2017 NYU School of Medicine Report

**elec·tric \ i-ˈlek-trik, ē- **

2: exciting as if by electric shock; also: charged with strong emotion

Contents

A dictionary definition is one thing. But what does the word electric really mean—and what does it *feel* like? At NYU School of Medicine, it's about energy and vitality, a sense that we're not just moving ahead swiftly, but shaking things up creatively as we go. Progress demands progressiveness, in thought and action. Our drive for excellence can be seen in our rapidly growing research portfolio, including more than $361 million in grant funding; in the surge of talented recruits to our faculty; in our innovative curriculum; in the high caliber of our medical students; and in our unshakable confidence that we can—and will—continue to elevate medicine, as this noble profession demands and those it serves expect.

Simply put, we're on the move.
And here are just a few of the reasons why.

“NYU School of Medicine was the first medical school in the country to offer accelerated entry into any specialty with a guaranteed residency spot.”

ROBERT I. GROSSMAN, MD
SAUL J. FARBER DEAN AND CEO

PHOTO BY JOHN ABBOTT

Training Doctors to Meet the Challenges of the 21st Century

A Q&A WITH ROBERT I. GROSSMAN, MD, SAUL J. FARBER DEAN AND CEO

At a time when medicine, science, and healthcare seem to be competing with each other for which field can change faster, medical educators face many challenges. Among the biggest, as I see it, is the cost of a medical education and the debt students assume after graduation. Shouldering a debt of more than $189,000—the average for new doctors—is unsustainable.

TO HELP ALLEVIATE THIS BURDEN, we established the Three-Year MD Pathway Program in 2013 for those who qualify. At that time, NYU School of Medicine was the first medical school in the country to offer accelerated entry into any specialty with a guaranteed residency spot. Shaving a year off medical school saves time and money, of course. But another significant advantage is that students are mentored from the outset by a faculty member in their chosen specialty, ensuring a seamless transition to clinical practice. We also aspire to be a tuition-free medical school. Achieving this goal will take time, but we're fully committed to making it happen.

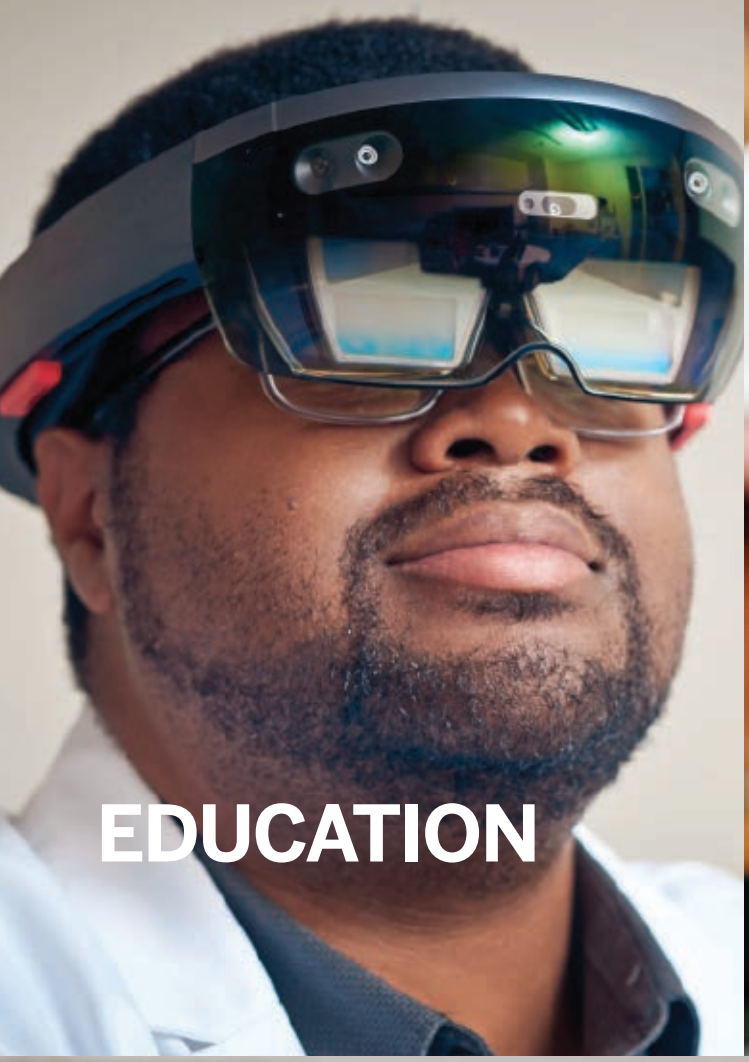
Our efforts to reform medical education started to take shape in 2010, when we launched the Curriculum for the 21st Century, or C21, designed to merge the study of science with clinical experience. A major objective of C21 is to offer individualized pathways to becoming a doctor. The five-year MD/master degree pathway, for example, provides graduates with the skills they'll need to become leaders in academic medicine, health policy, and industry.

At NYU School of Medicine, we've created an environment that respects great science and facilitates collaborative investigation. Our success is reflected in our 2016 core NIH research awards, which totaled $188 million—an increase of 6% over the previous year's comparable value of $178 million, which excludes post-Hurricane Sandy assistance. This rising trajectory is especially remarkable in a climate of declining federal funds.

The world is complex but our vision is quite simple: to train clinicians and clinician-scientists ready to meet the challenges of the 21st century. Our goal is to teach students to become life-long learners, and to equip them with the skills required to maintain a lifelong commitment to medicine and conduct research with curiosity, creativity, compassion, and rigorous professionalism. On the following pages, you'll see how we accomplish that.

Sincerely,

ROBERT I. GROSSMAN, MD
SAUL J. FARBER DEAN AND CEO

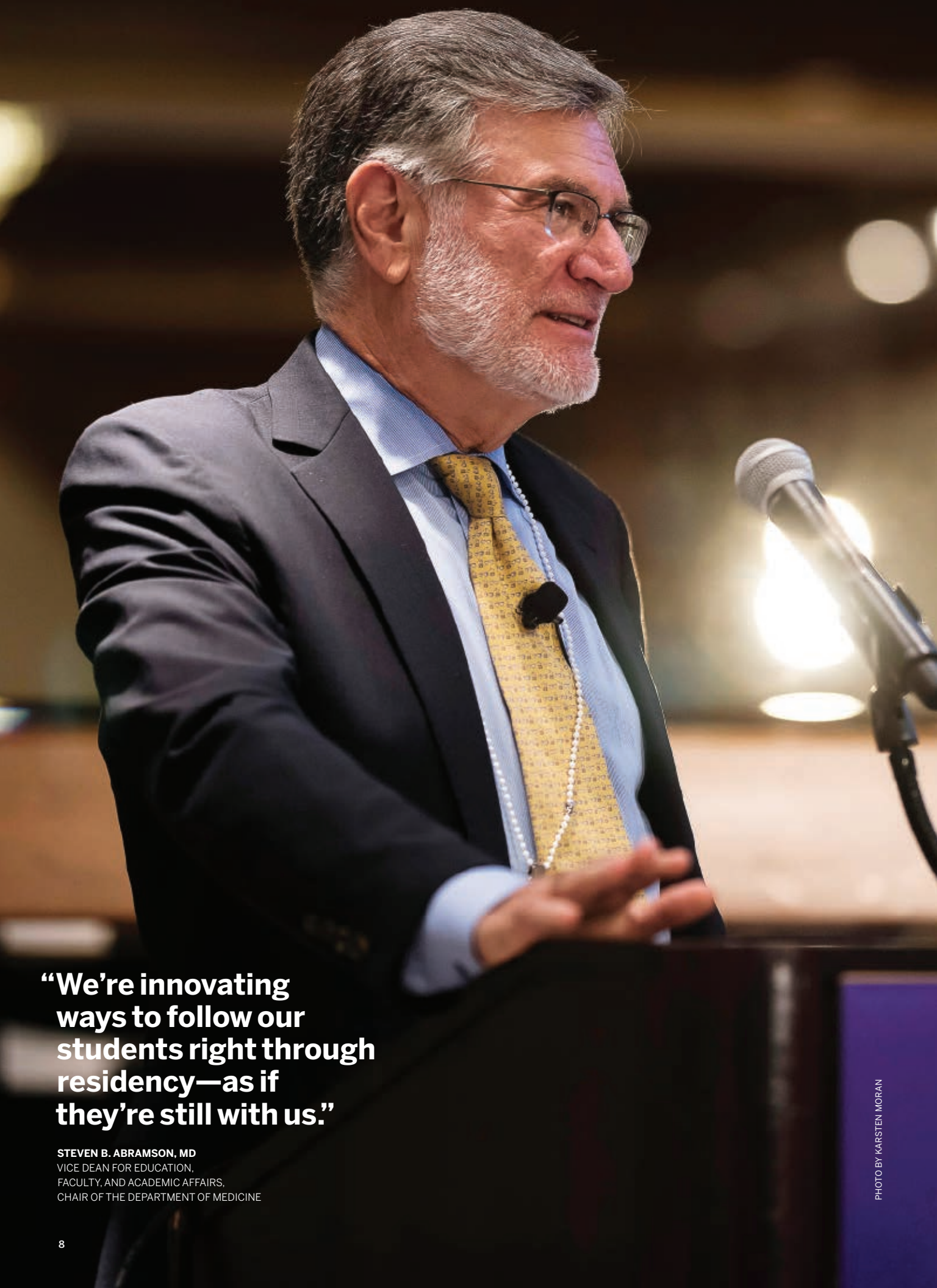


EDUCATION

TOP LEFT: PHOTO BY SASHA NALLA, TOP RIGHT: PHOTO BY KARSTEN MORAN, BOTTOM: PHOTO BY JULIANA THOMAS

Breaking down financial barriers to medical education. Harnessing technology to enhance learning. Bridging the gap between medical school and residency.

At NYU School of Medicine, it's all part of our broader mission—and responsibility—to educate tomorrow's brightest doctors.



“We’re innovating ways to follow our students right through residency—as if they’re still with us.”

STEVEN B. ABRAMSON, MD
VICE DEAN FOR EDUCATION,
FACULTY, AND ACADEMIC AFFAIRS,
CHAIR OF THE DEPARTMENT OF MEDICINE

PHOTO BY KARSTEN MORAN

How Do We Train Tomorrow's Doctors? It's Personal.

A Q&A WITH STEVEN B. ABRAMSON, MD, SENIOR VICE PRESIDENT AND VICE DEAN FOR EDUCATION, FACULTY, AND ACADEMIC AFFAIRS, AND CHAIR OF THE DEPARTMENT OF MEDICINE

HOW HAS THE CURRICULUM FOR THE 21ST CENTURY REINVENTED MEDICAL EDUCATION AT NYU SCHOOL OF MEDICINE?

Most important, we've personalized learning pathways, moving away from the model that says everybody has to study exactly the same thing at the same time. We've taken the first two years of medical school and condensed them into 18 months, freeing up a semester to allow students to do what I call "finding their major." We ask them to take an area of passion and really engage in it—do research or a scholarly project. Topics have ranged from neuroscience and molecular biology to health disparities and the business of medicine. And we've added over 10 new "selectives," rigorous courses in diverse fields that also allow students to pursue their individual interests.

HOW DO THE LEARNING PATHWAYS WORK?

We have several from which students can choose as they personalize their education. Certain students can accelerate and graduate from our Three-Year MD Pathway—their direction is clear, they know what they want to do. Or a student can opt for the traditional four-year pathway. And then there are people who want to take five years to graduate in order to get an advanced degree.

WHAT DOES A TYPICAL CLASS LOOK LIKE?

When we conceived the Curriculum for the 21st Century, one of our primary goals was to create alternative pathways to graduation beyond the traditional four-year MD degree. We've so far had great success in achieving that goal. For example, our last class consisted of 70% traditional four-year students, 13% five-year master's degree students, 12% three-year MD students, and 5% MD-PhD students. We strive for a healthy, dynamic mix that's consistent with our notion of "personalized education."

HOW ELSE IS THE REVAMPED CURRICULUM MEETING THE NEEDS OF TODAY'S MEDICAL STUDENTS AND SOCIETY?

We've tailored our curriculum to teach the science of medicine in the context of disease. For example, in the first year, students may learn in the morning about insulin and how pancreatic cells work, and that same afternoon, they're seeing patients with diabetes. We have also developed didactic programs for seven common disease areas that we call "pillars," which unfold over the course of a student's training. These "pillars" exemplify learning not only in the pathogenesis, diagnosis, and treatment of disease, but also in its genetic, environmental, and sociobehavioral determinants.

Finally, we've spent a great deal of time dealing with the challenges we face in health disparities and developing cultural sensitivity around disease. Students learn the basic and clinical science, but you can't effectively treat disease if you don't understand the cultural behaviors of people with different racial and ethnic backgrounds. You simply can't treat patients effectively without understanding the issues surrounding access to care.

YOU'RE ALSO PASSIONATE ABOUT BRIDGING THE GAP BETWEEN UNDERGRADUATE AND GRADUATE MEDICAL EDUCATION. WHY?

Right now, students finish medical school, show up at a residency program, and essentially start all over again. Not much attention is paid to the development of the individual's particular knowledge or skills as they progress into residency. How do you hand off a student from medical school to residency? What kind of portfolio do they need to carry with them? What skills have they mastered? These are the kinds of questions we want to answer to help make the transition to residency as coherent as possible. We're innovating ways to follow our students right through residency—as if they're still with us.

Helping Medical Students Graduate Sooner, and with Less Debt

MANY STUDENTS CONSIDERING CAREERS in medicine find themselves weighing the significant financial burden it imposes—and often decide on another life path. NYU School of Medicine's pioneering Three-Year MD Pathway, launched in 2013, helps keep talented aspiring doctors on course. The accelerated curriculum—the first of its kind among medical schools—allows select students to skip the fourth year entirely, saving a year's worth of tuition fees and housing costs. It also offers them a guaranteed residency spot in the specialty of their choice at NYU Langone Health. "Many new doctors begin their careers with more debt than a typical mortgage," notes Rafael Rivera, MD, associate dean for admission and financial aid. "We have an obligation to help alleviate that burden."

The potential benefits of accelerated study are substantial. By shortening their stay in medical school, students not only save tens of thousands of dollars in tuition fees and housing costs, but also launch their careers one year earlier—no small advantage considering that for some doctors, the path to practice extends for eight years beyond medical school. "People have the mistaken impression that earning the MD degree is the end of your training as a doctor, when it's essentially a ticket to the next phase of training—residency," says Steven B. Abramson, MD, senior vice president, vice dean for education, faculty, and academic affairs, and chair of the Department of Medicine.

The accelerated pathway also eases the stressful transition from medical school to residency, thanks to a special emphasis on mentorship and departmental engagement. Accelerated students spend at least one summer performing research in the department of their intended residency. "It's not simply a fast track," explains Joan F. Cangiarella, associate dean for education, faculty, and academic affairs. "Having a connection between the medical school admission process and the residency program provides a valuable opportunity to assess and follow learners across the entire continuum of undergraduate-graduate medical education." Students are given the opportunity to "opt in" for accelerated study, and can "opt out" at any time.

To ensure that the program is a good fit, NYU School of Medicine evaluates students throughout the accelerated program and follows graduates as they move through their residencies. The success of those young doctors so far has helped ease any doubts about their competency and preparedness, and has encouraged more medical schools to pursue their own accelerated programs. A recent survey of medical school deans nationwide reported that at least 35% of U.S. medical schools have or are considering developing a three-year MD program. NYU School of Medicine is in the vanguard of this trend, heading a consortium of 12 medical schools nationwide to identify and share best practices, provide opportunities for collaboration, and offer guidance to institutions considering an accelerated program.

Dean and CEO Robert I. Grossman, MD, predicts that the accelerated pathway will become "a tsunami in medical education," but he says he looks forward to the day when such a program will no longer be needed for its financial incentives. "We aspire to be a tuition-free medical school," he declares. "Achieving this goal will take time, but we're fully committed to making it happen." NYU Langone's board chair, Kenneth G. Langone, believes that the easier it is for promising, idealistic students to become doctors, the better off society will be. "By making medical education more affordable, if not free," he insists, "we put ourselves in a position to attract the very best medical students."

PHOTO BY JOSHUA BRIGHT

“By making medical education more affordable, if not free, we put ourselves in a position to attract the very best medical students.”

KENNETH G. LANGONE
CHAIR, BOARD OF TRUSTEES

“The accelerated students are already up to speed on things that a regular first-year resident can spend two years learning.”

JOHN G. GOLFINOS, MD
CHAIR OF THE DEPARTMENT OF NEUROSURGERY

A PERFECT MATCH Neurosurgery resident Travis Hill, MD, who graduated from NYU School of Medicine in three years, with mentor John G. Golfinos, MD, chair of the Department of Neurosurgery at NYU Langone Health.

Are Three-Year MD Grads Ready for Residency?

For neurosurgery residents Travis Hill, MD, and Dennis London, MD, the choice of the Three-Year MD Pathway was a no-brainer (pardon the expression). Dr. Hill, a member of the inaugural three-year class in 2016, had already earned his PhD in neuroscience from the University of California, Davis. Meanwhile, Dr. London, a graduate of the next class, who earned his undergraduate degree from Princeton University, knew his calling was neurosurgery and research since he was a teenager.

How did they feel on their first day of residency? "The learning curve is steep regardless of the path you choose," Dr. London acknowledges. "But I actually couldn't imagine having done what I did as I began my residency without the 'cushion' that the three-year program gave me. I have been involved with the Department of Neurosurgery since day one of medical school."

Dr. Hill echoes that sentiment. "It's an incredible amount of responsibility," says Dr. Hill, who recalls the intimidation of July 1: holding the pager, responding to traumas, fielding consults. "But I don't think I could have felt any more prepared—even if I'd done a fourth year. I was ready."

As to the question of competency and professionalism among accelerated learners, it's no question at all, according to John G. Golfinos, MD, chair of the Department of Neurosurgery. "Even as medical students, the Three-Year Pathway students begin to function early on like first-year residents," says Dr. Golfinos, "so they're already up to speed on things that a regular first-year resident can spend two years learning."

PHOTO BY KARSTEN MORAN

Harnessing the Power of New Technology to Transform Physician Training, Not Disrupt It

THE TERM "DISRUPTIVE TECHNOLOGY" entered our culture in 1997, when a Harvard Business School professor coined the phrase to describe a new form of technology that shakes up an industry by displacing an established one. But NYU School of Medicine actually embraced the concept more than a decade earlier, when six medical students and their faculty adviser launched the Hippocrates Project, exploring innovative ways to apply computer technologies to support medical education. Over the next 30 years, that cadre of dreamers evolved into what is now one of the largest medical education innovation groups in the country. The Institute for Innovations in Medical Education (IIME), a multidisciplinary team of 23 full-time staff and more than 30 affiliate faculty—educators, education scientists, informaticians, and developers—is not only shaking up medical education, but moving it into the 21st century.

By harnessing the power of information technology across a broad spectrum—from big-data analytics to connectivity that links people to people, people to machines, and machines to machines—the IIME is transforming the ways we teach and learn. Using analytics to individualize and personalize medical education, it takes into account each learner's unique background, experiences, and aptitude, and at the same time, makes possible a truly integrated curriculum. With ever-increasing amounts of data collected along the educational continuum, NYU School of Medicine can apply big data techniques, such as data mining and predictive modeling, to key questions about its course of study: How do elements from preclerkship and clerkship experiences connect to each other? How should students be guided in their studying? Which clinical encounters have the most impact?

"New technologies are merely a means to an end. The goal is to improve the ways we teach and learn," says Marc M. Triola, MD, director of the IIME and associate dean for educational informatics. "Paradoxically, I think computer- and web-based tools create more, not fewer, opportunities for faculty and students to interact in productive and engaging ways. They also give students more control over their education content—when, where, and how they access it, and how they organize it."

One example is iBeacons, tiny Bluetooth transmitters that are able to sense the location of the user's smartphone or iPad and transmit personalized messages to it. Working with the Morphological and Developmental Basis of Medicine faculty, the IIME has piloted iBeacons in the anatomy laboratory. When students enter the lab, the iBeacons send them proximity-aware content—the materials they will need for that session, such as PDFs, web pages, or videos. The iBeacons can even direct a student to explore specific parts of the body using 3D models of cadavers or pathology specimens, depending on the student's physical location within the lab and where they are in their coursework.

Data from students' iPads are continually collected in NYU Langone Health's Education Data Warehouse. This information, drawn from an array of sources, can be mined for strategic planning and to measure performance and competencies, but it also impacts patient care. By aligning the school's curriculum with clinical data, the IIME is closing the gap between medical education and the fast-changing world of healthcare delivery.

"We're getting a fine-grained perspective on what our learners are encountering, and we're adjusting our training accordingly," says Dr. Triola. "And for the first time, we're doing it in a data-driven way." Dr. Triola and his team are now beginning to merge their "e-learning" data with public data sources to track NYU School of Medicine graduates beyond the institution. "The untapped potential of big data to inform and improve medical education is enormous," says Dr. Triola.

PHOTO BY SASHA NIALLA

“New technologies are merely a means to an end. The goal is to improve the ways we teach and learn.”

MARC M. TRIOLA, MD
DIRECTOR OF THE IIME, ASSOCIATE DEAN
FOR EDUCATIONAL INFORMATICS

Bridging the Gap between Medical School and Residency

FEW EXPERIENCES ARE more stressful in the life of a doctor than making the leap from medical school to residency. "Right now, the model is that you finish medical school, and even though your education continues, there is no coherent transition to residency," says Steven B. Abramson, MD, vice dean for education, faculty, and academic affairs, and chair of the Department of Medicine. "The freshly minted graduate essentially starts all over again, with little attention to building upon that individual's particular knowledge and skills."

Can medical schools make that transition easier? What is the transition to residency like for accelerated learners? And how do we know that we have trained the best doctors possible, whether they have completed three or four years of medical school? These questions were front-and-center at "Rethinking the UME-GME Continuum," a conference hosted last July by NYU School of Medicine and the Consortium of Accelerated Medical Pathway Programs, convening more than 50 deans and other leaders from medical schools nationally and internationally.

"We've spent several years looking at acceleration and how to improve and enhance it," Dr. Abramson told attendees. "And one of the challenges we encounter over and over is the gap between medical school and residency." Far too often, he says, UME and GME, which set standards of competencies, appear to be speaking different languages.

To bridge that gap, guest speaker Susan E. Skochelak, MD, group vice president, medical education at the American Medical Association, issued a challenge to her fellow medical educators: "We must experiment, collaborate, innovate, and invest in faculty, data, and new platforms," she said. "And we need a uniform language around competency."

Eric Holmboe, MD, senior vice president for Milestones, Development and Evaluation, Accreditation Council for Graduate Medical Education, tackled another pain point: resident transitions. In a study called "Lost in Transition: The Experience of Impact of Frequent Changes in the Learning Environment," which Dr. Holmboe and colleagues published in the *Journal of the Academy of Medicine*, focus groups of residents, nurses, faculty, and ward staff revealed an extremely low level of faculty involvement in supporting residents through transitions. Faculty, it reported, mostly considered rotations "rites of passage." Dr. Holmboe noted that as educators think about these types of rotations, there is an imperative to always remember the patient. "We need to ask ourselves if we're preparing people sufficiently to deal with transitions in ways that are safe for patients—making sure they are getting the best care as our learners progress and develop professionally," he said.

Will medical education ever be evidence-based? That question was core to the keynote address by Louis Pangaro, MD, professor and chair of medicine at the Uniformed Services University. His answer: Yes, with the caveat that evidence-based medical training demands the aggregation of more actual evidence than has been required until now. Evidence-based medicine and medical education have a social function, Dr. Pangaro explained. It's not simply an intellectual construct. "Evidence allows understanding, and understanding based on evidence has implications as we move from theory to practice, where we make decisions for patients and for society," Dr. Pangaro said.

Regarding evaluations of students, he noted: "If we can't evaluate with consistency, transparency, and fairness, then there is no such thing as professionalism as a concept in our schools. It's all nonsense. Evaluation, and how we turn values into curriculum and assessments is professionalism. The heart of the word 'evaluation' is 'value.' We're saying we can make truthful observations—whether we're taking care of a patient with diabetes or working with a resident."

PHOTOS BY KARSTEN MORAN


UCDAVIS
SCHOOL OF MEDICINE
Accelerated Competency-Based Educa
UC Davis School of Medicine
Mark Henderson, MD, Project Team

Night-OnCall: Who Do You Trust?

The lack of trusted methods to assess readiness for residency inspired Adina L. Kalet, MD, and her team at NYU School of Medicine to develop Night-OnCall, a competency-based training module that uses standardized patients, nurses, and actual attending physicians to simulate the experience of a hectic night on call. Launched in spring 2016, the pilot program has so far been used to assess the "entrustability" of both three- and four-year medical students in their final year with a host of clinical tasks and responsibilities, commonly referred to as "entrustable professional activities" or EPAs. "We built the experiences to measure all 13 core EPAs of the Association of American Medical Colleges, either across many cases or within one case, depending on the task," explains Dr. Kalet, director of medical education research, program for medical education and technology.

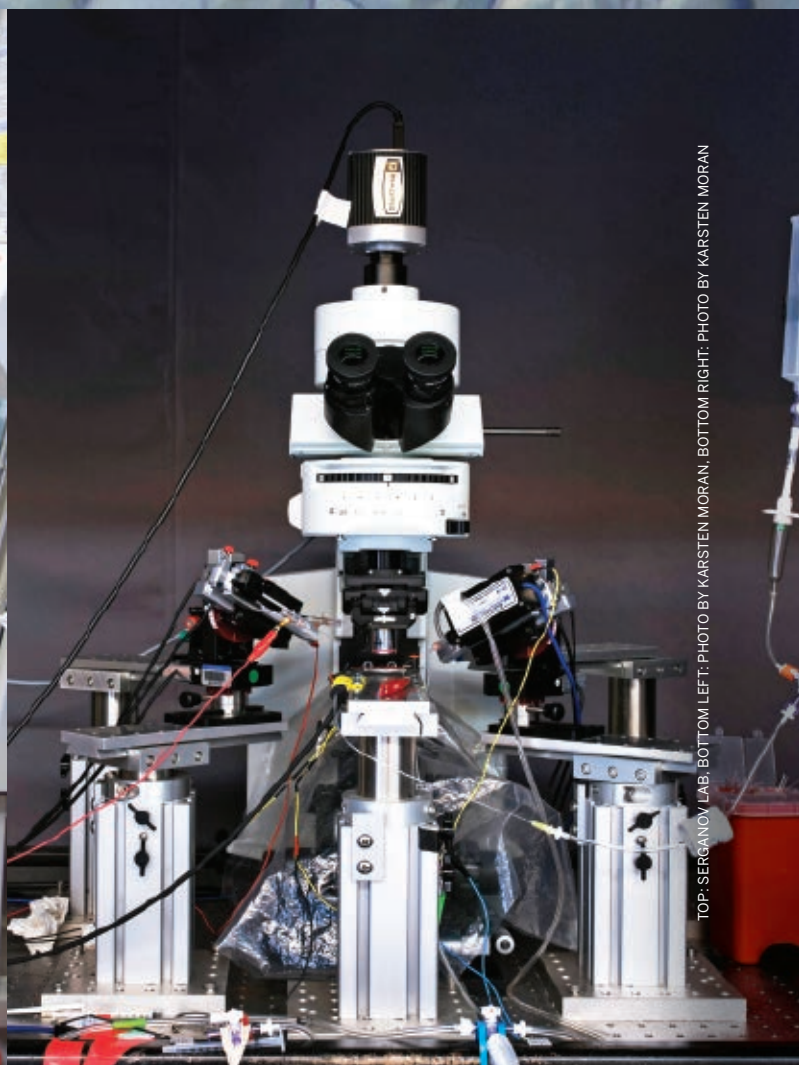
What have they discovered? There were no competency differences between student groups, save for one exception: four-year students were better at managing clinical notes. "Admittedly, we're assessing a small sample of students," says collaborator Thomas S. Riles, MD, associate dean for medical education and technology. "But with further validation, we believe that the Night-OnCall simulation will provide a reliable means of assessing preparedness for residency that can address all 13 EPAs, identify students in need of remediation, and serve as a guide for curriculum development with respect to the EPAs."

PHOTO BY ANDREW NEARY

“We believe that the Night-OnCall simulation will provide a reliable means of assessing preparedness for residency.”

THOMAS S. RILES, MD
ASSOCIATE DEAN FOR MEDICAL EDUCATION AND TECHNOLOGY

RESEARCH



TOP: SERGANOV LAB. BOTTOM LEFT: PHOTO BY KARSTEN MORAN. BOTTOM RIGHT: PHOTO BY KARSTEN MORAN

Transforming discoveries into groundbreaking medicine. Training doctors to think like scientists. Inspiring excellence in basic and clinical science.

These are just a few of the ways NYU School of Medicine empowers its researchers to investigate medicine's deepest mysteries.

“I believe that people who pursue research do so because they love it. It’s not only their vocation, but their avocation.”

DAFNA BAR-SAGI, PHD
SENIOR VICE PRESIDENT,
VICE DEAN FOR SCIENCE,
CHIEF SCIENTIFIC OFFICER

PHOTO BY SASHA NIALLA

Energy, Ingenuity and the Future of Biomedical Research

A Q&A WITH DAFNA BAR-SAGI, PHD, SENIOR VICE PRESIDENT, VICE DEAN FOR SCIENCE, AND CHIEF SCIENTIFIC OFFICER

BIOMEDICAL RESEARCH AT NYU SCHOOL OF MEDICINE HAS EXPERIENCED TREMENDOUS GROWTH IN THE PAST FIVE YEARS. WHAT'S BEHIND THIS SURGE?

Our aspiration is to be one of the most prolific biomedical research enterprises in the country, and productivity starts with talented, dynamic people. In the past five years, we have focused on recruiting investigators who can energize our institution and plant the seeds of future success. Our strategy is already reaping dividends. The size of our research faculty has nearly doubled. The new Science Building, which opens in phases starting this fall, more than doubles our research capacity. At the same time, our grant revenue is up from $196 million in 2008 to $361 million in 2017. But numbers only tell part of the story. What is really propelling us forward is a palpable sense of vitality and creativty.

WHAT'S NEXT?

We're enhancing our expertise in areas that we feel represent the future of biomedical science—human genetics, computational medicine, biomedical engineering, and immunology, among others—and we're being highly strategic about how and where we invest our resources. Technology changes at lightning speed. You can invest millions in "state-of-the-art" equipment that becomes obsolete virtually overnight. Our goal is to lead the technology curve, not follow it.

WHY IS A STRONG RESEARCH FOUNDATION SO VALUABLE TO A MEDICAL SCHOOL?

The impact of basic science on medical training can't be overstated. Next-generation medicine will rely on increasingly complex models of physiology. In turn, future doctors will need a more refined grasp of cell and molecular biology, genomics, immunology, and so on to apply the principles of personalized medicine in the clinic. In other words, doctors will need to think more like scientists, and, conversely, scientists will need a sharper understanding of clinical challenges. Our training programs help basic scientists and clinicians find common ground.

NYU SCHOOL OF MEDICINE HAS A UNIQUE MODEL FOR IDENTIFYING AND FACILITATING COMMERCIALLY VIABLE RESEARCH. HOW DOES THIS BENEFIT SCIENTISTS?

More than ever, researchers are encouraged to take their work beyond the lab and into the commercial sector. But making that leap is expensive, time-consuming, and daunting, if not overwhelming. Our Office of Therapeutics Alliances eases that burden by handling the painstaking work required to identify research with commercial potential and then advance it to the point where it can be licensed to industry partners. For researchers who want to take a more active role in the business end of their work, we've also established state-of-the-art training programs that help them learn how to commercialize and license their work.

BIOMEDICAL RESEARCH IS A CHALLENGING PURSUIT. HOW DOES NYU SCHOOL OF MEDICINE SUPPORT AND ENCOURAGE ITS INVESTIGATORS?

I believe that people who pursue research do so because they love it. It's not only their vocation, but their avocation. They could be extremely successful doing a lot of other things, but they choose to be scientists. Our role is to do everything we can to bolster and foster their curiosity, creativity, and passion—to help them fulfill their aspirations.

Part of that is breaking down barriers to collaboration. We pride ourselves on a culture of cooperation that inspires investigators to work together across disciplines and rank. By placing a premium on interdisciplinary research, and pooling ideas and resources across scientific silos, we put ourselves in the best possible position to innovate new treatments for a broad range of diseases that demand an equally broad range of expertise.

NYU Langone's Innovative Model of Drug Discovery

THE AVERAGE DRUG takes about a decade to develop, fails 90% of the time, and can cost up to $1 billion by the time it reaches FDA approval. Academic institutions traditionally lack the hefty resoures required to transform the discoveries made in their laboratories into meaningful medicine. That's where NYU Langone Health's Office of Therapeutics Alliances comes in. The OTA, as it's known, is a pioneering academic "virtual biotech" drug-discovery program that frees up investigators to do what they do best—investigate—while accelerating the pace of new drug discovery and development.

"Our goal is to reduce the risk in drug discovery, make a project much more attractive for partnership, and then hand it off to industry to prepare for FDA approval," says Robert Schneider, PhD, the Albert Sabin Professor of Microbiology and Molecular Pathogenesis, and associate dean for therapeutics alliances at NYU Langone Health.

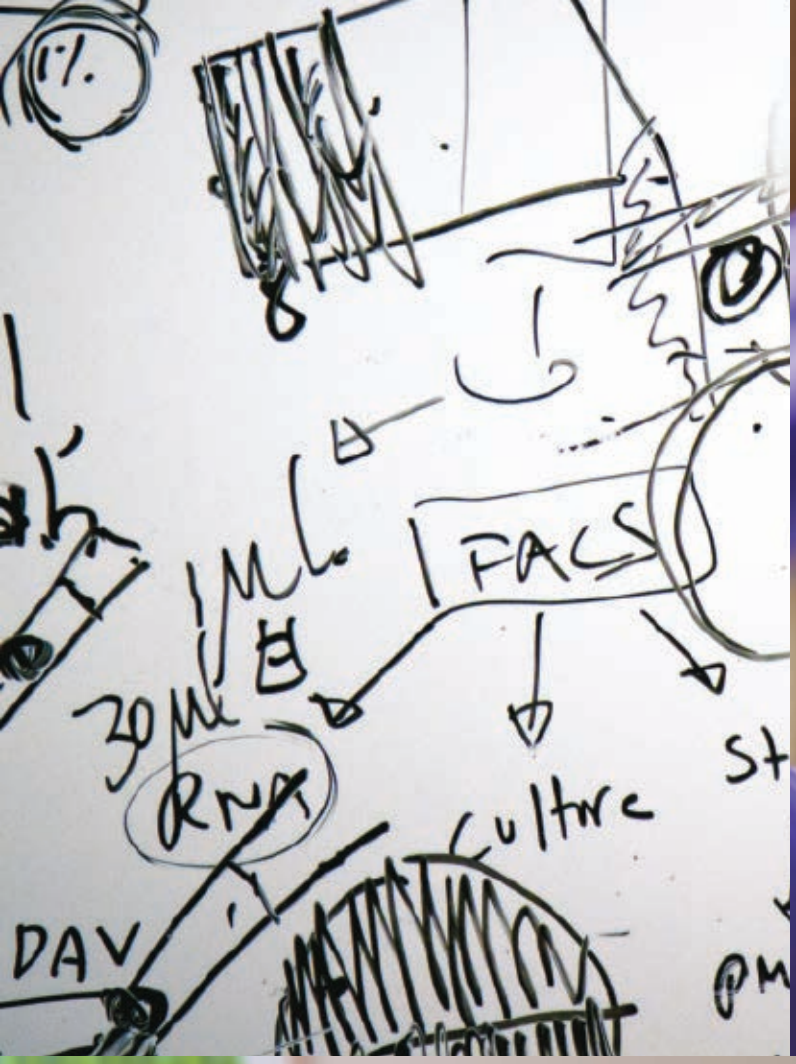
The OTA approach to drug development breaks new ground. Unlike most other academic medical centers, which attempt to develop new medications in house, the OTA focuses exclusively on translating the earliest stages of basic research—where NYU Langone scientists thrive—to early-stage drug discovery. Taking a page out of Big Pharma's playbook, it outsources the most labor-intensive parts of drug development to contract research organizations, or CROs, which can handle everything from biopharmaceutical development and biologic assay development to preclinical research and clinical-trials management—all of which eases the burden on NYU School of Medicine researchers. Then, it partners with the Office of Industrial Liaison to forge funding partnerships with venture capital firms, disease foundations, and pharmaceutical companies, among others, who can bring the science to market. "By outsourcing drug development to CROs, the best drug-discovery enterprises in the business, and painstakingly evaluating research projects for their commercial potential, we save time and money, and reduce risk," says molecular biologist Nadim Shohdy, PhD, assistant dean of therapeutics alliances, who cofounded the OTA in 2013 with Dr. Schneider.

In the past four years, the OTA has developed a robust pipeline of more than 25 new drug-discovery-and-development projects in oncology, inflammation, metabolic diseases, and neurodegenerative diseases that have led to exciting drug development. Among those projects is an early-stage drug that could lead to a new treatment for multiple sclerosis, an autoimmune disorder that attacks myelin, the fatty substance insulating nerve fibers. Advanced by James Salzer, MD, PhD, professor of neurology, and neuroscience and physiology, the drug helps repair damaged myelin and provides clinical benefit in relevant animal models. "Other drugs tamp down the immune system and slow the progression of the disease, but there's nothing that actually restores function to the nervous system," says Dr. Schneider.

Another benefit of the OTA is its ability to attract major funding for NYU Langone researchers. The office recently helped secure a $2 million grant from the National Institutes of Health to support the work of Ann Marie Schmidt, MD, PhD, the Dr. Iven Young Professor of Endocrinology and director of the Diabetes Research Program. Dr. Schmidt is developing drug candidates targeting a cell receptor known as RAGE, or receptor for advanced glycation end products, which is a key driver of vascular complications in diabetes, such as nephropathy, retinopathy, and neuropathy.

"What makes the OTA model so satisfying is that it allows researchers to capitalize on a lifetime of research and see their work benefit patients," says Dr. Schneider. "It's what researchers live for."

TOP LEFT: PHOTO BY MIKE WEYMOUTH. TOP RIGHT: PHOTO BY JULIANA THOMAS. BOTTOM: PHOTO BY KARSTEN MORAN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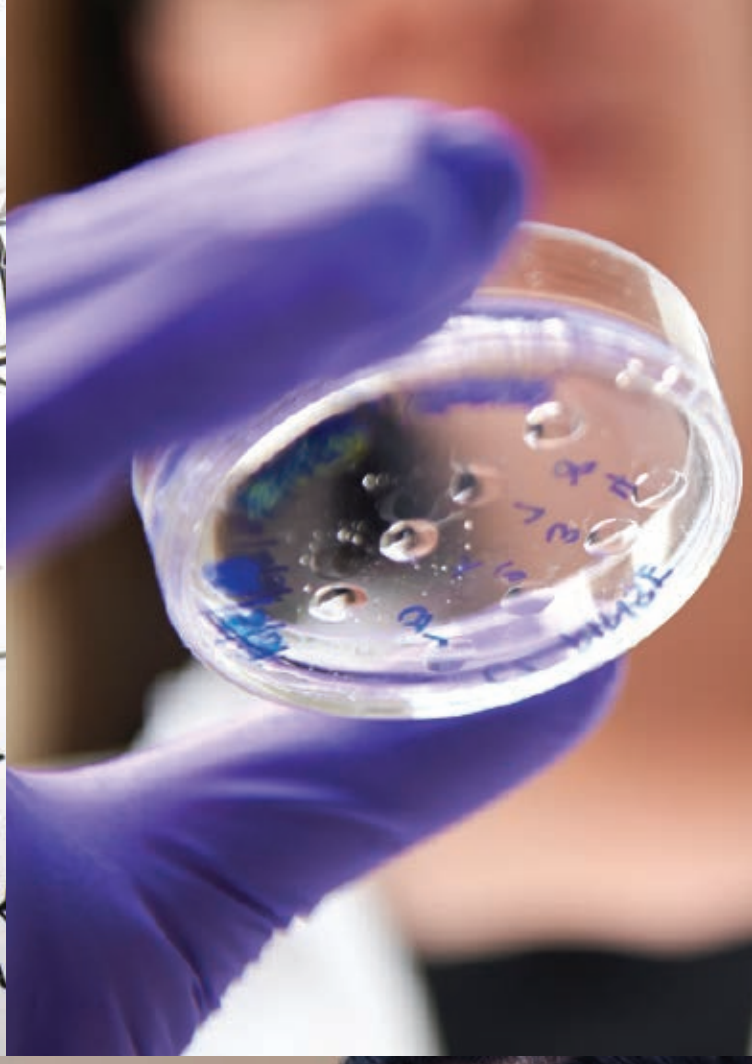
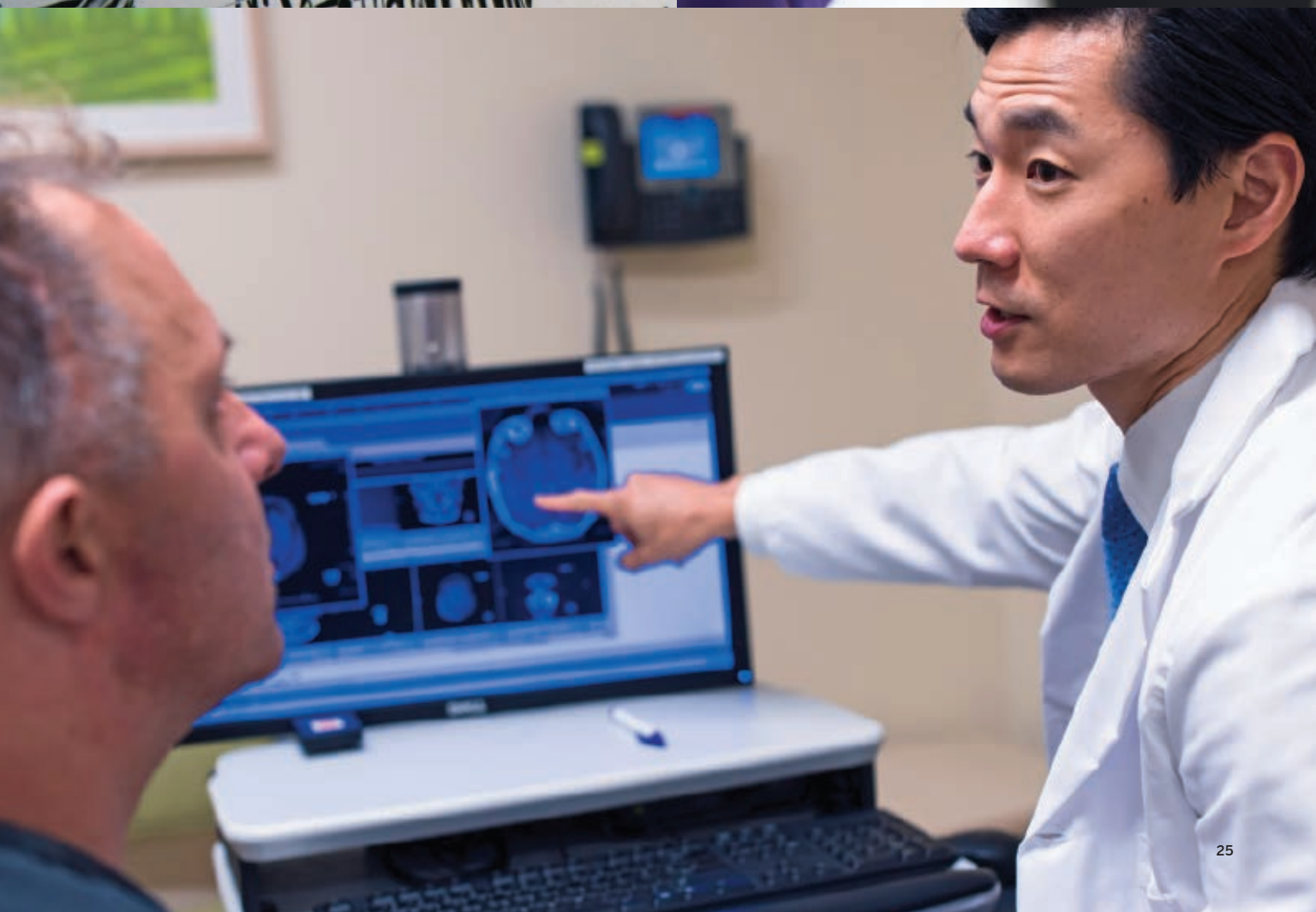




Equipping Scientists with Entrepreneurial Know-How

Historically, medical schools have struggled to help budding scientists bridge the abyss between research and commercialization. The prevailing wisdom has been that scientists should be scientists, and entrepreneurs should be entrepreneurs. But NYU School of Medicine is turning that convention on its head, to the benefit of researchers and patients alike.

The innovative Biomedical Entrepreneurship Program—developed by Robert J. Schneider, PhD, associate dean for therapeutics alliances at NYU Langone Health, and his colleague, program director Michal Gilon-Yanai—provides a thorough education for postdocs and PhD students in how to commercialize and license their work. "It surprises people, but entrepreneurship is something you can teach," says Dr. Schneider.

The yearlong program is designed to impart the skills and knowledge required to launch a successful new venture in the biomedical industry, explains Gilon-Yanai. In the fall, courses introduce participants to market research and business planning, using relevant case studies, and review the experiences of successful entrepreneurs. In the spring, project-based training helps students commercialize technologies that emerge from their own labs or are currently being patented by NYU Langone Health.

"By teaching entrepreneurship, we're enabling PhDs, postdocs, and others to effectively transmit their ideas, get others excited, and have an impact on health," says Gilon-Yanai. "That's really what entrepreneurship is all about."

PHOTO BY MIKE WEYMOUTH

“Be bold in establishing industry contacts, and take advantage of any and all resources available … There’s nothing more gratifying than seeing your research help alleviate suffering.”

JAN T. VILCEK, MD, PHD
RESEARCH PROFESSOR AND
PROFESSOR EMERITUS OF MICROBIOLOGY

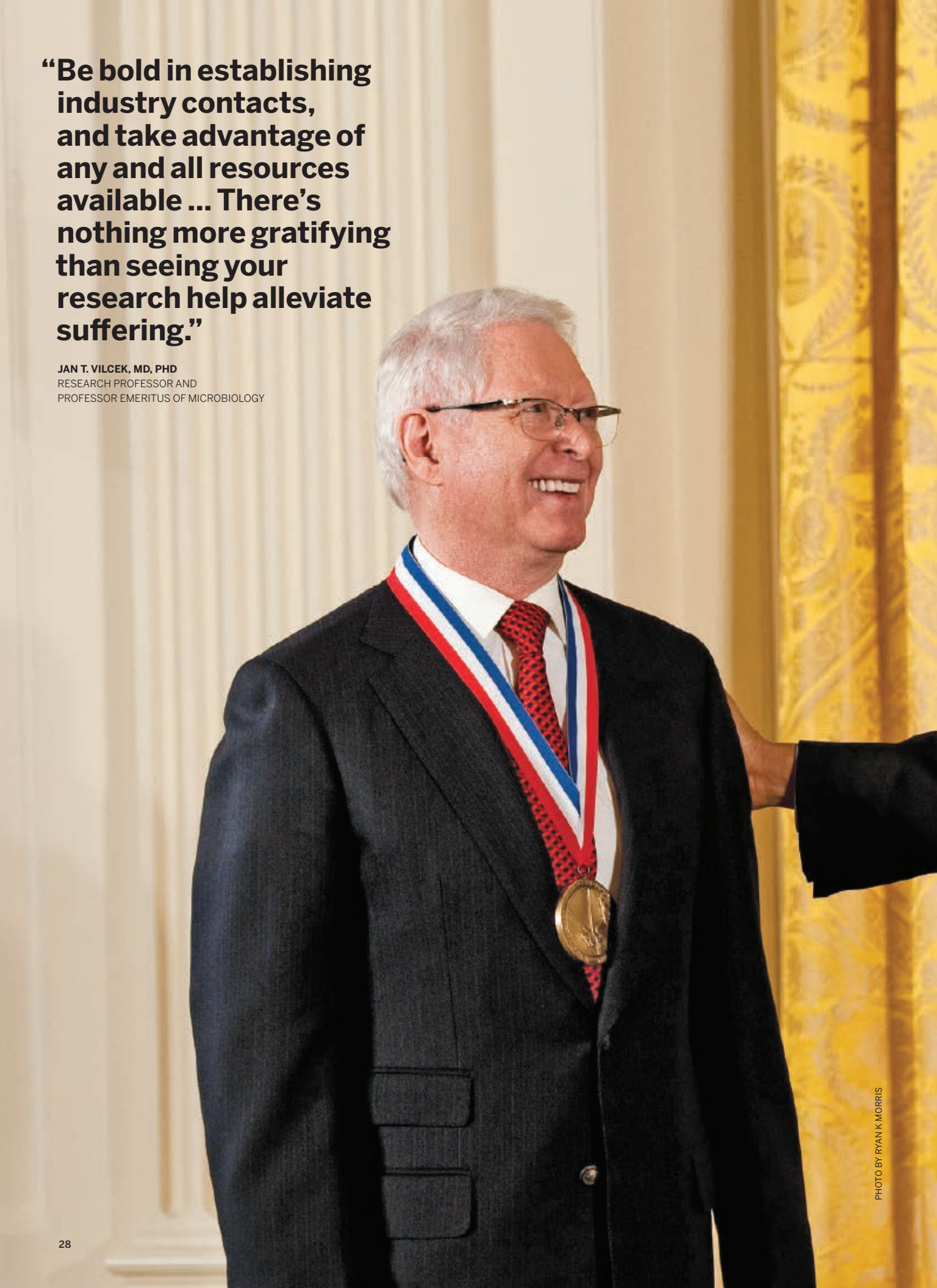


PHOTO BY RYAN K MORRIS

Jan T. Vilcek, MD, PhD, a Pioneer of Scientific Entrepreneurship

The story of Remicade, a biologic used to treat a wide range of autoimmune and inflammatory diseases, is a remarkable one. Jan T. Vilcek, MD, PhD, the microbiologist who, with his colleague Junming Le, PhD, created a monoclonal antibody that led to Remicade's development, was a penniless refugee from communist Czechoslovakia when he joined the faculty of NYU School of Medicine in 1965. The treatment his research made possible, approved by the FDA in 1998, now helps nearly 3 million people around the globe. The second-highest selling pharmaceutical product in the world, with sales exceeding $10 billion, Remicade has paved the way for several other drugs in its class.

What makes that success all the more impressive is that it was achieved without the institutional support system that's now in place to help researchers partner with industry. Typically, a drug can take a decade to develop and cost up to $1 billion before it reaches the market. To reduce the risk of early-stage drug discovery, NYU Langone Health's Office of Therapeutics Alliances, within the Office of Science and Research, works with investigators to evaluate research projects for their commercial potential, identify possible clinical paths, and advance the project to a stage suitable for licensing to a biopharma company or launching a startup company [see page 24]. Since its inception in 2013, the office has brought 24 biomedical products to market.

"In the 1980s, there was no mechanism for such collaboration," explains Dr. Vilcek, who was awarded the National Medal of Technology and Innovation in 2013 [at left]. "Translational medicine and scientific entrepreneurship did not exist, so I had to make my own contacts. I encourage younger people to be bold in establishing industry contacts, and take advantage of any and all resources available. I've received hundreds of emails from patients who've benefitted from Remicade. There's nothing more gratifying than seeing your research help alleviate suffering."

"NYU School of Medicine supports physician-investigators like me at the earliest stages of research, when it's too early to think about commercialization, but with an eye to eventual commercialization."

GEORGE MILLER, MD
HEPATOBILIARY SURGEON,
CANCER RESEARCHER,
ENTREPRENEUR

PHOTO BY KARSTEN MORAN

Case Study in Entrepreneurship

INVESTIGATOR: George Miller, MD, vice chair for research, Department of Surgery, hepatobiliary surgeon, cancer researcher

PRODUCT: Monoclonal antibodies targeting newly discovered immunosuppressive mechanisms in pancreatic cancer

Dr. George Miller's landmark research in pancreatic ductal carcinoma, among the toughest malignancies to treat, illuminates the inflammatory mechanisms that suppress the immune system and allow deadly tumors to evade the body's natural defenses. Could disrupting those mechanisms keep cancer in check? That's the big idea behind Nybo Therapeutics, a biotech launched by Boston-based PureTech Health. Last year, the start-up worked with NYU School of Medicine's tech-transfer programs to license Dr. Miller's immuno-oncology technology. The goal: to develop novel therapeutics to block immunosuppression in pancreatic cancer, colorectal cancer, and other solid tumors. "NYU School of Medicine helps physician-investigators like me recognize the commercial potential of our work, even at the earliest stages of research, when medical applications may seem distant," says Dr. Miller.

“Dr. Walker knew the biomechanical design and I had the clinical expertise, but we needed an industry partner.”

JOSEPH BOSCO, MD
SPECIALTIES: ORTHOPEDIC SURGERY, SPORTS MEDICINE, HIP & KNEE RECONSTRUCTION

Case Study in Entrepreneurship

INVESTIGATORS: Joseph Bosco, MD, professor and vice chair, Department of Orthopedic Surgery, orthopedic surgeon; and Peter S. Walker, PhD, research professor, Department of Orthopedic Surgery

PRODUCT: Early Intervention Knee replacement

In 2010, Drs. Bosco and Walker saw an opportunity to improve the quality of life for patients with early osteoarthritis of the knee, at relatively low cost. Their solution: a partial knee replacement called the Early Intervention Knee, consisting of uniquely designed femoral and tibial components that are implanted in an outpatient surgical setting.

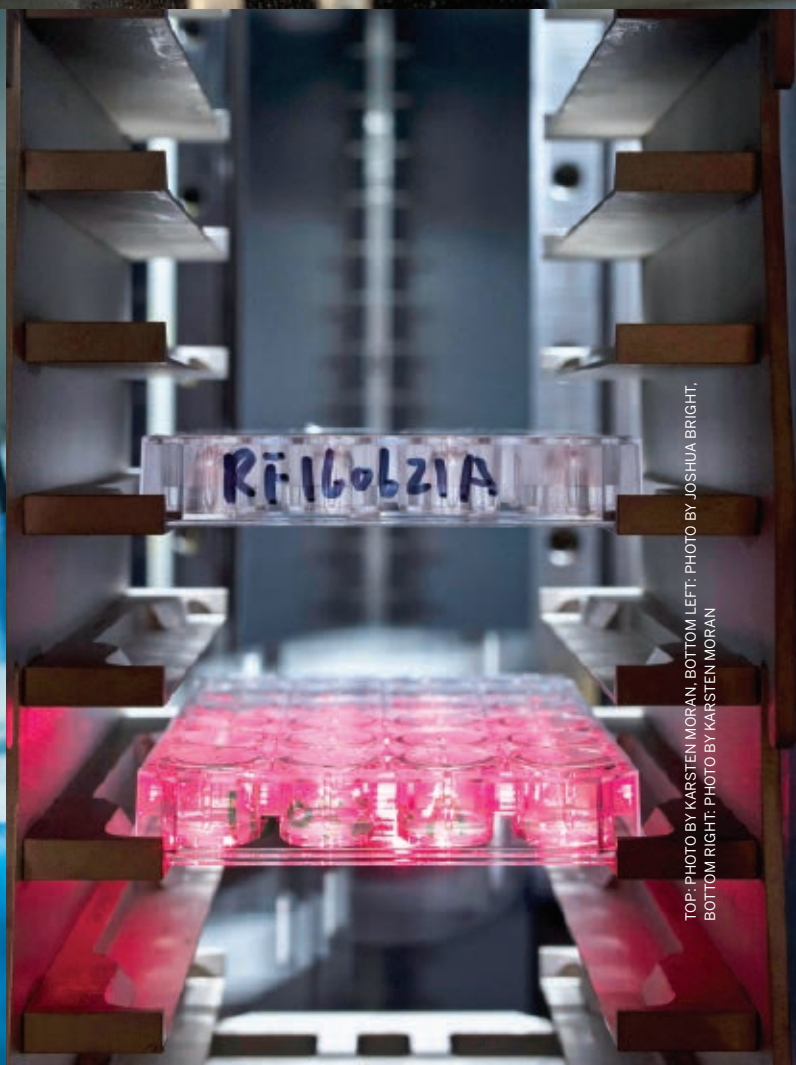
"Dr. Walker knew the biomechanical design and I had the clinical expertise, but we needed an industry partner to bring our device to market," explains Dr. Bosco. "Neither of us had the entrepreneurial expertise in raising money for testing and dealing with regulatory agencies."

NYU Langone Health's Office of Therapeutics Alliances stepped in, helping Drs. Bosco and Walker obtain four patents, which are jointly owned by NYU Langone and the surgeons, and establish Genovel Orthopedics in 2014 to bring the device to market.

PHOTO: ©BUCK ENNIS/CRAIN'S NEW YORK BUSINESS

“The work of clinician-scientists forms the base of evidence for so much of medicine.”

JUDITH S. HOCHMAN, MD
CO-DIRECTOR,
CLINICAL AND TRANSLATIONAL
SCIENCE INSTITUTE



TOP: PHOTO BY KARSTEN MORAN. BOTTOM LEFT: PHOTO BY JOSHUA BRIGHT. BOTTOM RIGHT: PHOTO BY KARSTEN MORAN

Training Young Doctors to Think Like Scientists

ALMOST EVERY PATIENT can inspire a research question, but not every doctor has the time or training required to investigate it. In 2014, a survey by the National Institutes of Health found that less than 1.5% of the estimated 1 million practicing physicians in the U.S. reported research as their primary focus. At the same time, the number of physician-scientist faculty members with NIH funding has steadily declined since the late 90s.

Consistent cuts to federal funding, lower pay versus clinical care, and a constant struggle to balance lab time and clinic hours are all to blame. "It's more and more of a struggle to keep physicians in research," says Judith S. Hochman, MD, the Harold Snyder Family Professor of Cardiology, senior associate dean for clinical sciences, and co-director of NYU School of Medicine's Clinical and Translational Science Institute (CTSI). "Yet the work of clinician-scientists forms the base of evidence for so much of medicine."

As an antidote, NYU School of Medicine has cultivated a host of unique programs and strategies, highlighted below, to help doctors combine their clinical perspective with scientific insight. "The support of budding physician-scientists is central to our mission," says Bruce N. Cronstein, MD, co-director of the CTSI. "It's at the core of who we are."

- The *Clinical Investigator Program in Internal Medicine* is an innovative program that provides in-depth training and intense mentoring for physicians who plan academic careers involving translational, clinical, and population-based research.

- A *master's program* in clinical research equips medical students with the tools they need to investigate the complex questions that arise in the clinic. The program tacks on an extra year of training to medical school but at no cost to the student—tuition is free. "It's a real benefit we can offer our students," says Dr. Cronstein. This same master's degree program is also open to house staff, fellows, and junior faculty who are pursuing careers in research.

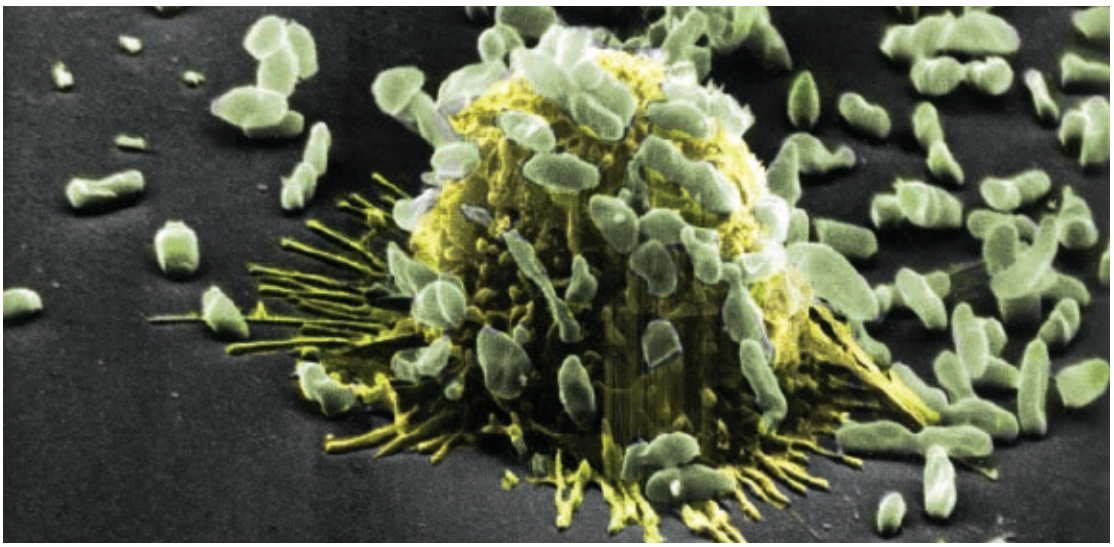
- The *Collaborative Translational Pilot Project Program* awards funds to support a one-year collaborative scientific study to produce the kind of high-quality preliminary data that wins competitive grants in translational research.

- The *Research Studio Program* offers young investigators the opportunity to bounce their early protocols off a panel of experts before submitting them to funding agencies or journals. "Young researchers really do need the help," says Dr. Cronstein.

- Funding from Doris Duke Foundation's *Fund to Retain Clinical Scientists* supports more than 250 early-career physician-scientists at NYU School of Medicine who face substantial extra-professional demands such as child care and elder care. The fund, dispersed among just 10 medical schools nationwide, aims to reverse a discouraging statistic: An estimated 40% of young physicians with full-time faculty appointments at academic medical schools leave academia within 10 years. "The program seeks to support outstanding junior physician-scientists for whom a relatively small investment over a two-year period promises to substantially minimize the likelihood that they will change their career path owing to the demands of extra-professional caregiving obligations, such as child or elder care," explains Dr. Hochman.

Matching the Biggest Mysteries with the Brightest Minds

NYU School of Medicine's cadre of more than 400 researchers is tackling medicine's toughest challenges, from obesity to organ transplantation, through cross-discipline collaboration and creative problem solving. It's a simple formula that continues to yield extraordinary results. Here are just a few examples of the stellar science our investigators reported in 2017.



BIG EATERS A human macrophage ingesting bacteria.

Finding the Molecular Link between Obesity, Diabetes, and Atherosclerosis

TWO-THIRDS OF AMERICANS are overweight or obese, conditions that fuel diabetes and heart disease. "Unfortunately, people with obesity and diabetes overwhelmingly die of heart disease," explains Edward A. Fisher, MD, PhD, a clinician-scientist whose research focuses on atherosclerosis, the leading cause of heart attacks. "These three conditions likely share molecular mechanisms." With a five-year, $12 million grant from the National Heart, Lung, and Blood Institute, Dr. Fisher and his colleagues at NYU School of Medicine,

THIS PAGE: PHOTO BY DAVID M. PHILLIPS / SCIENCE SOURCE.
OPPOSITE PAGE: PHOTOS BY JOHN ABBOTT & KARSTEN MORAN

Obesity, diabetes, and atherosclerosis can turn macrophages against the body. "An exciting possibility is that we might one day find a magic bullet that lets us kill three birds with one therapeutic stone."

EDWARD A. FISHER, MD, PHD
LEON H. CHARNEY PROFESSOR OF CARDIOVASCULAR MEDICINE AND DIRECTOR OF THE CENTER FOR THE PREVENTION OF CARDIOVASCULAR DISEASE

CANCER FOES Iannis Aifantis, PhD, and Benjamin G. Neel, MD, PhD, of the Perlmutter Cancer Center shed new light on vitamin C.

Kathryn Moore, PhD, the Jean and David Blechman Professor of Cardiology, and Ann Marie Schmidt, MD, PhD, the Dr. Iven Young Professor of Endocrinology, are zooming in on the particular role of the macrophage, a type of white blood cell.

Under healthy conditions, macrophages serve as the immune system's early responders, engulfing and digesting pathogens. But obesity, diabetes, and atherosclerosis can turn macrophages against the body. "As obesity leads to diabetes, macrophages in fat tissue become very active, angry and inflamed, making the diabetes worse," Dr. Fisher explains. "Something similar happens in atherosclerotic plaques. The macrophages start damaging the arteries."

Drs. Fisher, Moore, and Schmidt have individually been working for years to understand the role macrophages play in atherosclerosis, obesity, and diabetes. Over the next five years, using mouse models, this trio will pool their efforts, seeking factors that activate or repress macrophage inflammatory activity in each disease. "An exciting possibility is that we might one day find a magic bullet that lets us kill three birds with one therapeutic stone," says Dr. Fisher.

High-Dose Vitamin C Fights Certain Types of Blood Cancers

SCIENTISTS HAVE BEEN investigating the anti-cancer potential of high-dose Vitamin C for decades. Now researchers at NYU Langone's Laura and Isaac Perlmutter Cancer Center have reported that

the vitamin might help block the progression of some blood-borne cancers by preventing a chain of molecular reactions that stimulate the runaway growth of abnormal cells.

"This study adds a brand new strategy to our list of potential treatment approaches," says corresponding author Iannis Aifantis, PhD, professor and chair of the Department of Pathology at NYU Langone Health. An enzyme called TET2 helps oversee the normal maturation of precursor blood cells. But a mutated form of the enzyme, prevalent in some leukemias and other cancers, traps the cells in perpetual immaturity and allows them to proliferate uncontrollably. In mice genetically engineered with a TET2 mutation, the NYU School of Medicine team was able to correct the deficiency by treating the animals intravenously with high-dose vitamin C. The experimental method, recently described in the journal *Cell*, also suppressed implanted human leukemia cells and could eventually complement existing anti-cancer strategies.

"We're excited by the prospect that high-dose vitamin C might become a safe and effective supplemental treatment option for these blood diseases," says corresponding author Benjamin G. Neel, MD, PhD, director of the National Cancer Institute-designated Laura and Isaac Perlmutter Cancer Center at NYU Langone Health.

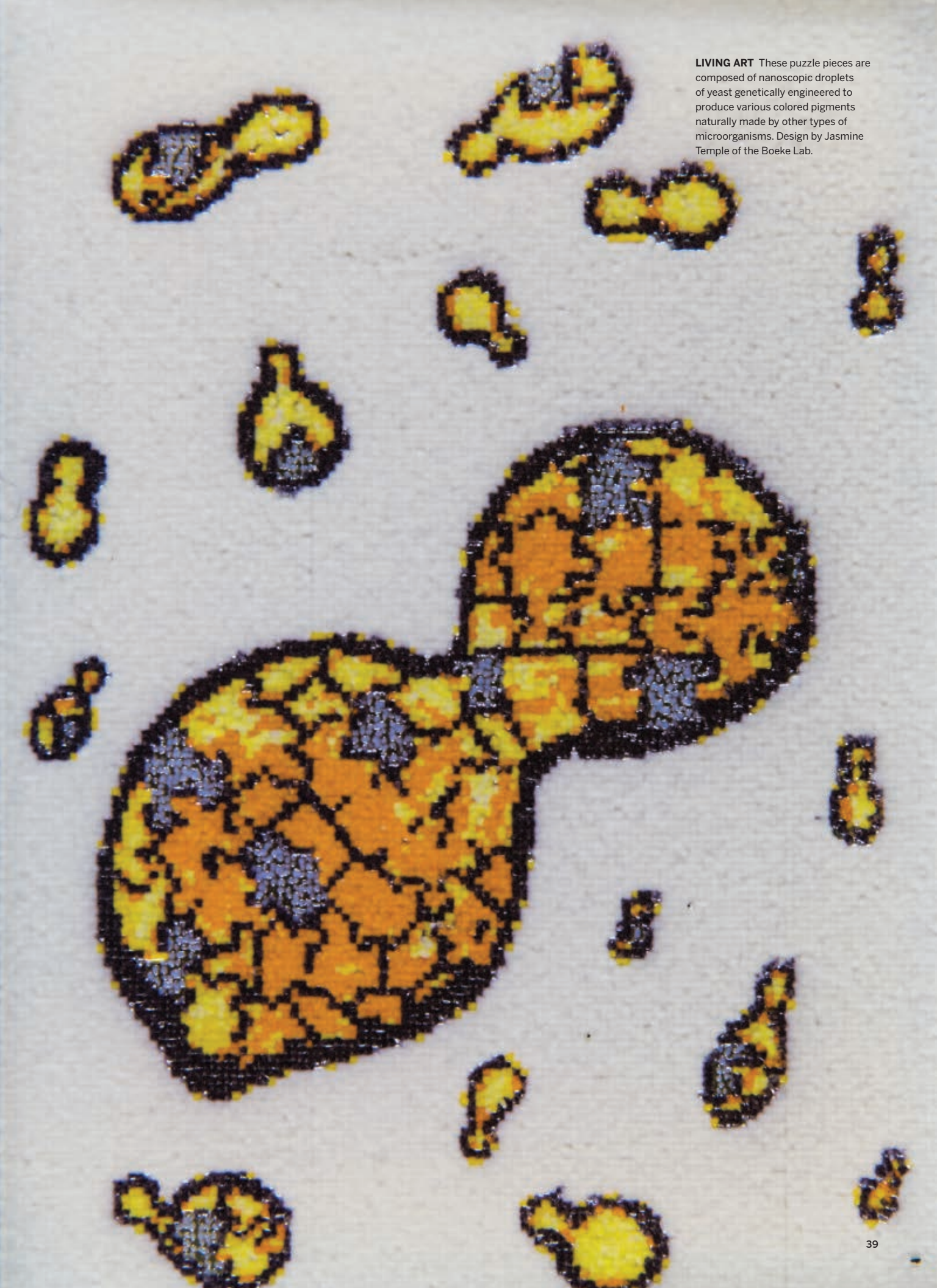
A Pioneering Project Synthesizes Functional Chromosomes from Scratch

ROUGHLY HALF OF THE HUMAN GENOME is composed of repetitive DNA stretches that can be cut and pasted into new locations. Jef Boeke, PhD, is clarifying how some of these plug-and-play bits of DNA can move and influence development and diseases such as cancer.

His lab's in-depth knowledge of DNA guides its major new direction: redesigning or synthesizing chromosomes and genomes from scratch. To that end, Dr. Boeke, director of the Institute for Systems Genetics, is leading an international project to construct the 12 million DNA letters of the baker's yeast genome. Last March, in a landmark package of seven papers published in *Science*, his team of more than 200 scientists worldwide announced the successful synthesis of 5 of the 16 chromosomes that make up the yeast species *S. cerevisiae*. "This work sets the stage for completion of synthetic genomes to address unmet needs in medicine and industry," says Dr. Boeke, professor of biochemistry and molecular pharmacology. "Beyond any one application, the papers confirm that newly created systems and software can answer basic questions about the nature of genetic machinery by reprogramming chromosomes in living cells."

In a related initiative called Genome Project-Write, Dr. Boeke and team aim to assemble the 3 billion DNA letters of the human genome, as well as other organisms' genomes, from their individual parts. To facilitate such work, he has established the GenomeFoundry@ISG to automate critical steps in DNA writing. One of the major goals, Dr. Boeke says, is to encourage new technology that can dramatically reduce the cost of synthesizing large DNA segments. Building genes and genomes and analyzing them in cells, he adds, may allow scientists to compare genetic variants and understand which sequences contribute to health and disease.

And, finally Dr. Boeke is also collaborating with NYU Langone's Transplant Institute and other researchers to grow human organs in pigs—a forward-thinking effort to help alleviate a critical organ shortage that kills 20 people a day.



LIVING ART These puzzle pieces are composed of nanoscopic droplets of yeast genetically engineered to produce various colored pigments naturally made by other types of microorganisms. Design by Jasmine Temple of the Boeke Lab.

NEW PEOPLE

The list of distinguished faculty recruited for key clinical and research positions in 2017—still growing beyond those featured below—is just one measure of the institution's dramatic expansion and drive for excellence.



CANCER

Ahmad Samer Al-Homsi, MD, a hematologist-oncologist, was appointed director of the Blood and Marrow Transplant Program at the Laura and Isaac Perlmutter Cancer Center. Previously, he cofounded the Blood and Marrow Transplant Program at Spectrum Health in Michigan.

Leena Gandhi, MD, PhD, a thoracic cancer specialist and researcher, was appointed director of thoracic medical oncology at the Laura and Isaac Perlmutter Cancer Center. Previously, she served at the Dana-Farber Cancer Institute, Brigham and Women's Hospital, and Harvard Medical School.

Ophira Ginsburg, MD, was appointed inaugural director of the High Risk Cancer Program at the Laura and Isaac Perlmutter Cancer Center. Previously, she was director of a cancer genetics program at the University of Toronto.

Shohei Koide, PhD, a leader in protein engineering, was named inaugural director of an innovative new biologics research program at the Laura and Isaac Perlmutter Cancer Center. Previously, he served as director of a biomolecular nuclear resonance facility at the University of Chicago.

Douglas A. Levine, MD, a surgeon and researcher, was appointed director of the Division of Gynecologic Oncology at the Laura and Isaac Perlmutter Cancer Center and director of the Department of Obstetrics and Gynecology. Previously, he was head of the Gynecology Research Laboratory at Memorial Sloan Kettering Cancer Center.

Diane M. Simeone, MD, a pancreatic cancer surgeon and researcher, was appointed director of the new Pancreatic Cancer Center and associate director of translational research at the Laura and Isaac Perlmutter Cancer Center. Previously, she served as director of the gastrointestinal oncology program at the University of Michigan's Comprehensive Cancer Center.

Jeffrey S. Weber, MD, PhD, an immunotherapy expert, was appointed deputy director of the Laura and Isaac Perlmutter Cancer Center, overseeing its work in experimental therapeutics. Previously, he served as director of the Donald A. Adam Comprehensive Melanoma Research Center at the H. Lee Moffitt Cancer Center in Tampa, Florida.

Theodore H. Welling III, MD, a liver cancer surgeon, has been appointed director of the new Liver Tumor Program at the Laura and Isaac Perlmutter Cancer Center. Previously, he served as codirector of the Multidisciplinary Liver Tumor Program at the University of Michigan Health System.

Kwok-Kin Wong, MD, PhD, an expert on the genetic and environmental causes of lung cancer, was appointed chief of hematology and medical oncology. Previously, he served at Harvard Medical School and the Dana-Farber Cancer Institute.

CARDIOTHORACIC SURGERY

Robert J. Cerfolio, MD, a pioneering thoracic surgeon who specializes in robotic procedures, was appointed chief of clinical thoracic surgery and the inaugural director of the Lung Cancer Center at the Laura and Isaac Perlmutter Cancer Center. Previously, he was chief of thoracic surgery at the University of Alabama Hospital at Birmingham.

CHILD AND ADOLESCENT PSYCHIATRY

Helen Egger, MD, a child psychiatrist and researcher, was appointed chair of the Department of Child and Adolescent Psychiatry and director of the Child Study Center. Previously, she served as chief of the Division of Child and Family Mental Health and Developmental Neuroscience and vice chair for Integrated Pediatric Mental Health in the Department of Psychiatry and Behavioral Sciences at Duke University Medical Center.

COMPUTATIONAL MEDICINE

Itai Yanai, PhD, a genetics researcher, was appointed inaugural director of the Institute for Computational Medicine, a hub for multidisciplinary efforts to reveal patterns in medical data that aid in the diagnosis and treatment of diseases. Previously, he served on the biology faculty at Technion–Israel Institute of Technology.

GASTROENTEROLOGY

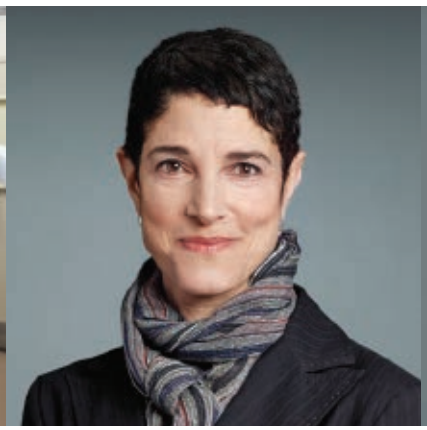
George G. Abdelsayed, MD, was appointed chief of gastroenterology and hepatology at NYU Langone Hospital–Brooklyn. Previously, he served as director of gastroenterology and hepatology at Staten Island University Hospital.

Ira Jacobson, MD, an expert in liver disease whose research has been instrumental in the global development of antiviral therapy for viral hepatitis, was appointed director of hepatology in the Division of Gastroenterology. Previously, he served as chair of the Department of Medicine at Mount Sinai Beth Israel.

GENERAL SURGERY

Feza Remzi, MD, a leader in the surgical treatment of inflammatory bowel disease and other complex colorectal conditions, was appointed director of the Inflammatory Bowel Disease Center. Previously, he served as chair of the Department of Colorectal Surgery at the Cleveland Clinic.

Josef A. Shehebar, MD, was appointed chief of the Division of Colorectal Surgery at NYU Langone Hospital–Brooklyn. Previously, he served as an attending surgeon at Morristown Medical Center in New Jersey.


NEUROLOGY

Jennifer A. Frontera, MD, a neurointensivist and stroke specialist, was appointed chief of neurology at NYU Langone Hospital–Brooklyn. Previously, she served at the Cleveland Clinic, where her research focused on the immediate effects of a ruptured aneurysm on the brain.

Lawrence Newman, MD, an expert in headache medicine, was appointed director of the Division of Headache Medicine in the Department of Neurology, leading one of the few fellowship-accredited programs in this field. Previously, he served as director of the Headache Institute at St. Luke's Roosevelt Hospital and Beth Israel Medical Center.

ORTHOPEDICS

Pablo G. Castañeda, MD, an expert in pediatric and adolescent hip conditions, was appointed chief of the Division of Pediatric Orthopedic Surgery in the Department of Orthopedic Surgery. Previously, he served on the faculty of the National Autonomous University of Mexico.

OTOLARYNGOLOGY-HEAD AND NECK SURGERY

Seth Kaplan, MD, was appointed chief of otolaryngology–head and neck surgery at NYU Langone Hospital–Brooklyn. Previously, he completed a fellowship in laryngology–professional voice and swallowing disorders at the Cleveland Clinic.

PEDIATRIC ENDOCRINOLOGY

Mary Pat Gallagher, MD, a pediatric endocrinologist, was appointed the inaugural director of the Robert I. Grossman, MD, and Elisabeth J. Cohen, MD, Pediatric Diabetes Center. She previously served as codirector of the pediatric diabetes program at the Naomi Berrie Diabetes Center at Columbia University Medical Center.

PLASTIC SURGERY

Rachel Bluebond-Langner, MD, a plastic surgeon who specializes in gender-affirming procedures, was appointed the Laura and Isaac Perlmutter Associate Professor of Reconstructive Plastic Surgery in the Hansjörg Wyss Department of Plastic Surgery. Previously, she served in the Division of Plastic and Reconstructive Surgery at University of Maryland School of Medicine.

PSYCHIATRY

W. Gordon Frankle, MD, an expert on schizophrenia, was appointed chief of psychiatry at NYU Langone Hospital–Brooklyn. Previously, he served as chief of psychiatry at Rutland Regional Medical Center in Vermont.

PULMONARY, CRITICAL CARE, AND SLEEP MEDICINE

Ravindra C. Rajmane, MD, an expert in critical-care ultrasonography, was appointed chief of pulmonary, critical care, and sleep medicine at NYU Langone Hospital–Brooklyn. Previously, he completed a fellowship in pulmonary and critical-care medicine at St. Vincent's Catholic Medical Center.

REHABILITATION MEDICINE

Jeffrey S. Fine, MD, was appointed chief of rehabilitation medicine at NYU Langone Hospital–Brooklyn. Previously, he served as regional director for rehabilitation services at Elmhurst and Queens Hospital Centers and associate program director at the Icahn School of Medicine at Mount Sinai.

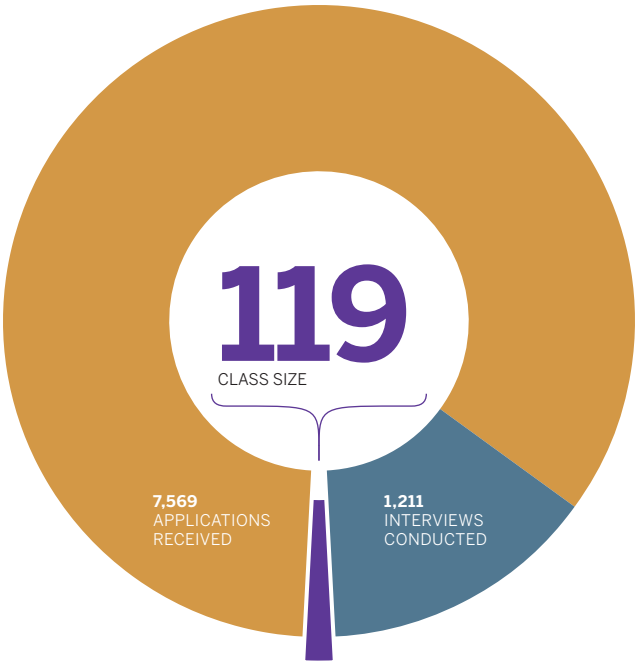
TRANSPLANT SURGERY

Robert A. Montgomery, MD, DPhil, a pioneering kidney transplant surgeon, was appointed inaugural director of the Transplant Institute. Previously, he served as chief of the Division of Transplantation at The Johns Hopkins Hospital, where he was director of the Comprehensive Transplant Center and the Incompatible Kidney Transplant Program.

UROLOGY

Frederick A. Gulmi, MD, was appointed chief of urology at NYU Langone Hospital–Brooklyn. Previously, he served as chair of urology at Brookdale University Hospital and Medical Center.

ENTERING CLASS OF 2017



3.93
MEDIAN GPA

521
MCAT MEDIAN (99TH PERCENTILE)

21%
UNDERREPRESENTED IN MEDICINE

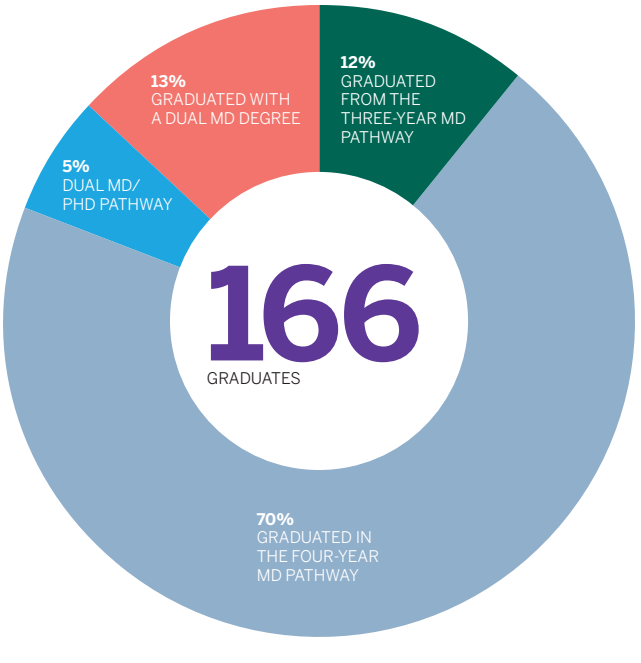
50%
FEMALE

MATCH DAY 2017

75%
OF STUDENTS MATCHED TO SCHOOLS AND HOSPITALS RANKED IN THE TOP 25 BY *U.S. NEWS & WORLD REPORT*

#12
In the Nation
U.S. News & World Report
Best Medical Schools for Research

GRADUATING CLASS OF 2017



243
AVERAGE USMLE STEP 1 SCORE

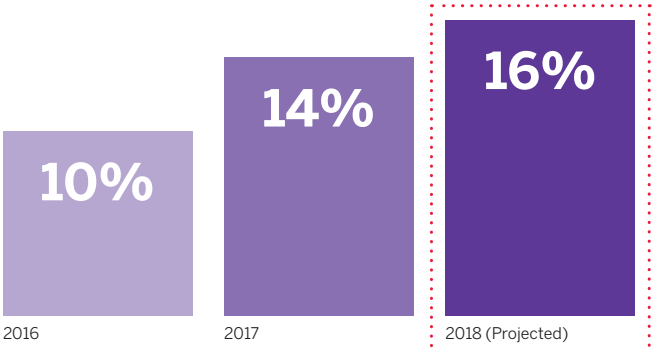
30
MEMBERS OF THE CLASS OF 2017 INDUCTED INTO ALPHA OMEGA ALPHA, NATIONAL MEDICAL HONOR SOCIETY

GRADUATE MEDICAL EDUCATION

1,327
RESIDENTS AND FELLOWS

TRENDS IN ACCELERATED LEARNING

Percentage of MD Graduates Earning a Degree in Three Years



RESEARCHERS

481
RESEARCH FACULTY

421
POSTDOCTORAL FELLOWS

31
NEW RESEARCH-FOCUSED FACULTY

263
PHD CANDIDATES

FACULTY HONORS

5
Howard Hughes Medical Institute Investigators

10
Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine (formerly Institute of Medicine) Members

10
National Academy of Sciences Members

11
American Academy of Arts and Sciences Members

18
American Association for the Advancement of Science Fellows

NYU TECHNOLOGY VENTURES AND ALLIANCES*

+$1B
TOTAL AMOUNT RAISED BY STARTUPS

779
PATENTS ISSUED

#1
IN LICENSE INCOME OVER THE PAST 10 YEARS

24
BIOMEDICAL PRODUCTS BROUGHT TO MARKET

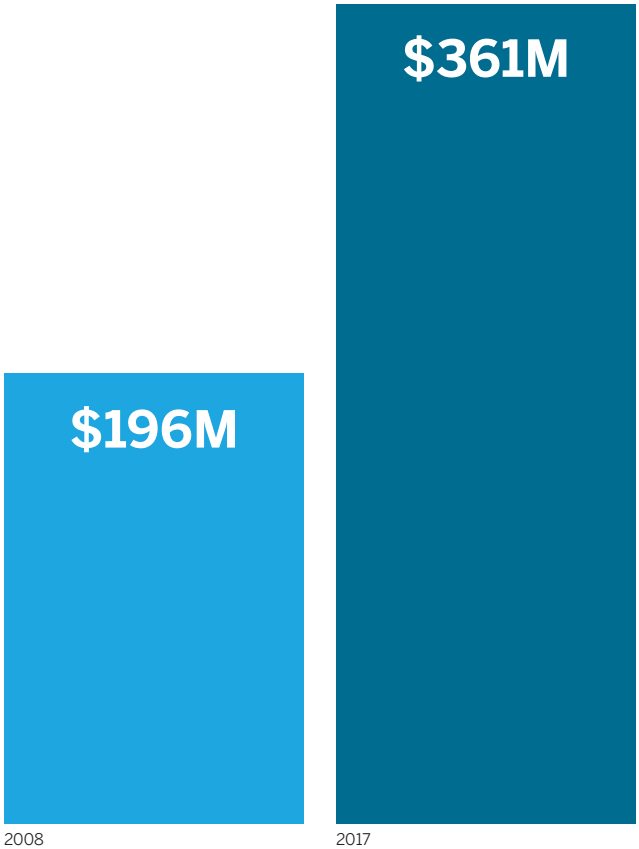
69
STARTUPS FORMED

186
LICENSES SIGNED IN THE PAST FIVE YEARS

**These numbers are cumulative and exclude other NYU schools*

FUNDING

Total Grant Revenue



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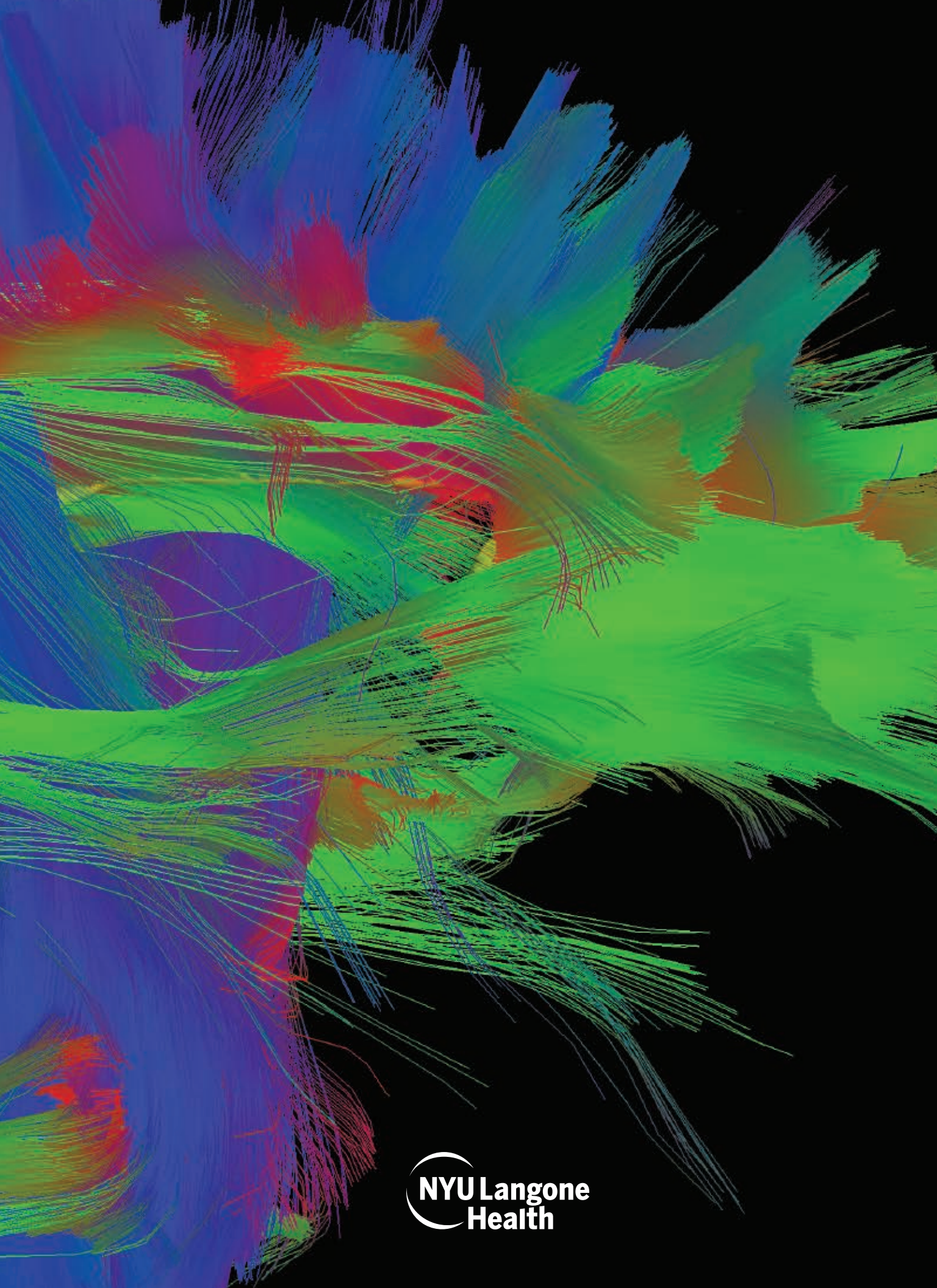
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