system using New York State consortium database *EMD Serono, Inc.* $374,000

EVA M. HERNANDO-MONGE Mechanisms of mesenchymal transformation and leiomyosarcoma-genesis *American Cancer Society, Inc.* $716,000

EVA M. HERNANDO-MONGE Determine the role of the miR-182-96-183 cluster in melanocyte differentiation and melanoma-pathogenesis *Harry J. Lloyd Charitable Trust* $107,615

EVA M. HERNANDO-MONGE Study of the melanoma cell of origin *New York State Department of Health* $240,000

MAX J. HILZ A collaborative study in traumatic brain injury *International Brain Research Foundation* $265,000

HORACIO KAUFMANN Dysautonomia Research Laboratory *Dysautonomia Foundation, Inc.* $397,100

ALLEN S. KELLER Advocating against torture: the clinician's voice *Open Society Institute* $180,000

EDWIN H. KOLODNY Anti-platelet therapy in ischemic stroke: imaging real time neurochemical changes in the brain *F.M. Kirby Foundation, Inc.* $125,000

EDWIN H. KOLODNY Lysosomal storage disorders *Genzyme Corporation* $315,000

MICHELLE KROGSGAARD Engineering T-cells with enhanced sensitivity to melanoma antigens *American Cancer Society, Inc.* $720,000

HERBERT LEPOR Urology research *J. Weinstein Foundation Inc.* $125,000

HERBERT LEPOR Urology research *The Selander Foundation* $200,000

JAMIE LEVINE Institute for Reconstructive Plastic Surgery Research Laboratory *National Foundation for Facial Reconstruction* $285,000

DAVID E. LEVY Derivation and characterization of dendritic cell lineages from hematopoietic stem cells *New York State Department of Health* $240,000

MACK LIPKIN Psychosocial aspects of terrorism and disasters *American Association of Medical Colleges* $561,075

DAN R. LITTMAN Regulation of inflammatory Th17 cells in ASD *Simons Foundation* $300,000

RODOLFO LLINAS Bayesian probability inspired tensorial approach *Office of Naval Research* $131,288

SHARI I. LUSSKIN The NYU Reproductive Psychiatry Program *Anonymous* $500,000

JEREMY F. NANCE Establishing the *C. elegans* stem cell niche *New York State Department of Health* $240,000

ERIK PARKER The NYU Brain Tumor Research Fund *The Zaharopoulos Family* $609,985

H. LEON PACHTER The NYU Institute for Surgical Research *Helen and Norman Stark* $100,000

LESLIE S. PRICHEP Amended and restated master research and license agreement *Brainscope Company, Inc.* $551,842

RAHMIN A. RABENOU Center for the Study of Asian American Health *Estate of William Laughlin* $200,000

WILLIAM N. ROM Con Edison clinical research project *Con Edison* $200,000

HYUNG RYOO The Ellison Medical Foundation New Scholar in Aging Award *Ellison Medical Foundation* $400,000

JAMES L. SALZER Role of aberrant signaling in Charcot-Marie-Tooth (CMT) disease *Muscular Dystrophy Association* $324,876

EINAR M. SIGURDSSON Tau pathology: therapy and in vivo imaging *Alzheimer's Association* $450,000

SAMIR TANEJA The Prostate Cancer Diagnostic Program *Joseph S. and Diane H. Steinberg Charitable Trust* $1,000,000

JESSICA E. TREISMAN Developing drosophilia as a system to study axon regeneration *NYS Spinal Cord Injury Research Board* $373,069

E. SERGIO TROMBETTA Stabilization against proteolysis as a mechanism to increase the immunogenicity of protein antigens *Bill and Melinda Gates Foundation* $100,000

ISAAC I. WIRGIN Vulnerability of Hudson River Atlantic Sturgeon to coastal bycathes *New York Sea Grant* $200,794

DEBORAH L. YELON Genetic regulation of cardiac chamber formation in zebrafish *American Heart Association* $500,000

HSIANG YIN Dissemination of a health literacy intervention to enhance provider communication of medication instructions and decrease outpatient pediatric medication errors *Robert Wood Johnson Foundation* $100,000

BRUCE YOUNG William and Linda Haugland Research Fund *The Haugland Family Foundation, Inc.* $1,000,000

DAVID S. YOUNGER Imaging lyme borreliosis *Neurology Research Foundation, Inc.* $477,593

ESTATE OF DOROTHY IRENE DEBEAR The Arthur DeBear Cohen and Irene Cohen Research Fellowship $496,661

ESTATE OF JAMES L. SAPHIER The Arna and James L. Saphier Research Fellowship $299,251

ESTATE OF RUTH LUBOWE The Irwin Lubowe Fellowship Fund in Dermatology $630,925

ESTATE OF MARIE MUSCARNERA Research $190,486

FOUNDATION FOR RESEARCH IN SLEEP The Pulmonary Research Fund $103,000

HELEN L. KIMMEL The Helen L. and Martin S. Kimmel Wound Healing Center $4,000,000

MARICA VILCEK AND JAN T. VILCEK, MD, PHD, Basic science research $3,850,344

SHELDON EISENBERGER The NYU Institute for Surgical Research $100,000

THE IRMA T. HIRSCHL TRUST Career Scientist Awards $350,000

THE SKIRBALL FOUNDATION Stem cell biology and the role of stem cells in regenerative medicine $1,500,000

VILCEK FOUNDATION Biochemistry and medical science $1,060,666

WILLIAM AND SYLVIA SILBERSTEIN FOUNDATION, INC. Alzheimer's disease research $125,000

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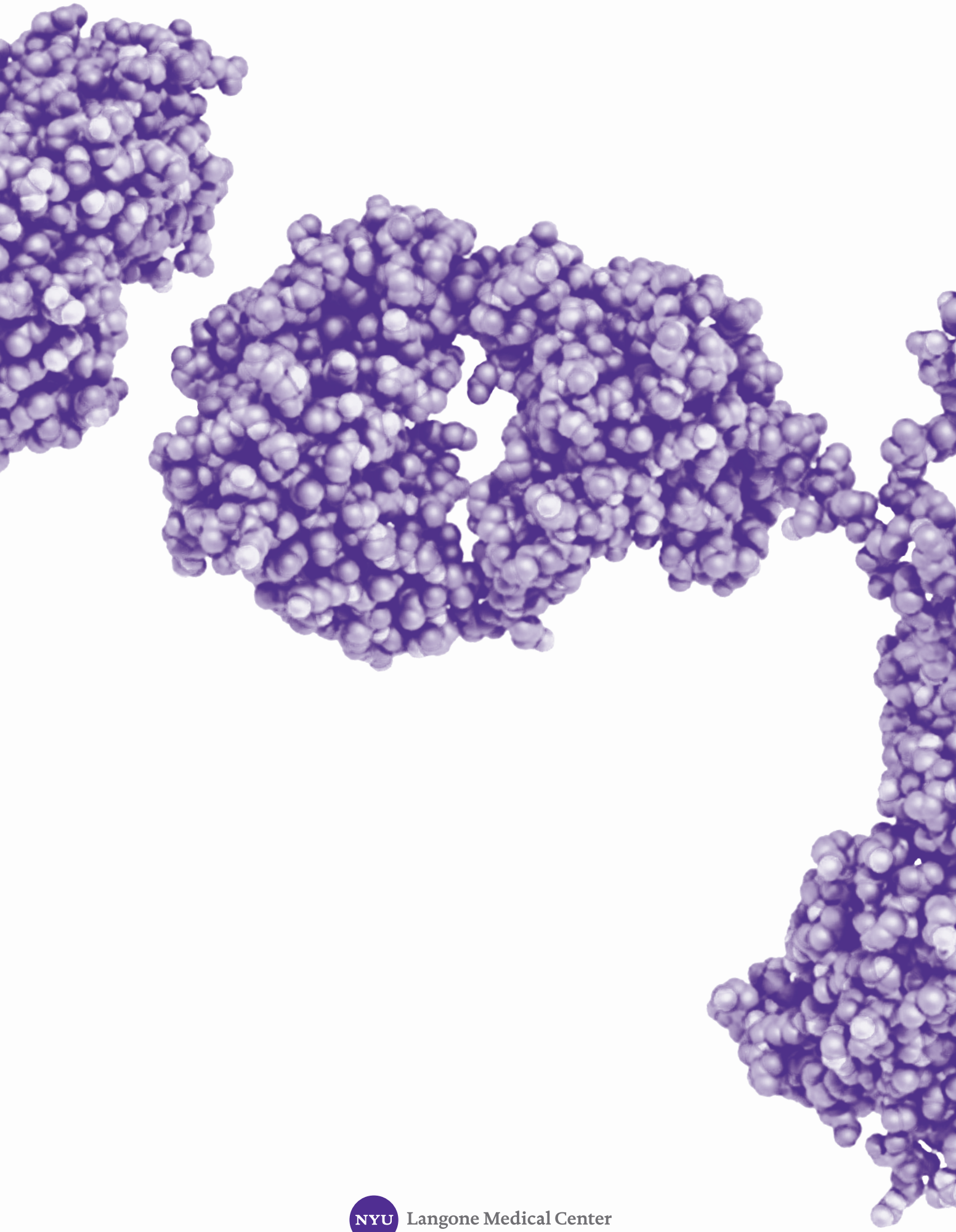

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