Dean, School of Science

School of Science researchers seek to answer fundamental questions about nature. These range in scope from the microscopic—where a neuroscientist might isolate the electrical activity of a single neuron—to the telescopic—where an astrophysicist might scan hundreds of thousands of stars to find Earth-like planets in their orbits. This research will provide a better understanding of the nature of the universe and help humanity address major challenges to improving and sustaining quality of life, such as developing viable resources of renewable energy or unraveling the complex mechanics of Alzheimer's disease.

Such profound and important questions often require collaborations across departments or schools, and are facilitated by affiliations with MIT's numerous laboratories, centers, and institutes as well as through participation in interdisciplinary initiatives such as the MIT Quest for Intelligence, the Aging Brain Initiative, or the Transiting Exoplanet Survey Satellite. The faculty's participation in the Undergraduate Research Opportunities Program, established in 1969 by Professor of Physics Margaret MacVicar, enables undergraduate students to work across departmental and disciplinary boundaries and gain hands-on experience in basic research.

Similarly, our faculty's commitment to teaching and mentorship is not constrained by lines between schools or departments. School of Science faculty teach General Institute Requirement subjects in biology, chemistry, mathematics, and physics that provide the conceptual foundation of every undergraduate student's education at MIT. The School faculty solidify cross-disciplinary connections through participation in graduate programs established in collaboration with the School of Engineering, including the programs in biophysics, microbiology, molecular and cellular neuroscience, and statistics. Through their contributions to EdX, our faculty's commitment to excellence in education has reached beyond the walls of MIT's classrooms and laboratories to students around the world.

Initiatives and Programs

Aging Brain Initiative

Spearheaded by Li-Huei Tsai, director of the Picower Institute for Learning and Memory, and Dean Michael Sipser, the Aging Brain Initiative was established to support interdisciplinary research on Alzheimer's disease and other diseases of the aging brain. The number of Americans with Alzheimer's disease is predicted to increase from 5.1 million today to 13.5 million by 2050, and there is currently neither a cure for the disease nor an effective means of slowing its progress. Until we know more about what causes brain functions to change with age, we will be no closer to a cure or a disease-modifying therapy. The Aging Brain Initiative seeks to address this gap in knowledge through collaborative efforts by researchers in the areas of neuroscience, bioengineering, biology, computer science, artificial intelligence, medicine, and health policy.

Center for Brains, Minds and Machines

The Center for Brains, Minds and Machines (CBMM), a multi-institutional collaboration headquartered at MIT, aims to create a new field—the science and engineering of intelligence—by bringing together computer scientists, cognitive scientists, and neuroscientists to work in close collaboration. Led by Tomaso Poggio, Eugene McDermott Professor in the Brain Sciences, the vision of this multi-institutional collaboration is to develop a deep understanding of intelligence and the ability to engineer it, to train the next generation of scientists and engineers in this emerging new field, and to catalyze continuing progress in and cross-fertilization among computer science, mathematics and statistics, robotics, neuroscience, and cognitive science.

Institute for Data, Systems, and Society

Launched in 2015 with participation from all five MIT Schools, the Institute for Data, Systems, and Society (IDSS) brings together researchers working in the mathematical, behavioral, and empirical sciences to capitalize on their shared interest in tackling complex societal problems. Led by Munther Dahleh, the William A. Coolidge Professor in the Department of Electrical Engineering and Computer Science, IDSS offers a range of cross-disciplinary academic programs, using tools and methodologies in statistics, information and decision systems, and social sciences to address challenges and opportunities in complex systems. IDSS research encompasses a variety of domains, including finance, social networks, urbanization, energy systems, and health analytics.

Transiting Exoplanet Survey Satellite

The Transiting Exoplanet Survey Satellite (TESS) will monitor more than 200,000 stars in search of exoplanets capable of supporting life. Faculty members in the Departments of Aeronautics and Astronautics, Physics, and Earth, Atmospheric and Planetary Sciences (EAPS) are participating in the first MIT-led NASA (National Aeronautics and Space Administration) TESS mission, with support from Lincoln Laboratory staff. George Ricker, a principal investigator at the MIT Kavli Institute for Astrophysics and Space Research, leads the project. Managed by NASA's Goddard Space Flight Center, the TESS mission provides extraordinary opportunities for MIT to raise its international profile in space science, expand its educational and research mission, and enhance its strength in developing space exploration missions.

After a successful launch on April 18, 2018, TESS is undergoing a series of commissioning tests before it begins searching for planets, with a projected date for science research to begin in July 2018. TESS uses an array of wide-field cameras to survey the entire sky, looking for the transient dimming of stars that indicates that planets are passing in front of them. The satellite employs a number of innovations, such as an offset, highly eccentric orbit that oscillates close enough to Earth for high data-downlink rates and far enough away to avoid Earth's harmful radiation belts. TESS will carry out its all-sky survey using cameras designed and fabricated at Lincoln Laboratory. The cameras contain novel charge-coupled device detectors with high signal-handling capacity and high photometric accuracy and speed.

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Additional partners include Northrop Grumman, based in Falls Church, VA; NASA's Ames Research Center in California's Silicon Valley; the Harvard-Smithsonian Center for Astrophysics in Cambridge, MA; MIT's Lincoln Laboratory in Lexington, MA; and the Space Telescope Science Institute in Baltimore, MD. More than a dozen universities, research institutes, and observatories worldwide are participants in the mission.

Quest for Intelligence

Launched on February 1, 2018, the MIT Quest for Intelligence is a campus-wide initiative to discover the foundations of intelligence and to drive the development of technological tools that can positively influence society.

James DiCarlo, the Peter de Florez Professor of Neuroscience, head of the Department of Brain and Cognitive Sciences (BCS), and principal investigator at the McGovern Institute for Brain Research, was named director of "The Core." One of the Quest's two linked entities, The Core advances the science and engineering of both human and machine intelligence. Daniela Rus, the Andrew (1956) and Erna Viterbi Professor of Electrical Engineering and Computer Science and director of MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL), was named associate director of The Core. CBMM director Tomaso Poggio, also a member of CSAIL and a principal investigator at the McGovern Institute, was appointed as The Core's founding scientific advisor.

The Core's scientific directors include Josh Tenenbaum, a professor of computational cognitive science in the Department of Brain and Cognitive Sciences and a member of CSAIL, and Leslie Kaelbling, the Panasonic Professor of Computer Science and Engineering and a member of CSAIL. The leadership of The Core will bring together teams of researchers to tackle the most ambitious "moonshot" projects focusing on the science and engineering of intelligence.

Education

MIT is exceptional among major research institutions for its dedication to undergraduate education. The Institute places great emphasis on hiring and promoting young faculty members and using undergraduate teaching as an important criterion for promotion and tenure. It is not uncommon for Nobel Prize winners and others among our best researchers to teach first-year subjects. Committed to providing undergraduates with a strong science base for studies in their majors, the School and its departments participate in and support a variety of programs designed to create more active, student-centered learning environments inside the classroom.

Interdisciplinary Graduate Programs

The School of Science has worked to expand educational and training opportunities for graduate students, collaborating with other schools and centers within the Institute to create innovative graduate programs in fields in which MIT shows great strength. These programs exemplify the Institute-wide goal of reducing boundaries between disciplines and allow MIT to attract the most talented students in their respective fields. The programs integrate educational resources across participating departments, build connections among faculty with shared interests, and create an educational and research community for training students.

Biophysics

The Biophysics program trains graduate students in the application of the physical sciences and engineering to fundamental biological questions at the molecular, cellular, and systems levels. The program spans the Schools of Science and Engineering and includes the Departments of Biological Engineering, Biology, Brain and Cognitive Sciences, Chemical Engineering, Chemistry, Civil and Environmental Engineering, Electrical Engineering and Computer Science, Materials Science and Engineering, Mechanical Engineering, Nuclear Science and Engineering, and Physics, along with the Harvard-MIT Program in Health Sciences and Technology.

Microbiology

The Microbiology program is an interdisciplinary doctoral program in microbial science and engineering with more than 50 faculty members from several departments in the Schools of Science and Engineering. Students receive training in a wide range of approaches to microbiology, including biochemistry, biotechnology, cell and molecular biology, chemical and biological engineering, computational biology, ecology, environmental biology, evolutionary biology, genetics, genomics, geobiology, immunology, pathogenesis, structural biology, synthetic biology, systems biology, and virology.

Molecular and Cellular Neuroscience

The Molecular and Cellular Neuroscience doctoral program carries out cutting-edge neuroscience research and education across multiple sub-disciplines, providing critical bridges from the molecular and cellular neuroscience field to neuro-engineering, systems neuroscience, genomics, optogenetics, and neurochemistry. The program provides elective offerings in key cross-discipline courses, such as neuroengineering, biochemistry, genetics, systems neuroscience, neuroimaging, cell biology, neural networks, quantitative biology, and neuronal dynamics. The program graduates trainees with unique abilities to solve complex problems in basic neuroscience and neuropsychiatric disease.

Statistics and Data Science

In April 2018, the MIT Statistics and Data Science Center, part of the Institute for Data, Systems, and Society, announced two new academic programs: the MicroMasters Program in Statistics and Data Science, and an interdisciplinary doctoral program in statistics. The interdisciplinary doctoral program is designed for currently enrolled doctoral students who wish to develop their understanding of 21st-century statistics using concepts of computation and data analysis along with elements of classical statistics and probability. Participating departments include Aeronautics and Astronautics, Economics, Mathematics, and Political Science, as well as the interdisciplinary social and engineering systems PhD program offered through IDSS.

EdX

Krishna Rajagopal, the William A.M. Burden Professor of Physics and former chair of the MIT faculty, was named dean for digital learning effective September 1, 2017. This new position expands leadership roles for faculty within the Office of the Vice President for Open Learning and gives Rajagopal oversight of Residential Education, MITx, OpenCourseWare, and the Digital Learning Lab.

To support MIT's goals to establish leadership in online education through our involvement with EdX and our own MITx initiative, School of Science departments continue to add to MITx curricula. Over the past few years, our departments have worked diligently to translate General Institute science requirements into MITx curriculum offerings, benefitting our enrolled students immensely. These courses include 8.01, 8.02, 18.01 (with plans to develop 18.02), and 7.00x, reflecting MIT's introductory biology courses and rigorous competency exam certificates.

As part of the launch of the MITx MicroMasters Program in Statistics and Data Science, Philippe Rigollet, associate professor in the Department of Mathematics and a member the Statistics and Data Science Center, taught the 18.650 Fundamentals of Statistics course.

In collaboration with IBM Q and the MIT-IBM Watson AI Lab, a new quantum computing curriculum was offered through EdX with a foundations component intended for quantum computing engineers and scientists and an applications component open to business leaders. The multipart series was taught by Isaac Chuang, professor of physics and electrical engineering; William Oliver, professor of the practice in the Department of Physics, Lincoln Laboratory Fellow, and associate director of the Research Laboratory of Electronics; Aram Harrow, associate professor of physics; and Peter Shor, the Morss Professor of Applied Mathematics.

Other new courses include a three-part series on quantum mechanics led by Professor of Physics Barton Zwiebach and two mathematics courses: 18.033x Differential Equations: Linear Algebra and NxN Systems of Differential Equations, led by Professor of Mathematics David Jerison, and Bjorn Poonen, the Claude Shannon Professor of Mathematics, and 18.032x Differential Equations: 2x2 Systems, led by Jerison.

Teaching Prizes for Graduate and Undergraduate Education

To reward individual faculty members for supporting the Institute's mission to foster excellence in teaching, the School recognizes student-nominated professors with School of Science Prizes in Undergraduate and Graduate Teaching. This year Jeremiah Johnson, associate professor in the Department of Chemistry, was awarded the prize for undergraduate education for his role in 5.43 Advanced Organic Chemistry. Tracy Slatyer, the Jerrold R. Zacharias Career Development Associate Professor in the Department of Physics, was awarded the graduate education prize for her course 8.323 Relativistic Quantum Field Theory I.

Research

Research findings from the Laser Interferometer Gravitational-Wave Observatory (LIGO) and international partners within the LIGO scientific collaboration continued to make headlines. MIT's David Shoemaker, senior research scientist at the Kavli Institute and leader of the Advanced LIGO Project, announced that LIGO and the Virgo Collaboration had observed the first joint detection of gravitational waves in the United States and Italy, respectively. On August 14, 2017, the three detectors detected gravitational waves, ripples in space and time, emitted during the final moments of the merger of two black holes with masses about 31 and 25 times the mass of the sun and located about 1.8 billion light years away. Three days later, the three detectors observed the merger of two neutron

stars, the smallest, densest stars known to exist and formed when massive stars explode in supernovas. As these neutron stars spiraled together, they emitted gravitational waves that were detectable for about 100 seconds; when they collided, a flash of light in the form of gamma rays was emitted and seen on Earth about two seconds after the gravitational waves. In the days and weeks following the collision, other forms of light, or electromagnetic radiation (including X-ray, ultraviolet, optical, infrared, and radio waves), were detected by 70 ground- and space-based observatories. This finding ushered in the new field of "multi-messenger astronomy": cosmic events viewed in gravitational waves and light. These scientific findings bookended the announcement of MIT physicist Rainer Weiss's sharing of the 2017 Nobel Prize in Physics for "decisive contributions to the LIGO detector and the observation of gravitational waves."

Bonnie Berger, the Simons Professor of Mathematics, and colleagues at Stanford University created a new system for protecting the privacy of people who contribute their genomic data to large-scale biomedical studies. Where earlier cryptographic methods were so computationally intensive that they became prohibitively time consuming for more than a few thousand genomes, the new system promises efficient privacy protection for studies conducted over as many as a million genomes. At the core of the system is a technique called secret sharing, which divides sensitive data among multiple servers.

MIT scientists, including Professor of Applied Mathematics John Bush, have explained why under certain conditions a droplet of liquid should not coalesce with the liquid surface below. If the droplet is very cold and the bath sufficiently hot, then the droplet should levitate on the bath's surface as a result of the flows induced by the temperature difference. The team's findings, published in the *Journal of Fluid Mechanics*, grew out of a question Bush posed in his 18.357 Facial Phenomena graduate course. The results offer a detailed mathematical understanding of drop coalescence, which can be observed in everyday phenomena such as milk poured in coffee. The findings have implications for other biological and chemical mixing events in commercial and industrial applications.

Gloria Choi, assistant professor in the Department of Brain and Cognitive Sciences and a member of the McGovern Institute, authored two studies on the connection between infection and autism. In research on mice, scientists found that the composition of bacterial populations in the mother's digestive tract can influence whether maternal infection leads to autistic-like behaviors in offspring. If further validated in human studies, the findings could offer a possible means of reducing the risk of autism, one that would involve blocking the function of certain strains of bacteria found in the maternal gut.

Professor of Physics Janet Conrad and graduate students in the Laboratory for Nuclear Science designed a low-cost detector for muons, particles created when high-energy cosmic rays collide with the Earth's atmosphere. Scientists have used muon tomography instruments, much like X-rays or computed tomography scans, to uncover geological structures. These $100 handheld devices were designed specifically to engage younger students in science, but may also be employed in conjunction with IceCube, a particle detector encased in ice deep underground at the South Pole that is used to detect subatomic particles called neutrinos. These small detectors could tag the precise position of muons, enabling scientists to sift out those particles in their search for neutrinos.

Catherine Drennan, a professor of chemistry and biology and Howard Hughes Medical Institute investigator, led a team of researchers at MIT and the University of Illinois at Urbana-Champaign in the discovery of a natural source of methane released by marine microbes. Ocean-produced methane represents around 4% of the total methane discharged into the atmosphere. Understanding the source of this methane could help scientists better account for its role in climate change. In another research program, Drennan and colleagues including JoAnne Stubbe, the Novartis Professor of Chemistry (emerita), used electron microscopy to discover the structure of an enzyme crucial for maintaining an adequate supply of DNA building blocks in human cells. The structure also reveals the likely mechanism for how cells regulate the enzyme, known as ribonucleotide reductase (RNR). Significantly, the mechanism appears to differ from that of the bacterial version of the RNR enzyme, suggesting that it could be possible to design antibiotics that selectively block the bacterial enzyme.

Mei Hong, a professor of chemistry, was the senior author of a study using solid-state nuclear magnetic resonance spectroscopy to determine how cholesterol membrane proteins allow viruses to break free and infect other cells. This technique could be applied to study other membrane proteins such as the amyloid precursor protein and the alpha-synuclein protein, implicated in Alzheimer's disease and Parkinson's disease, respectively.

Matthew Shoulders, the Whitehead Career Development Associate Professor of Chemistry, and MIT colleagues including Professor of Physics Leonid Mirny also uncovered aspects of viral infection, specifically within influenza. The MIT team found that flu viruses' rapid evolution relies in part on their ability to hijack some of the cellular machinery of the infected host cell, specifically a group of proteins called chaperones. When viruses were unable to get help from these chaperones, they did not mutate as rapidly, suggesting that these proteins could be the target of future therapeutic interventions.

H. Robert Horvitz, the David H. Koch Professor of Biology, a Howard Hughes Medical Institute investigator, and a member of the McGovern Institute and the Koch Institute for Integrative Cancer Research, discovered a function of a gene that is believed to account for up to 40% of all familial cases of amyotrophic lateral sclerosis (ALS). Studies of ALS patients have shown that an abnormally expanded region of DNA in a specific region of this gene can cause the disease. In a study of the microscopic worm *Caenorhabditis elegans*, researchers found that the gene plays a key role in helping cells remove waste products via structures known as lysosomes. When the gene is mutated, these unwanted substances build up inside cells. The researchers posit that if this also happens in neurons of human ALS patients, it could account for some of those patients' symptoms.

Professor of Biology Amy Keating and other biologists designed a new peptide that can disrupt a key protein that many types of cancers, including some forms of lymphoma, leukemia, and breast cancer, need to survive. The new peptide targets a protein called Mcl-1, which helps cancer cells avoid the cellular suicide that is usually induced by DNA damage. By blocking Mcl-1, the peptide can force cancer cells to undergo programmed cell death.

MIT professors offered more insights into the study of memories. Earl Miller, Picower Professor in the Department of Brain and Cognitive Sciences, found evidence that the brain's ability to control working memory relies on low-frequency brain waves known as

beta rhythms. Susumu Tonegawa, Picower Professor in the Department of Biology and a Howard Hughes Medical Institute investigator, uncovered new brain circuits dedicated to retrieving memories, as well as a pathway for memorizing new locations. Tonegawa also published findings reversing a long-held assumption that memory storage relies on strengthening synapses between memory cells. Weifeng Xu, assistant professor in the Department of Brain and Cognitive Sciences, discovered that two proteins, neurogranin and FMRP, are integral to memory formation.

Daniel Rothman, professor of geophysics in the Department of Earth, Atmospheric and Planetary Sciences and co-director of MIT's Lorenz Center, analyzed significant changes in the carbon cycle over the last 540 million years, including the Earth's five mass extinction events. He identified "thresholds of catastrophe" in the carbon cycle that, if exceeded, would lead to an unstable environment and ultimately mass extinction. Rothman predicts that given the recent rise in carbon dioxide emissions over a relatively short time scale, a sixth extinction will depend on whether a critical amount of carbon is added to the oceans, which he predicts may occur by the year 2100.

The amount of carbon dioxide that can be stored by the ocean's plankton population has also decreased, according to research published by Michael Follows, a professor in the Department of Earth, Atmospheric and Planetary Sciences. Scientists calculate that during the past 30 years, as temperatures have risen worldwide, the amount of carbon that has been removed and stored in the deep ocean has decreased by 1.5%.

Kerry Emanuel, the Cecil and Ida Green Professor of Atmospheric Science and co-director of the Lorenz Center (with Professor Rothman), also published research suggesting that current climate models predict an increase in natural disasters such as hurricanes and tropical storms. Given the likely trajectory of climate change conditions, events such as Hurricane Harvey—which devastated parts of the Texas coastline and produced more rainfall than any other US hurricane on record—could occur once every 100 years instead of once every 2,000 years.

Laura Schulz, professor in the Department of Brain and Cognitive Sciences, published a study in *Science* demonstrating that babies as young as 15 months can learn persistence from watching their caregivers. Researchers found that babies who watched an adult struggle at two different tasks before succeeding tried harder at their own difficult tasks, compared to babies who saw an adult succeed effortlessly.

Li-Huei Tsai, director of the Picower Institute for Learning and Memory and Picower Professor in the Department of Brain and Cognitive Sciences, continued to produce seminal research on the study of Alzheimer's disease. MIT researchers have now shown that they can reverse memory loss in mice by interfering with the enzyme that forms the genetic blockade seen in the brains of Alzheimer's patients. The enzyme, known as HDAC2, turns genes off by condensing them so tightly that they cannot be expressed. In another study, Tsai and colleagues found a possible link between Alzheimer's and the gene variant APOE4. The researchers discovered that by editing the deleterious APOE4 gene into the more common APOE3 variant, they could eliminate signs of Alzheimer's in neurons, astrocytes, and microglia brain cells derived from human pluripotent stem cells.

Omer Yilmaz, the Eisen and Chang Career Development Professor, an assistant professor of biology, and a member of the Koch Institute, and David Sabatini, a professor of biology and a member of the Whitehead Institute for Biomedical Research and the Koch Institute, co-authored a paper showing that fasting substantially improves stem cells' ability to regenerate in murine models. Their study details how fasting improves overall health, including the role of adult stem cells in intestinal regeneration, repair, and aging. This research may provide a new target for pharmacological intervention to improve tissue function in age-associated pathology.

Awards and Honors

Faculty Awards and Honors

Every year, academic and professional organizations honor numerous School of Science faculty members for their innovative research as well as their service to the community. Individual reports from the School's departments, labs, and centers will document these honors and awards more completely, but several deserve additional mention here.

Gerald Fink, a professor of genetics in the Department of Biology and a member of the Whitehead Institute, was named the 2018–2019 recipient of MIT's James R. Killian Jr. Faculty Achievement Award for his work in transforming *Saccharomyces cerevisiae* into the leading model for studying the genetics of eukaryotes, organisms whose cells contain nuclei.

Institute Professor Ann Graybiel won the 2018 Gruber Neuroscience Prize for her pioneering work on the complexity and function of the basal ganglia.

Aram Harrow, associate professor of physics, and Keith Nelson, the Haslam and Dewey Professor of Chemistry, were both honored by the American Physical Society in 2018. Harrow received the Rolf Landauer and Charles H. Bennett Award in Quantum Computing for his "outstanding accomplishments in the mathematics of quantum information and the development of new algorithmic primitives for quantum computers." Nelson received the Frank Isakson Prize for Optical Effects in Solids for his "pioneering contributions to the development and application of ultra-fast optical spectroscopy to condensed matter systems, and providing insight into lattice dynamics, structural phase transitions, and the non-equilibrium control of solids."

Laura Kiessling, the Novartis Professor of Chemistry, was the recipient of the 2017 Tetrahedron Prize for Creativity in Organic Chemistry for her outstanding contributions to ground-breaking research in the broad field of chemical glycobiology.

Tom Leighton, professor of mathematics, was selected to receive the 2018 Marconi Prize for his fundamental contributions to technology and the establishment of the content delivery network industry.

Michael Sipser, the Donner Professor of Mathematics and dean of science, was named a 2017 Association for Computing Machinery Fellow for his "contributions to computational complexity, particularly randomized computation and circuit complexity."

Susan Solomon, the Lee and Geraldine Martin Professor of Environmental Studies, was awarded Sweden's 2018 Crafoord Prize in Geosciences for "fundamental contributions to understanding the role of atmospheric trace gases in Earth's climate system." She was also a recipient of the UK Royal Society's 2017 Bakerian Medal for "her outstanding contributions in atmospheric science, in particular to the understanding of polar ozone depletion."

JoAnne Stubbe was selected as the 2017 recipient of the Pearl Meister Greengard Prize. The prize, which recognizes outstanding women in biomedical research, was given in honor of Stubbe's "landmark research into the chemistry at the root of life."

As noted above, Rainer Weiss, professor emeritus of physics, won the 2017 Nobel Prize in Physics. Weiss won half of the prize, with the other half shared by Kip S. Thorne, professor emeritus of theoretical physics at the California Institute of Technology (Caltech), and Barry C. Barish, professor emeritus of physics at Caltech.

Professors of Mathematics Zhiwei Yun and Wei Zhang shared the 2018 New Horizons in Mathematics Breakthrough Prize "for deep work on the global Gan-Gross-Prasad conjecture and their discovery of geometric interpretations for the higher derivatives of L-functions in the function field case."

Feng Zhang, the James and Patricia Poitras Professor of Neuroscience, was named a winner of the 2017 Albany Medical Center Prize in Medicine and Biomedical Research, the 2017 Lemelson-MIT Prize, and the 2018 Vilcek Prize for his contributions to the discovery and development of CRISPR. He was also named a Howard Hughes Medical Institute investigator along with Ed Boyden, the Y. Eva Tan Professor in Neurotechnology.

The following professors were elected to the American Academy of Arts and Sciences in 2018: Alexei Borodin (professor of mathematics), Larry Guth (professor of mathematics), Leigh Royden (professor of earth, atmospheric, and planetary sciences), Sara Seager (the Class of 1941 Professor), and Feng Zhang.

Mehran Kardar (the Francis Friedman Professor of Physics), Xiao-Gang Wen (the Cecil and Ida Green Professor of Physics), and Feng Zhang were elected to the National Academy of Sciences in 2018.

The following professors were awarded 2018 Sloan Fellowships: Riccardo Comin (assistant professor of physics), Andrei Negut (assistant professor of mathematics), Gabriela Schlau-Cohen (the Thomas D. and Virginia W. Cabot Assistant Professor of Chemistry), and Alex K. Shalek (the Pfizer-Laubach Career Development Assistant Professor).

School of Science Rewards and Recognition

The School of Science Rewards and Recognition program continues to acknowledge the dedication and hard work of the people who fill our departments, labs, and centers, and whose efforts are the source of our prestige. The School continues its Spot Awards, which recognize employees "on the spot" for going beyond the requirements of their normal duties.

Since the Infinite Mile Award program was established in 2001, the School of Science has presented the awards to more than 300 of its members based on the nominations of grateful colleagues. This year's winners were Theresa Cummings (Mathematics), Hristina Dineva (Biology), Mary Gallagher (Biology), Jack McGlashing (Laboratory for Nuclear Science), Sydney Miller (Physics), Miroslava Parsons (EAPS), and Alexandra Sokhina (Simons Center for the Social Brain).

The Infinite Kilometer, which is designated for postdoctoral researchers and research scientists, was added in 2012 to recognize the contributions of these individuals to both our scientific endeavors and the MIT community as mentors and advisors to students and colleagues. This year's winners were Rodrigo Garcia (McGovern Institute), Lydia Herzel (Biology), Yutaro Iiyama (Laboratory for Nuclear Science), Kendrick Jones (Picower Institute), Matthew Musgrave (Laboratory for Nuclear Science), Cody Siciliano (Picower Institute), Peter Sudmant (Biology), and Ashley Watson (Picower Institute).

Personnel

Appointments and Promotions

Iain Cheeseman (Biology), Nuh Gedik (Physics), Pablo Jarillo-Herrero (Physics), and Jonathan Kelner (Mathematics) were promoted to the rank of full professor.

Daniel Cziczo (EAPS), Matthew Evans (Physics), Anna Frebel (Physics), Aram Harrow (Physics), Adam Martin (Biology), and Kay Tye (BCS) were granted tenure.

Jörn Dunkel (Mathematics), Semyon Dyatlov (Mathematics), Myriam Heiman (BCS), Mehrdad Jazayeri (BCS), Yen-Jie Lee (Physics), Joshua McDermott (BCS), Tracy Slatyer (Physics), Yogesh Surendranath (Chemistry), Mark Vogelsberger (Physics), and Adam Willard (Chemistry) were promoted to the rank of associate professor without tenure.

Laura Kiessling and Ronald T. Raines joined the Department of Chemistry as full professors. Wei Zhang joined the Department of Mathematics as a full professor. Alexander Rakhlin joined the Department of Brain and Cognitive Sciences as an associate professor with tenure.

Ian Crossfield (Physics), Joseph Davis (Biology), Michael Halassa (BCS), Daniel Harlow (Physics), Philip Harris (Physics), Or Hen (Physics), Rebecca Lamason (Biology), Sebastian Lourido (Biology), Brent Minchew (EAPS), Giulia Saccà (Mathematics), Stefani Spranger (Biology), Daniel Suess (Chemistry), and Yufei Zhao (Mathematics) joined the School of Science faculty as assistant professors.

Faculty Lunch Programs

Tenure-track faculty lunch meetings are intended to help junior faculty members meet their peers in different departments and to provide a forum for discussion of important issues. This year's meetings included faculty presentations given by Jing-Ke Weng (assistant professor of biology) on metabolic evolution in plants, Jörn Dunkel (associate professor of mathematics) on applied mathematics, and Kay Tye (associate professor of neuroscience) on how emotional and motivational states influence health and disease behaviors.

School of Science Learn@Lunch Series

To provide administrative staff the support they need to do their jobs as effectively as possible, the School of Science holds a monthly lunch series for staff members on a variety of topics. This year, presentations included a panel discussion on emerging careers at MIT with Colleen Leslie, senior director of research administration and compliance; Sarah Rankin, Title IX coordinator; and Olu Brown, director of platform engagement for Information Systems and Technology. Brown also gave a presentation on MIT's use of Quickbase database application systems. Pam Schickling Buckley, senior director for practice and process improvement in the Office of the Vice President for Finance (VPF), discussed initiatives to help support administrators who regularly engage with VPF.

School of Science Peer Connections

The Peer Connections Program pairs new School of Science staff with mentors who will help them navigate job responsibilities, MIT policies and procedures, and Institute organization and culture. The program provides opportunities for both mentors and new employees to expand their skill sets, increase their confidence, and make connections with School of Science community members outside of their home department, lab, or center.

Michael Sipser
Dean
Donner Professor of Mathematics