said, it received $393 million in National Institutes of Health funding in fiscal year 2019—a 13 percent increase over the prior year—ranking the school No. 12 in the nation. The Icahn School of Medicine also rose to No. 3 from No. 4 in research dollars per principal investigator, according to the Association of American Medical Colleges. “We are by far the best-funded independent medical school and are competing very effectively with all the major universities,” Dr. Charney said. “But most important—our science is leading to breakthroughs that have the potential to help our patients.”

The matriculating class of medical students is a well-rounded and diverse group who came from some of the nation’s top universities and had a median grade point average of 3.82 (out of 4.0). “We have a great class of students, not only because of their metrics but because of their passion for social justice, said, it received $395 million in National Institutes of Health funding in fiscal year 2019—a 13 percent increase over the prior year—ranking the school No. 12 in the nation. The Icahn School of Medicine also rose to No. 3 from No. 4 in research dollars per principal investigator, according to the Association of American Medical Colleges. “We are by far the best-funded independent medical school and are competing very effectively with all the major universities,” Dr. Charney said. “But most important—our science is leading to breakthroughs that have the potential to help our patients.”

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Precise cell types that correlate with a patient’s resistance to the standard therapy for Crohn’s disease—anti-inflammatory drugs called TNF inhibitors—have been identified for the first time by researchers at the Icahn School of Medicine at Mount Sinai and published in the August 29, 2019, issue of Cell. TNF inhibitors are used in Crohn's disease to stop inflammation, but as many as 30 percent of patients do not respond to this treatment and require surgical intervention within 10 years after diagnosis. The new discovery could open the door to identifying biomarkers and tailoring better therapeutic options for these patients.

At the same time, two studies in the September 26, 2019, issue of The New England Journal of Medicine validate effective therapies for patients with treatment-resistant ulcerative colitis (UC), a chronic inflammatory disease of the large intestine. Both of these studies were led by Bruce E. Sands, MD, the Dr. Burrill B. Crohn Professor of Medicine and Chief of the Dr. Henry D. Janowitz Division of Gastroenterology at the Icahn School of Medicine at Mount Sinai.
for gender equity, and for science,” Dr. Charney said. “They want to do it all, and we are here to be their teachers and make sure that is possible.” To further support medical students, in April 2019 Mount Sinai announced the Enhanced Scholarship Initiative, which ensures that medical students with a demonstrated need will graduate with a maximum debt of $75,000. Mount Sinai remains the largest sponsor of graduate medical education in the nation, with 2,500 residents and clinical fellows. And it has added six accredited programs at Mount Sinai South Nassau, which joined the Health System in 2019. The Graduate School of Biomedical Sciences was granted accreditation for a new Master of Health Administration program, which will launch in 2020, and it has expanded training in data science and entrepreneurship in response to requests from students. The school has an “outstanding” matriculating class of 44 PhD students, Dr. Charney said. “And 70 percent of the class are women, which is very encouraging, given that we want more women going into science and medicine.”

Among other high points:

Mount Sinai Innovation Partners (MSIP), which translates research findings into health care products and services, generated 209 patent applications and 60 new licenses and options for the use of research. MSIP helped create several spin-out companies, including HiberCell, Inc., which develops therapeutics focused on preventing cancer relapse, and RenalytixAI, PLC, which advances tools to identify patients at risk for fast-progressing kidney disease.

The Convocation Honorees

Joshua B. Bederson, MD
Leonard I. Malis, MD/Corinne and Joseph Gruber Professor of Neurosurgery

Lakshmi A. Devi, PhD
Mount Sinai Professor in Molecular Pharmacology

Fred R. Hirsch, MD, PhD
Joe Lowe and Louis Price Professor of Medicine

Sundar Jagannath, MBBS
Mount Sinai Professor in Multiple Myeloma

Nathalie Jette, MD, MSc
Bluhdorn Professor of International Medicine

Florian Krammer, PhD
Mount Sinai Professor in Vaccinology

Daniel M. Labow, MD
Eugene W. Friedman, MD Professor of Surgical Oncology

Avi Ma’ayan, PhD
Mount Sinai Professor in Bioinformatics

Roxana Mehran, MD
Mount Sinai Professor in Cardiovascular Clinical Research and Outcomes

Sarah E. Millar, PhD
Lillian and Henry M. Stratton Professor of Gene and Cell Medicine

The Mount Sinai Doctors Faculty Practice had its most successful year, with annualized revenue of $1.1 billion in 2019, an increase of 7 percent over 2018. The practice is one of the largest in the nation, with 1.4 million ambulatory visits to The Mount Sinai Hospital campus in 2019. The number of phone calls to its Access Center rose to 4.4 million in 2019 from 3.65 million in 2018.

“The Best Employers for Diversity,” a list of 500 companies compiled by Forbes, ranked Mount Sinai No. 1 among health systems and hospitals in 2019, and No. 19 overall. In January 2019, Carol Horowitz, MD, MPH, was named Dean for Gender Equity in Science and Medicine—the first such dean in the nation. Dr. Horowitz is overseeing a range of initiatives in areas including compensation, recruitment and retention, gender bias, and mentorship. The School of Medicine in 2019 created the Change Now Initiative to promote health care and education that are free of racism and bias. And in October 2019, the Diversity Innovation Hub (DIH) was launched by a team led by Gary C. Butts, MD, Dean for Diversity Programs, Policy, and Community Affairs, Icahn School of Medicine at Mount Sinai. DIH intends to create fellowships in technology and entrepreneurship for Mount Sinai medical and graduate students and to work with partners such as MSIP, local community leaders, and start-ups to seek innovative solutions to disparities in health and health care.

Looking ahead, Mount Sinai is continuing to
carry out the wide-ranging strategic plan developed in 2017, Dr. Charney said. In 2019, it created new institutes focusing on digital health, biomedical engineering, and transformative clinical trials. Mount Sinai is also planning a new building at 98th and Madison. “We expect this to be an iconic building and a gateway to our campus,” Dr. Charney said. “It will allow an expansion of our faculty practice and enhance our initiatives in digital health, artificial intelligence, and biomedical engineering.” To fund this and other capital projects, Mount Sinai is working with the Boards of Trustees to raise $2 billion by 2024. Thirty-one percent of the goal has been achieved as of October 2019.

Mount Sinai’s “great track record of discovery” was saluted by James S. Tisch, who in spring 2019 became Co-Chairman of the Boards of Trustees with Richard A. Friedman. “Our recent achievements and research rankings are truly impressive, particularly for a standalone medical school that is not a part of a larger research university,” Mr. Tisch said.

Mount Sinai is a leading driver of innovation at a critical time, said Kenneth L. Davis, MD, President and Chief Executive Officer, Mount Sinai Health System, comparing the present day to the dawn of quantum physics in the early 20th century. Physicists of that time could never have predicted that their discoveries would lead to artificial intelligence and cellphones that can send a photo across the globe in milliseconds. “Today we are in the midst of another incredible revolution, but this time it is in biology. We are seeing changes at an exponential rate as our research is transforming modern medicine and our understanding of disease,” Dr. Davis said. “Our grandchildren may look back and wonder why people ever died of cancer or why they only lived to 80.” He urged leading physician-scientists—like Mount Sinai’s 10 newly endowed professors—to use their prestige and expertise to convince government policymakers of the opportunities that lie ahead.

Concluding his address, Dr. Charney said he was looking forward to working further with Mr. Tisch and Mr. Friedman, and he expressed sincere gratitude to Peter W. May, who stepped down as Chairman of the Mount Sinai Boards of Trustees in May 2019 after guiding the Health System through 17 years of enormous growth and change. “Peter May enabled us to go from good to great—to be among the best medical schools and health systems in the world,” Dr. Charney said. “And we thank him for his inspirational leadership and wisdom.”

To view the State of the School presentation, please go to: icahn.mssm.edu/education/medical/events/convocation.

### Pioneering Discoveries in Inflammatory Bowel Disease (continued from page 1)

The results of Dr. Sands’ first clinical trial validated ustekinumab as a UC therapy. In the phase III clinical trial, Dr. Sands and his team tested more than 900 patients with moderate-to-severe UC who were unable to tolerate or had an inadequate response to TNF inhibitors. The results from this trial led the U.S. Food and Drug Administration in October to approve ustekinumab for adult patients with moderately to severely active ulcerative colitis. Ustekinumab had previously been approved for treating patients with Crohn’s disease.

The second study was the first ever head-to-head comparison of two biologic therapies for inflammatory bowel disease: vedolizumab and adalimumab. In total, 769 participants with moderate to severe UC were recruited for this randomized phase 3b study, with 385 patients receiving 500 mg of vedolizumab intravenously at weeks 0, 2, and 6, then every 8 weeks, and with subcutaneous placebo injections, and 386 receiving placebo intravenously and adalimumab subcutaneously (160 mg week 1, 80 mg week 2, and then 40 mg every 2 weeks).

Researchers found that patients who received vedolizumab achieved significantly higher week 52 clinical remission rates than patients who received adalimumab (51.3% versus 22.5%) and endoscopic improvement (59.7% versus 27.7%). The remission rates for both therapies were similar among the 20% of participants who had previous exposure to TNF inhibitors.

In the study in Cell, Mount Sinai researchers used single-cell RNA sequencing and CyTOF technology to examine inflamed and noninflamed small intestine tissue samples as soon as they were removed from Crohn’s disease patients. Looking at the lesions in real time on a single-cell level, the investigators identified the immune cells and the circulating blood cells and their interactions, and mapped a landscape of thousands of cells in the lesion.

“Single-cell profiling provides unprecedented information on the make-up of the disease,” says co-corresponding author Miriam Merad, MD, PhD, Director of the Precision Immunology Institute and the Human Immune Monitoring Center at the Icahn School of Medicine at Mount Sinai. “This type of analysis will help us understand why patients respond to or resist specific treatment and what else we could be targeting.”

Co-corresponding author Judy H. Cho, MD, Director of The Charles Bronfman Institute for Personalized Medicine, and Ward-Coleman Professor of Translational Genetics and Medicine at the Icahn School of Medicine at Mount Sinai, says, “We designed this study in a way that defines inflammation with unprecedented precision using immunology and computational biology to get a better understanding of this disease.”

Computational biologist Ephraim Kenigsberg, PhD, Assistant Professor of Genetics and Genomic Sciences at the Icahn School of Medicine at Mount Sinai, and co-corresponding author of the Cell study, says, “Single-cell analysis revealed different cellular signatures, and when we integrated this with larger data sets, including clinical trials, we were able to make our findings clinically relevant.”
Tele-ICU Brings Remote Teamwork to Intensive Care

Intensive care unit (ICU) physicians at The Mount Sinai Hospital and Mount Sinai Queens are consulting remotely on complex cases with Tele-ICU, a service developed by the Mount Sinai Health System’s Institute for Critical Care Medicine and Clinical Innovation team.

Tele-ICU makes use of audio-visual technology and Epic Canto, a secure app that provides extensive, real-time electronic medical information. “This technology-enabled care allows the Mount Sinai Health System to provide specialized consult services to our ICU patients at Mount Sinai Queens and keep many patients in their own community and close to their loved ones, while supporting Mount Sinai Queens’ goal of treating patients with increasingly complex medical needs,” says Roopa Kohli-Seth, MD, Director, Institute for Critical Care Medicine, Icahn School of Medicine at Mount Sinai.

The Mount Sinai Hospital has more than 7,000 intensive care admissions a year in units for cardiac, cardiovascular, cardiothoracic, medical, neurosciences, surgical, and transplant care. They are staffed 24 hours a day with intensivists, board certified specialists in critical care. Mount Sinai Queens, an outstanding community hospital, has an eight-bed intensive care unit, led by either an intensivist or an ICU hospitalist, usually an internal medicine physician.

When cases are particularly complex, Tele-ICU allows physicians at Mount Sinai Queens to compare notes with intensivists at The Mount Sinai Hospital. ICU physicians at both sites are equipped with monitors that show information from Epic, such as lab-test results and medical history. The physicians converse on tablets—similar to FaceTime but secure and encrypted—which can be turned toward patients to help visually assess their condition. The system makes communication and intervention easier, says Rohit R. Gupta, MD, Director of the Night Intensivist Coverage Service, Institute for Critical Care Medicine. “For example, if they are making adjustments to a patient’s ventilator at Mount Sinai Queens during the consult, we can see in real time what those changes are doing to his breathing pattern, to his oxygen numbers, to his blood pressure.”

Dr. Gupta described a case involving a woman who had ingested a toxic household chemical. She had seizures in the Emergency Department at Mount Sinai Queens and was taken to that hospital’s ICU, which contacted Dr. Gupta for a consultation at about 2 am. “Poisoning with this particular chemical is not very common,” Dr. Gupta says. “Fortunately we have experience with it, so we were able to discuss what to keep an eye out for.” The team was advised to avoid certain antibiotics that could predispose the patient to more seizures, and to carefully manage fluids because of the risk of kidney damage. “These consults are reassuring for both sides,” Dr. Gupta says, since they make physicians at The Mount Sinai Hospital well aware of patients who might need to be transferred. In this case, the patient was stabilized and remained at Mount Sinai Queens, where she made a “very good recovery” in a few days, he says.

Physicians have used Tele-ICU about twice a week since it was launched in March 2019, says Cameron R. Hernandez, MD, Chief Medical Officer and Vice President for Medical Affairs, Mount Sinai Queens. “We have found that it’s nice to work in teams, to have that support when there is a difficult diagnosis that you don’t often see.”

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Telemedicine programs like Tele-ICU are gaining traction throughout the nation as a way to efficiently share the expertise of specialists with community hospitals or hospitals in underserved rural areas, says Patrick Healy, MBA, Associate Director of Clinical Innovation, Mount Sinai Health System, who was the project manager of the system. “There is so much value in seeing the patient remotely,” says Robbie Freeman, MSN, RN, Vice President of Clinical Innovation. “In the case of The Mount Sinai Hospital and Mount Sinai Queens, Tele-ICU provides a fuller picture of the patient’s condition, to make sure the right resources are in place at the right time.”
Top Honor for Renowned Physician For Transformational Research

At the Library of Congress in Washington, D.C., on Tuesday, September 10, bipartisan Congressional supporters and representatives from science and higher education organizations saluted five scientists whose work has transformed the lives of countless millions of people. Among the honorees was David B. Sachar, MD, Clinical Professor of Medicine at the Icahn School of Medicine at Mount Sinai, and Director Emeritus of the Dr. Henry D. Janowitz Division of Gastroenterology, whose seminal research into cholera—and the landmark clinical human trials that followed—is credited with saving approximately 50 million lives worldwide.

The honor they received, the Golden Goose Award, recognizes scientists whose federally funded work—which may have been considered silly, odd, or obscure when first conducted—has resulted in profound benefits to society. The effort is led by the American Association for the Advancement of Science.

Cholera is an acute bacterial infection in human intestines that causes an immediate loss of water and electrolytes, and without urgent treatment, results in death. At one time, diarrheal diseases like cholera were the leading cause of infant mortality in the world.

For Dr. Sachar, his work involved learning how to measure electrolyte transport across a frog skin in the laboratory and then adapting that technique for the first time to the measurement of intestinal activity in humans in Bangladesh in 1966. By studying patients with cholera, he additionally was able to illuminate the underlying physiological cause for the deadly diarrhea provoked by this disease. His work ultimately contributed to the development of a simple oral solution, known as oral rehydration therapy, which cut the fatality rate by 99 percent. Later, Dr. Sachar, a specialist in inflammatory bowel disease, joined Mount Sinai, where he was instrumental in laying the foundation for the current international classification of Crohn’s disease.

“Our work shows not only the amazing and often unpredictable medical and social benefits of basic research, but also exemplifies the principle that these benefits may not be fully realized until we take the science from the laboratory and carry it directly to where the disease is,” says Dr. Sachar.

At “Walk the Talk” Event, Delivering a Message of Lifelong Health

Valentin Fuster, MD, PhD, Director of Mount Sinai Heart and Physician-in-Chief of The Mount Sinai Hospital, was a special guest speaker during “Walk the Talk: The Health-for-All Challenge in the United States,” a recent event sponsored by the World Health Organization and Walk with a Doc, a nonprofit that promotes physical fitness and access to care. The event, held on Sunday, September 22, in Central Park, included a four-mile run/walk, healthy snacks, blood pressure checks, and talks on public health. Dr. Fuster, a world leader in cardiology, delivered a message that he feels passionate about.

“Cardiovascular disease, unfortunately, is the No. 1 killer in the world,” Dr. Fuster said. “My advice is the following: First, be sure that elderly people take care of themselves, even if they feel well, and not wait until the next heart attack or stroke. No. 2, if you are a younger adult, take care of the seven risk factors—obesity, high blood pressure, high cholesterol, diabetes, smoking, poor diet, and lack of exercise. No. 3 to me is the most important: Infuse children—as young as age 3—with the idea that health is a priority. Education, education, education is the key.”
The Mount Sinai Health System recently partnered with Workforce Opportunity Services (WOS), a leading nonprofit that is dedicated to recruiting, training, and placing underserved and veteran job seekers into long-lasting civilian careers.

Through the organization’s WOS On Demand program, veterans Jonathan Duchnowski, Kevin Lama, and Anit Shrestha were recruited and placed in various roles within Mount Sinai’s Department of Information Technology (IT). Prior to joining this program, they struggled to find gainful employment opportunities as they transitioned from the military to civilian life.

“The Workforce program gives us a great opportunity to give back to those who have served in the military protecting our country,” says Roger Braman, RN, BSN, Senior IT Director of Infrastructure Project Management, who leads the partnership at Mount Sinai.

Using a scientifically based model derived from research conducted at Columbia University, the program recruits, educates, trains, and then places high-potential candidates at leading organizations around the world that are committed to diversifying their workforces.

Key to the effort’s success, says Mr. Braman, is “the additional support and training that the candidates receive, both from the WOS program and Mount Sinai, to allow them to build on the valuable skills they learned in the military and help them to transition to the civilian workforce.”

For example, Mr. Duchnowski, who served in the military from 2000 to 2006 as a Nuclear Propulsion Plant Machinist’s Mate and Engineering Laboratory Technician, completed his BA in 2018 and was looking for work in health care or in a biological lab when he found a position at Mount Sinai through WOS. He says, “I was contacted by one of their team members who also happened to be a Marine. He explained what WOS was all about, and I was immediately hooked.”

Mr. Duchnowski, who currently works in Infrastructure Project Management as the Infrastructure Project Coordinator, spent three weeks in general business professional development, as well as in focused Project Management training modules as part of the WOS program to prepare him for the Mount Sinai job. “I wanted to work for an organization trying to heal and help people, and I always wanted to work with IT, as well, so this fits both of those desires,” Mr. Duchnowski says.

Mr. Braman says, “All of the participants are really motivated and eager to learn and have quickly been able to integrate themselves into the teams to which they have been assigned.”

Learn About Lung Health

Join the Mount Sinai Health System Lung Screening team for a “Lungs for Life” educational event. Current or former smokers, as well as those concerned about their lung health, are encouraged to stop by an informational table, where they can learn if they qualify for a future lung screening. All are invited to tour a larger-than-life inflatable model of a pair of lungs. For more information, visit http://www.mountsinai.org/lungscreening.

Friday, November 15
8 am - 3 pm
Guggenheim Atrium