UPDATE TO THE BOARD
in advance of the March 4, 2022
Board of Trustees Meeting

Key Updates

Jian Cao Elected to National Academy of Engineering
The National Academy of Engineering announced on February 9, 2022, the election of 111 new members, including Jian Cao, Cardiss Collins Professor of Mechanical Engineering and (by courtesy) professor of civil and environmental engineering and of materials science and engineering at the McCormick School of Engineering. Cao’s research interests in manufacturing have focused on deformation-based and laser additive processes. She has made fundamental contributions to the characterization of the effects of material structure on forming behavior of metals and woven composites. Cao, who joined Northwestern in 1995, has published more than 300 technical articles, including more than 200 journal articles, 10 book chapters, and op-ed articles on manufacturing. She has given nearly 150 invited talks and has 15 patents.

Miriam Sherin and Uri Wilensky Elected to National Academy of Education
The National Academy of Education announced on January 28, 2022, the election of seventeen new members, including Miriam Sherin, Alice Gabrielle Twight Professor of Learning Sciences and Associate Provost for Undergraduate Education, and Uri Wilensky, Lorraine Morton Professor of Learning Sciences and Computer Science. Sherin is best known for her research on “teacher noticing” – how teachers make decisions about what to attend to in the moments of instruction. She has also pioneered the use of video to help teachers see how students think. In the Provost’s office, Sherin works to enrich the educational experiences of Northwestern’s undergraduate students through collaborative cross-school and cross-unit undergraduate initiatives. Wilensky is considered the father of a worldwide movement to harness the power of computer modeling and simulations and foster the mindset known as “computational thinking.”

Undergraduate Applications Increase for Fall 2022 Admission
The quality of undergraduate applications to Northwestern continues to strengthen as the quantity increased significantly compared to last year. As of February 8, Northwestern has received 51,554 first-year applications for fall 2022 admission, an 8.2 percent increase over last year’s applicant pool and a 38.3 percent increase overall from five years ago. The number of early decision applicants was up 10.8 percent over last year and increased 31.4 percent from five years ago. The University admitted 1,109 students in Early Decision (ED) from a very strong pool. With anticipated melt, ED students are projected to make up approximately 55 percent of the incoming class. Of the 1,109 ED admits, 572 students were rated as “academic ones” (top academic performance) compared to 602 last year. Northwestern will remain test-optional to applicants through at least the Fall 2022-23 application cycle.
**Martin Luther King, Jr. Day Commemoration**

Programming throughout the University community marked the annual commemoration of Martin Luther King, Jr.’s birthday, capped with a virtual keynote address by Nikole Hannah-Jones. Hannah-Jones is an investigative reporter covering racial injustice and creator of the New York Times’ 1619 Project, which was published in 2019. In 2020, Hannah-Jones received the Pulitzer Prize for commentary for the 1619 Project, and she has received many other awards and honors throughout her career, including membership in the American Academy of Arts and Sciences. Other events included a virtual candlelight vigil hosted by the Alpha Mu Chapter of Alpha Phi Alpha, Dr. King’s fraternity.

**Figlio Named Provost at the University of Rochester**

David Figlio, Dean of the School of Education and Social Policy (SESP), was named as the next provost of the University of Rochester, effective July 1, 2022. He will complete his term at Northwestern on May 15, 2022. Figlio has served as the Dean of the highly ranked SESP since 2017, was a previous director of the Institute for Policy Research (IPR) and has been the Orrington Lunt Professor of Education and Social Policy and an IPR fellow since 2008. Figlio was elected to the National Academy of Education in 2017 for his innovative work on the economics of K-12 and higher education. His scholarship also examines a range of education, public and social policy issues, including the link between health and education.

**McAdams named interim dean of Northwestern’s School of Education and Social Policy**

Dan P. McAdams has been named interim dean of Northwestern’s School of Education and Social Policy (SESP), effective May 16. McAdams, the Henry Wade Rogers Professor of Psychology and a professor of human development and social policy, joined Northwestern’s faculty in 1989 and has served as chair of the Weinberg College of Arts and Sciences’ Department of Psychology and coordinator for SESP’s doctoral program in human development and social policy. McAdams’ research focuses on narrative psychology and the development of the life-story model of human identity, which argues adults derive meaning and purpose in their lives by constructing self-defining life stories.

**Faculty Pandemic Impact Response Workgroup Report and Recommendations**

The Faculty Pandemic Impact Response Workgroup was convened in March 2021 by Provost Hagerty to understand the long-term impacts of COVID-19 on faculty and recommend strategies to mitigate the impacts and disruption of the pandemic. In December, the Workgroup completed its final report, including results from input gathering and recommendations. The report notes: “The recommendations include financial support in some cases, greater flexibility in operations in other cases, and deep investigation of practices critical to faculty career trajectories in yet others. Faculty need some of this help now. Other items need examination and careful deliberation. In the time horizon of Northwestern University’s existence, the pandemic may seem to be an acute time-limited event, yet its effects are going to be anything but time-limited. The recommendations made by the workgroup are directed at rejuvenating faculty careers and supporting faculty well-being. At their heart they are also designed to rejuvenate
Northwestern as an institution and sustain it as an inclusive and equitable cradle of knowledge creation and dissemination.”

Northwestern has already begun addressing some of these issues through research and caregiving grants. Additionally, individual schools have already implemented various programs to support faculty research and teaching. The administration is considering ways in which the University will address the long-term issues raised by this report.

**Northwestern establishes research recovery grants to help with COVID-19 challenges**

Northwestern recently announced the establishment of a COVID-19 Research Recovery Grant Program to assist pre-tenure faculty whose research or creative work has been delayed, interrupted or otherwise disrupted because of the COVID-19 pandemic. The new program divides grants into two levels: Purple grants up to $50,000 and White grants up to $15,000, depending on expenses. Eligible faculty members can submit one proposal for the most appropriate grant level based on their individual research recovery needs. Priority is given to those who are in their final three years before tenure review after accounting for clock extensions already granted and who have had significant caregiving responsibilities during the pandemic.

**Northwestern University Librarians and Library Staff Vote to Unionize**

The National Labor Relations Board counted votes on December 3, 2021, and a majority of eligible librarians and library staff who cast ballots elected to be represented by the Service Employees International Union (SEIU) in a single bargaining unit inclusive of professional and non-professional employees. Significantly, a subset of ballots submitted by eligible voters (subject to challenge by the University) were not tallied because the NLRB determined that they would not be outcome determinative. The University continues to believe this subset of challenged voters should not be included in the represented unit because they are “supervisors” – a category of employee that is expressly excluded from collective bargaining under the National Labor Relations Act. The University will attempt to resolve the status of the challenged voters with the SEIU.

The University will be prepared to come to the table in the coming months to negotiate a collective bargaining agreement.

**Winter Quarter and COVID-19 Update**

In place of an oral update on the agenda of the Board meeting, the administration has provided a separate written update on these topics that is attached.

**Financial Update**

The FY 2021 financial statements were reviewed and approved by the Audit, Risk, and Compliance Committee in December 2021. The University ended the year with an $87.8M operating surplus. Several revenue sources were impacted due to reduced on-campus activity in the fall of 2020, including undergraduate tuition, room and board, and athletics revenues. The University also took on additional expenses related to COVID testing and contract tracing, the faculty retirement incentive plan, and the one-
time bonuses for faculty and staff. These negative impacts were offset by savings from slowed hiring, the suspended retirement contributions, and reduced non-personnel expenditures, which remained over $100M below pre-pandemic levels. The University’s net assets increased $3.6B, primarily driven by unrealized gains on investments.

As discussed at the January Executive Committee, the FY 2022 Q1 forecast anticipates an operating surplus of $22M compared to $1.2M in the budget approved in June 2021. The anticipated net positive operating performance is driven by increases in net tuition, Northwestern Medicine transfers, and housing and dining services. These revenue increases more than offset increased expenses related to COVID and more on-campus activity and have created capacity to release the contingency funds that were being held for schools and units.

**Liquidity and Debt Management**
Treasury, Investments, and Budget and Planning continue to collaborate closely with respect to liquidity monitoring, planning, and debt management in support of the University’s operating and capital needs.

**Investment Management**
As of December 31, 2021, the Long-Term Balanced Pool had an estimated value of $15.1 billion based on preliminary returns. For the past twelve months ended December 31, 2021, the return to the Long-Term Balanced Pool was 18.0 percent versus a policy benchmark return of 16.5 percent. As a reminder, the fourth quarter returns for illiquid categories such as Private Investments and Real Assets are not yet reported.

**Alumni Relations and Development**
As of January 31, 2022, Northwestern raised $763.6 million in new gifts and commitments towards the $475 million fiscal year goal, compared with $311.9 million last year at the same time. The net amount raised without giving to Northwestern Medicine’s related entities is $611.9 million, compared to $115.6 million for the same period last year.

**Research Update**

**Research Award Funding**
Northwestern’s fiscal year 2022 year-to-date research award funding as of Feb. 7, reached $247.7 million, an 8.1% increase ($18.6 million) versus the same period last fiscal year. The number of awards totaled 1,056, representing a 3.5% decrease from the same period last year (1,094). The dollar volume of proposals submitted during this period was $1.5 billion, a 17.7% decrease from the prior year. The number of proposals submitted (1,412) decreased 15% over the same period last year. Typically 15% of annual awards arrive in each of the first two quarters of a fiscal year, followed by 25% in the third quarter and the remaining 45% arriving in the final quarter of the fiscal year. Proposals tend to be distributed evenly across all four quarters of the fiscal year.

As of Feb. 7, 2022, the dollar volume of awards from the National Institutes of Health reflected a 5.8% increase (to $116.3 million). The dollar volume of proposals submitted
to the National Institutes of Health was down about 12% (to $1.1 billion), while that to industry sponsors was down 32% (to $42.7 million).

Research News and Faculty Updates

E. Patrick Johnson hailed for scholarly achievement in communication studies
E. Patrick Johnson, dean of the School of Communication at Northwestern, received the Distinguished Scholar Award from the National Communication Association (NCA) in November. The NCA’s highest honor, the award recognizes remarkable NCA members for a full career of distinguished scholarly achievement in communication studies. Johnson was recognized for his research examining the intersection of gender, sexuality, race and religion, with focuses on Black gay men of the South and Black Queer Southern women. In addition to writing four award-winning, highly acclaimed books, Johnson has edited several book collections and published multiple journal articles and book chapters.

Rogers Honored by National Academy of Sciences
John Rogers, the Louis Simpson and Kimberly Querrey Professor of Materials Science and Engineering, Biomedical Engineering, has been awarded the 2022 James Prize in Science and Technology Integration by the Council of the National Academy of Sciences. The James Prize honors outstanding contributions made by scientists who adopt or adapt information or techniques from outside their fields to solve a major contemporary challenge not addressable from a single disciplinary perspective. Rogers, a bioelectronics pioneer, was selected for his development of “biocompatible” forms of electronic, optoelectronic and microfluidic technologies with unique capabilities in basic science research and clinical care. These devices range from brain mapping technology that can serve as the basis for a neural interface, to wireless wearable sensors that can monitor pregnant women and their fetuses or microfluidic sweat stickers that can diagnose cystic fibrosis.

Quaggin Elected to National Academy of Inventors
Susan Quaggin, the Charles H. Mayo, MD, Professor and chief of Nephrology and Hypertension in the Department of Medicine at the Feinberg School of Medicine, has been elected as a fellow of the National Academy of Inventors. She joins the academy’s roster of fellows selected for prolific innovations that have made an impact on the quality of life, economic development or welfare of society. Since joining Feinberg in 2013, Quaggin has worked to close the gap between scientific discovery and patient care for kidney and cardiovascular diseases. Her science has enhanced the understanding of common glomerular diseases and inspired the development of promising therapeutics, including discoveries regarding blood vessels, lymphatics and specialized hybrid circulations.

Parkinson’s disease researchers to study brain circuits driving symptoms
Northwestern scientists have received two major and highly competitive awards for Parkinson’s disease research from the ASAP Collaborative Research Network, a program of the Aligning Science Across Parkinson’s (ASAP) initiative implemented with The Michael J. Fox Foundation for Parkinson’s Research. A team led by D. James Surmeier, the Nathan Smith Davis Professor and chair of neuroscience at Northwestern’s Feinberg
School of Medicine, received a $9 million award over three years. He and his collaborators will investigate the origins of brain circuit dysfunction and how this condition develops to cause difficulty in moving and sleeping. This research aims at allowing earlier diagnosis of Parkinson’s disease and increasing the chances of stopping and better treating the disease with pharmacological and genetic therapies. Another ASAP-funded team, led by Rajeshwar Awatramani, professor of neurology at Feinberg, received an $8.9 million award over three years to study dopamine-producing neurons in a brain area called the \textit{substantia nigra pars compacta}. He and collaborators will investigate how these neurons contribute to movement and are affected in Parkinson’s disease.

**Human Proteoform Project to map proteins in human body**

An international team of researchers announced they will map the entire collection of proteins in the human body, a project that promises to advance medical science markedly. Plans and goals for the Human Proteoform Project were outlined in a paper published in November in the journal \textit{Science Advances}. The large undertaking will characterize known proteoforms (specific protein molecules) as well as aim to systematically discover and analyze new ones in human tissues, cells and fluids. Northwestern’s Neil Kelleher — a pioneering proteomics researcher — will be part of the project. Kelleher is the Walter and Mary Glass Professor of Molecular Biosciences and professor of chemistry in the Weinberg College of Arts and Sciences and a professor of medicine at the Feinberg School of Medicine. He also is director of the Chemistry of Life Processes Institute (CLP). Kelleher also is faculty director of Northwestern Proteomics, a center of excellence within CLP that develops novel platforms for drug discovery and diagnostics. “We are all built of proteins, and most drugs target proteins,” said Kelleher. “But understanding proteins is an open frontier. This project will serve as a major achievement that can help us more fully understand proteins’ role in all types of disease, aging and new therapeutics.”

**Harvard’s David Walt wins Kabiller Prize in Nanoscience and Nanomedicine**

Northwestern announced the winners of the 2021 international Kabiller prize and awards, which biennially recognize three top scholars — one pioneer, one young investigator and one rising star — in the fields of nanoscience and nanomedicine. David Walt, the Hansjörg Wyss Professor of Biologically Inspired Engineering at Harvard Medical School, was selected to receive the $250,000 Kabiller Prize in Nanoscience and Nanomedicine. Walt was recognized for his pioneering work aimed at the development of ultrasensitive single-molecule array detection technology, which is impacting the way cancer, infectious disease and neurological disorders are diagnosed and treated. Bin Liu, the Provost’s Chair Professor at National University of Singapore, will receive the $10,000 Kabiller Young Investigator’s Award in Nanoscience and Nanomedicine for the development of nanoparticle probes for enhancing biomedical imaging capabilities and tracking disease. The $2,000 Kabiller Rising Star Award in Nanoscience and Nanomedicine, which recognizes outstanding contributions by early career faculty went to Natalie Artzi, an assistant professor at Harvard Medical School and a research scientist at Brigham and Women’s Hospital as its inaugural recipient. Artzi designs smart material platforms and medical devices aimed at monitoring human health and increasing the efficacy of disease therapies. Established in 2015 and endowed in 2018, the Kabiller Prize and Kabiller Young Investigator Award have been made possible
through the generosity of entrepreneur and Northwestern trustee and alumnus David G. Kabiller (‘85, ’87 MBA).

Recipients named for inaugural Kabiller Science of Empathy Prize
Northwestern also announced the inaugural winners of the Kabiller Science of Empathy Prize, which recognizes a Kellogg School of Management faculty member who has led novel research advancing understanding of empathy and trust and also recognizes a Kellogg graduate known for leading with exceptional empathy. The prize is made possible by the generosity of Kellogg alumnus David G. Kabiller, co-founder and head of business development at global investment management firm AQR Capital Management. The prize was created to celebrate Kellogg’s strengths in and rigorous approach to empathy and stimulate new research in this area. This year’s faculty prize recipient is Nicole Stephens, Jeanne Brett Chair and Professor of Management and Organizations at Kellogg, and professor of psychology in the Weinberg College of Arts and Sciences, for her research on how misunderstanding across “cultural divides” contributes to systematic inequalities across social groups and settings. Alumni recipient Michael George (‘83, ’85 MBA), who recently retired as president and CEO of Qurate Retail, Inc., was honored for his “low-ego, high-impact” leadership style over a 16-year career.

IBM honors Ginni Rometty with $5 million gift to her alma mater
A $5 million gift from IBM will endow two computer science professorships in Northwestern’s McCormick School of Engineering in honor of Virginia M. “Ginni” Rometty (‘79, ’15 H), the first woman to lead the company. Rometty, a Northwestern alumna and vice chair of the University’s Board of Trustees, retired as executive chairman of IBM in December 2020, having previously served as chairman, president and chief executive officer over a 40-year career. The two professorships will support research and teaching related to artificial intelligence (AI) and machine learning. The first professorship will be awarded to Jessica Hullman, currently associate professor of computer science and journalism. The second professorship will fund the recruitment of a senior scholar who has attained distinction in AI and/or machine learning, with a preference for candidates who have demonstrated a strong commitment to diversity and inclusion in computer science. The professorships come at an important time for Northwestern Engineering, which launched the Computer Science Transformation Initiative in 2016 as part of a plan to hire 20 new faculty members — 10 in computer science and 10 with joint appointments across the University. To date, 11 new faculty have been hired, plus a department chair.

Medill, Google partner to support under-resourced news investigations
In November, Northwestern’s Medill School of Journalism, Media, Integrated Marketing Communications announced a $2 million partnership with the Google News Initiative (GNI). The Data-Driven Reporting Project will bolster the school’s efforts to advance local news and investigative journalism. The Medill-led project will award funds to investigative journalists working for local news outlets and outlets serving underrepresented communities across the U.S. and Canada. The Data-Driven Reporting Project will award $2 million to journalists working on document-based investigative projects. The GNI’s investment will also help cover expenses related to these projects, including document acquisition, storage and processing; staffing and training costs; and
travel or equipment. Medill will provide specialized training, expertise and resources to award recipients, who will be selected by a panel of Medill faculty, journalists and technologists. Medill Dean Charles Whitaker said this project would help address a crucial gap in reporting. “Local journalism is critical to the strength and health of our democracy, but sometimes journalists from smaller news outlets, or freelance writers, don’t have access to the technology and resources to help uncover the information their readers, listeners or viewers need to make informed decisions,” said Whitaker.

Policy-focused research continues to explore pandemic’s social impact
In January, Northwestern announced the second round of projects funded by a $1 million Peterson Foundation grant in 2021. This research is aimed at evaluating policies and action during the COVID-19 pandemic and to explore potential future recommendations to strengthen public health. Five additional faculty members from Northwestern’s Kellogg School of Management and Feinberg School of Medicine have initiative projects thanks to the Peter G. Peterson Foundation Pandemic Response Policy Research Fund. Investigations include studying the impact and economics of telehealth; ways to increase resilience of the healthcare system; tactics to counter harmful health effects of COVID-19 conspiracy theories; COVID-19 surveillance tools; and student loan forbearance during the pandemic.

Office for Research bolsters leadership team
Several recent strategic enhancements have further strengthened Northwestern’s Office for Research (OR), including the addition of Dr. Leon Platanias and Prof. Emma Adam as associate vice presidents for research. Platanias, an eminent Feinberg School of Medicine oncologist and director of the Lurie Comprehensive Cancer Center, brings his biomedical expertise to this new role and will focus on overseeing clinical cancer research, working to optimize University operations essential for such research and leading efforts to streamline cancer clinical trials operations for Northwestern faculty. Adam, a distinguished scholar of human development and social policy, as well as a faculty fellow at Northwestern’s Institute for Policy Research, brings deep disciplinary insights to support research leadership’s continued engagement with Northwestern investigations across fields such as sociology, psychology, anthropology, social policy, and more. She is a faculty member in Northwestern’s School of Education and Social Policy (SESP). Also joining OR as an associate vice president is Dr. Crista Brawley, a highly experienced research administrator and scientist with a doctorate in biochemistry/molecular biology from Johns Hopkins University. She comes to Northwestern from Rush University. Her responsibilities include oversight of key areas of research administration, notably the Institutional Review Board (IRB) Office, the Institutional Animal Care and Use Committee (IACUC) Office, and research-related conflict of interest matters. Vice President for Research Milan Mrksich said the strategic efforts were aimed at increasing operational effectiveness and engagement among the research office and with the University’s schools and units.
Research Highlights

A new treatment for glaucoma?
A Northwestern Medicine study in mice has identified new treatment targets for glaucoma, including preventing a severe pediatric form of glaucoma, as well as uncovering a possible new class of therapy for the most common form of adult glaucoma. In people with high pressure glaucoma, fluid in the eye doesn’t properly drain and builds up pressure on the optic nerve, leading to vision loss. Using gene editing, the scientists in the study developed new models of glaucoma in mice that resembled primary congenital glaucoma. By injecting a new, long-lasting and non-toxic protein treatment (Hepta-ANGPT1) into mice, the scientists were able to replace the function of genes that, when mutated, cause glaucoma. With this injectable treatment, the scientists also successfully prevented glaucoma from ever forming in one model and reduced pressure in the eyes in another, supporting it as a possible new kind of therapy for the most common cause of glaucoma in adults. The study was published Oct. 18 in the journal *Nature Communications*. Dr. Susan Quaggin, chief of nephrology and hypertension in the Department of Medicine at Northwestern's Feinberg School of Medicine, is a corresponding author. Other Northwestern co-authors are Ben Thompson (first), Dr. Jing Jin, Pan Liu (all nephrology and hypertension) and medical student Raj Purohit. This study builds on major teamwork and an ongoing collaboration with University of Wisconsin-Madison co-authors.

For diabetes patients, new hope through nanotherapy
A Northwestern research team has discovered a technique to help control the immune response that destroys insulin-producing tissue in people living with Type 1 diabetes. Typically, Type 1 diabetics suffer from an immune system that attacks and destroys insulin-producing cells, such as those found in pancreatic tissue called islets. Those cells control insulin production when blood sugar levels change. Because of this, Type 1 diabetics must receive daily insulin injections via syringe, pump or other device. In recent decades, transplanting healthy islet tissue into patients with Type 1 diabetes has emerged as a viable cure, but immune system rejection remains a barrier while immunosuppressant drugs can lead to harmful side effects. The new technique developed by Northwestern’s Evan Scott and Guillermo Ameer uses nanocarriers to re-engineer the commonly used immunosuppressant drug rapamycin to generate a new form of immunosuppression capable of targeting specific cells related to the transplant without suppressing wider immune responses. The paper was published Jan. 17 in *Nature Nanotechnology*. Scott is the Kay Davis Professor and an associate professor of biomedical engineering at the McCormick School of Engineering and microbiology-immunology at the Feinberg School of Medicine. Ameer is the Daniel Hale Williams Professor of Biomedical Engineering at McCormick and Surgery at Feinberg. Ameer also serves as the director of the Center for Advanced Regenerative Engineering (CARE), and both professors are members of the Chemistry of Life Processes Institute (CLP).

Researchers pinpoint how Zika virus evades cell’s antiviral response
In a new study of the Zika virus, Northwestern scientists have discovered a key mechanism it uses to evade the antiviral response of the cell it is attacking. This finding contributes to a better understanding of how viruses infect cells, overcome immune barriers and replicate — information that is essential for fighting them. The
Northwestern research reveals how the virus suppresses interferon signaling — a key player in initiating the antiviral immune response — to gain access to the cells. Identification of this specific virus-host interaction offers a new target for antiviral therapeutics. Zika, identified in humans in 1952, is a member of Flavivirus family that includes dengue, hepatitis C, yellow fever and others. The study was published recently in the *Journal of Virology*. Curt Horvath, the paper’s corresponding author, and his lab study the ability of a virus to suppress the human antiviral response. He is professor of molecular biosciences in the Weinberg College of Arts and Sciences and professor of medicine and of microbiology-immunology at the Feinberg School of Medicine.

**Fitbit for the face’ can turn any face mask into smart monitoring device**
Northwestern engineers have developed a new smart sensor platform for face masks that they are calling a “Fitbit for the face.” Dubbed “FaceBit,” the lightweight, quarter-sized sensor uses a tiny magnet to attach to any N95, cloth or surgical face mask. It can sense the user’s real-time respiration rate, heart rate and mask wear time, and also may be able to replace cumbersome tests by measuring mask fit. All this information is then wirelessly transmitted to a smartphone app, which contains a dashboard for real-time health monitoring. The app can immediately alert the user when issues — such as elevated heart rate or a leak in the mask — unexpectedly arise. The physiological data also could be used to predict fatigue, physical health status and emotional state. A tiny battery powers the device, although the FaceBit is designed to harvest energy from various ambient sources, including the force of the user’s breathing, motion and heat from a user’s breath, and the sun. The research was published in January in *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*. Josiah Hester, an assistant professor of computer science, computer engineering and electrical engineering and the Breed Junior Professor of Design at Northwestern’s McCormick School of Engineering, led the device development.

**One coronavirus vaccine may protect against other coronaviruses**
Northwestern Medicine scientists have shown for the first time that coronavirus vaccines and prior coronavirus infections can provide broad immunity against other, similar coronaviruses. The findings build a rationale for universal coronavirus vaccines that could prove useful in the face of future epidemics. The findings were recently published in the *Journal of Clinical Investigation*. Lead author Pablo Penaloza-MacMaster is an assistant professor of microbiology-immunology at the Feinberg School of Medicine. In the study, Penaloza-MacMaster collaborated with Northwestern Medicine physician Dr. Igor Koralnik, chief of neuro-infectious disease and global neurology at Feinberg, and Lavanya Visvabharathy, a postdoctoral research associate in neurological manifestations of COVID-19 at Feinberg.

**Boosters increase protection over full vaccine dose**
A recent Northwestern study on the effectiveness of COVID-19 boosters shows they generate a five-fold stronger antibody response than after a full two-dose vaccination and a 50-fold response than after natural infection. These are the first findings showing the antibody response to booster doses is much larger than the response after the second vaccine dose and even higher than the responses among people who had natural infections as well as full vaccination. The study was conducted among a younger,
healthy adult population, with a median age of 43, recruited from the Chicagoland area. The study was published Nov. 21 on medRxiv. Co-corresponding author Thomas McDade is a professor of anthropology in the Weinberg College of Arts and Sciences and a faculty fellow with the University’s Institute for Policy Research.

**Gene therapy boosts Parkinson’s disease drug benefits**

In late-stage Parkinson’s disease, the drug levodopa becomes less effective in treating symptoms because of the inexorable loss of dopamine-releasing neurons. But a new Northwestern Medicine preclinical study shows a gene therapy targeting the small brain region where these neurons reside substantially boosts the benefits of levodopa. The gene therapy restored the ability of neurons in the substantia nigra to convert levodopa to dopamine. In essence, this allowed levodopa to recreate the environment found in the healthy brain and eliminated the aberrant brain activity responsible for difficulty in moving. In the same study, scientists also provide an explanation for why dopamine-releasing neurons are lost in the disease. Using advanced genetic tools, the authors show that damage to the power plants inside dopamine-releasing neurons (mitochondria) is sufficient to trigger a sequence of events that faithfully recapitulates what happens to brain circuits in Parkinson’s disease. The findings in mice, which were published Nov. 3 in Nature, may help identify humans in the earliest stages of Parkinson’s disease, develop therapies to slow disease progression, and treat late-stage disease. D. James Surmeier, the Nathan Smith Davis Professor and chair of neuroscience at Northwestern’s Feinberg School of Medicine, led the research team.

**‘Dancing molecules’ successfully repair severe spinal cord injuries**

Northwestern researchers have developed a new injectable therapy that harnesses “dancing molecules” to reverse paralysis and repair tissue after severe spinal cord injuries. In a new study, researchers administered a single injection to tissues surrounding the spinal cords of paralyzed mice. Just four weeks later, the animals regained the ability to walk. By sending bioactive signals to trigger cells to repair and regenerate, the breakthrough therapy dramatically improved severely injured spinal cords in several key ways: the severed extensions of neurons, called axons, regenerated; scar tissue, which can create a physical barrier to regeneration and repair, significantly diminished; myelin, the insulating layer of axons that is important in transmitting electrical signals efficiently, reformed around cells; functional blood vessels formed to deliver nutrients to cells at the injury site; and more motor neurons survived. The research was published in the Nov. 12 issue of Science. Samuel I. Stupp, the Board of Trustees Professor of Materials Science and Engineering, Chemistry, Medicine and Biomedical Engineering at Northwestern, led the study, which has since garnered enormous global media attention and public interest.

**ALS therapy should target brain, not just spine**

The brain is indeed a target for treating amyotrophic lateral sclerosis (ALS), Northwestern Medicine scientists have discovered, flipping a long-standing belief that the disease starts in the spinal motor neurons and any therapy would need to target the spine as the key focus. A new Northwestern study published Dec. 2 shows the degeneration of brain motor neurons (the nerve cells in the brain that control limb movement) is not merely a byproduct of the spinal motor neuron degeneration, as had been previously thought. The study was conducted in two mouse models of ALS that
represent 90% of all ALS pathologies. Hande Ozdinler, an associate professor of neurology at the Feinberg School of Medicine, is the study’s lead author. “We discovered that the brain degenerates early in diseases like ALS, sends us warning signals and shows defects very early in the disease,” said Ozdinler. “Our findings not only give legitimacy for targeting brain motor neuron health in ALS as a therapeutic intervention, but it also reveals the first target gene that can help these neurons be revitalized. This has huge clinical implications.”

College football players have abnormalities in coordination and inflammation
A new study between Northwestern Medicine, Pennsylvania State University and other collaborating universities has found collegiate football athletes with a decade or more of experience with the sport have related abnormalities in inflammation, energy production and coordination that are apparent before the football season and across the season. The abnormalities are related to routine repetitive head impacts from tackling and blocking. Most head trauma studies tend to focus on injury being severe enough to cause a clinical concussion, as opposed to assessing the routine effect of repeated tackles or blows to the head over a season. These findings argue that impact-sport athletes, regardless of concussion history, have chronic problems. The research team noted that in addition to common (and costly) imaging techniques such as MRIs, it is vital to better understand how fluctuations in simple blood measures can quantify brain abnormalities. To that end, the scientists developed a statistical method to understand relationships between blood measures, coordination, and head impacts. Hans Breiter, professor of psychiatry and behavioral sciences at Northwestern’s Feinberg School of Medicine, and Semyon Slobounov, professor of neurosurgery at Penn State College of Medicine, and co-senior authors of the study, published Dec. 15 in *iScience*.

Secondary structures in DNA are associated with cancer
A new cancer study reports that DNA manifested as knot-like folds and third rungs between DNA’s two strands may drive cancer development, and an important regulatory enzyme could be associated with the formation of these unusual structures. Scientists from Northwestern Medicine and the La Jolla Institute for Immunology (LJI) have discovered that the loss of TET enzymes — a family of enzymes crucial for removing DNA methylation marks — is associated with B-cell lymphoma. Reduced activity of TET enzymes is common in many different cancers. Understanding the mechanisms behind cancer development upon loss of TET function may open the door for new drug treatment strategies to target multiple cancers. The research was recently published in the journal *Nature Immunology*. Vipul Shukla, an assistant professor of cell and developmental biology at Northwestern’s Feinberg School of Medicine, along with Anjana Rao, a professor in LJI Center for Cancer Immunotherapy, and Daniela Samaniego-Castruita, a University of California San Diego graduate student, are the study’s authors. Shukla’s lab hopes to see how drugs can stabilize the abnormal structures and work as an effective treatment for malignant cells in many cancers. Shukla said there is great potential, and lots more to learn. “The structures are like black boxes....This study sheds light on a new aspect of genome biology,” said Shukla.
Astronomers capture red supergiant’s death throes
A research team from Northwestern University and the University of California, Berkeley, observed a red supergiant during its last days leading to its deadly detonation and collapse into a type II supernova, the first time the phenomenon had been documented. The discovery defies previous ideas of how red supergiant stars evolve right before exploding. Earlier observations showed that red supergiants were relatively quiescent before their deaths — with no evidence of violent eruptions or luminous emissions. The new observations, however, detected bright radiation from a red supergiant in the final year before exploding, suggesting at least some of these stars must undergo significant changes in their internal structure resulting in the tumultuous ejection of gas moments before they collapse. The discovery was published Jan. 6 in *The Astrophysical Journal*. Wynn Jacobson-Galán, a former National Science Foundation (NSF) Graduate Research Fellow at Northwestern before moving to UC Berkeley, is the study’s lead author. Northwestern co-authors include Deanne Coppejans, Charlie Kilpatrick, Giacomo Terreran, Peter Blanchard and Lindsay DeMarchi, who are all members of Northwestern’s Center for Interdisciplinary and Exploratory Research in Astrophysics (CIERA).

Nearly 1,000 mysterious strands revealed in Milky Way’s center
An unprecedented new telescope image of the Milky Way galaxy’s turbulent center has revealed some 1,000 mysterious strands inexplicably dangling in space. Stretching up to 150 light years long, the one-dimensional filaments are found in pairs and clusters, often stacked equally spaced, side by side like strings on a harp. Using observations at radio wavelengths, Northwestern’s Farhad Yusef-Zadeh discovered the highly organized, magnetic filaments in the early 1980s. The mystifying filaments, he found, comprise cosmic ray electrons gyrating the magnetic field at close to the speed of light. But their origin has remained an unsolved mystery ever since. Now, the new image has exposed 10 times more filaments than previously discovered, enabling Yusef-Zadeh and his team to conduct statistical studies across a broad population of filaments for the first time. This information potentially could help them finally unravel the long-standing mystery. The study has been accepted for publication by *The Astrophysical Journal Letters*. Yusef-Zadeh, a professor of physics and astronomy at Northwestern’s Weinberg College of Arts and Sciences and a member of the Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA), is the paper’s lead author.

Chemists develop a fundamentally new mode of adsorption
A research team led by Northwestern chemists has made a breakthrough in surface science by introducing a new active mechanism of adsorption. Such adsorption-based phenomena — in which molecules are attracted onto a solid surface — are essential for today’s catalysts, energy storage and environmental remediation. The research demonstrates how artificial molecular machines (wholly synthetic molecular components producing machine-like movements) that are grafted on surfaces can be used to “recruit” molecules onto these surfaces at very high concentrations, thereby storing significant amounts of energy. The new adsorption mechanism, called mechanisorption, results from non-equilibrium pumping to form mechanical bonds between the adsorbent (the surface) and the adsorbate (the molecules). The research team says their work is the first major fundamental advance in surface chemistry in many decades. The study, “Active mechanisorption driven by pumping cassettes,” was
published Oct. 21 in *Science*. Sir Fraser Stoddart, who received the 2016 Nobel Prize in Chemistry for his work involving the design and synthesis of molecular machines and is the Board of Trustees Professor of Chemistry at the Weinberg College of Arts and Sciences, is the investigation’s co-corresponding author, along with University of Maine professor Dean Astumian, a theorist in the department of physics and astronomy, and Omar Farha, an expert in metal-organic framework chemistry and a professor of chemistry at Northwestern. Liang Feng and Yunyan Qiu, postdoctoral fellows in Stoddart’s lab, are the paper’s co-first authors.

**New holographic camera sees the unseen with high precision**
Northwestern researchers have invented a new high-resolution camera that can see the unseen — including around corners and through scattering media, such as skin, fog or potentially even the human skull. Called synthetic wavelength holography, the new method works by indirectly scattering coherent light onto hidden objects, which then scatters again and travels back to a camera. From there, an algorithm reconstructs the scattered light signal to reveal the hidden objects. The study was published Nov. 17 in *Nature Communications*. The method also has potential to image fast-moving objects, such as the beating heart through the chest or speeding cars around a street corner. Beyond more obvious applications — noninvasive medical imaging, early-warning navigation systems for automobiles and industrial inspection in tightly confined spaces — the innovation has vast potential applications, say the Northwestern researchers.

“Our technology will usher in a new wave of imaging capabilities,” said Northwestern’s Florian Willomitzer, first author of the study and research assistant professor of electrical and computer engineering at the McCormick School of Engineering. “Our current sensor prototypes use visible or infrared light, but the principle is universal and could be extended to other wavelengths. The same method could be applied to radio waves for space exploration or underwater acoustic imaging. It can be applied to many areas, and we have only scratched the surface.”

**Machine learning used to predict synthesis of complex novel materials**
Researchers at Northwestern and the Toyota Research Institute have successfully applied machine learning to guide the synthesis of new nanomaterials, eliminating barriers associated with materials discovery. The highly trained algorithm combed through a defined dataset to accurately predict new structures that could fuel processes in clean energy, chemical and automotive industries. The study’s data-generation tool, called a “Megalibrary,” dramatically expands a researcher’s field of vision, producing an unprecedentedly large, quality dataset. Each Megalibrary houses millions or even billions of nanostructures. The study was published Dec. 22 in *Science Advances*. Corresponding author Chad Mirkin is the George B. Rathmann Professor of Chemistry in the Weinberg College of Arts and Sciences; a professor of chemical and biological engineering, biomedical engineering, and materials science and engineering at the McCormick School of Engineering; and a professor of medicine at the Feinberg School of Medicine. He also is the founding director of the International Institute for Nanotechnology. Mirkin’s team also created the Megalibrary tool, doing so by using a technique (also invented by Mirkin) called polymer pen lithography, a massively parallel nanolithography tool that allows site-specific deposition of hundreds of thousands of features per second.
Pandemic’s effect on scientists may be long lasting, study finds

More than a year-and-a-half after the onset of the COVID-19 pandemic, the scientific community is still feeling the effects of the vastly disruptive event — and may for many years to come. A new study led by Northwestern’s Kellogg School of Management found that although researchers’ productivity levels have mostly returned to pre-pandemic highs, scientists who did not pursue COVID-19-related research initiated 36% fewer new projects in 2020 compared to 2019. This dramatic decline in new projects suggests the pandemic’s impact on science may be longer lasting than commonly imagined. The study showed that researchers are busy working on established topics, writing up existing work, reviving legacy projects, or revisiting previous data, said Dashun Wang, professor of management and organizations at the Kellogg School of Management and of industrial engineering and management sciences in the McCormick School of Engineering. Prof. Wang led the study, which was published Oct. 26 in *Nature Communications*.

**Academic Affairs Updates**

**School of Professional Studies**

*School of Professional Studies to Offer Online Master’s in Healthcare Administration*

The School of Professional Studies will launch a new online Master of Science in Healthcare Administration in spring 2023 in partnership with the Feinberg School of Medicine. As demand for managerial positions in healthcare continues to increase, the Master of Science in Healthcare Administration will prepare students for leadership roles in the business side of the healthcare field. SPS has collaborated with faculty and staff from Northwestern Memorial Hospital to design a curriculum that is tailored to mid-level managers in both clinical and non-clinical settings seeking the management skills they need to advance their careers. This program will be unique in this space and fulfilling a demand in the marketplace, as it is one of the only online MHA degrees offered by a top-tier university, offering both high quality and flexibility to busy medical professionals. This new program builds upon a productive collaborative relationship between Feinberg and SPS and the two graduate degree programs the two schools already share: the MS in Health Informatics and MS in Health Analytics.

**Northwestern University-Qatar**

*Northwestern Qatar announces Institute for Advanced Study in the Global South*

The new research institute will serve as a flagship initiative for the school. Dean Marwan M. Kraidy said that it is “designed to amplify the reach and impact of our faculty and student research and mediamaking, and to enhance our reputation as a distinctive contributor to Northwestern University, the Qatar Foundation, and knowledge more broadly.”

With key partners from Evanston, particularly the Buffett Institute for Global Affairs, the Institute for Advanced Study in the Global South will produce and promote evidence-based storytelling focused on the histories, cultures, societies, and media of the Global South. It seeks to enhance diversity, equity, and inclusion in the research community and mitigate the under-representation of researchers and creators from the Global South in global knowledge production. The institute will be transformative in
positioning NU-Q to shape our understanding of the world beyond the West and broadening Northwestern University’s global reach as it continues to rise to the top of rankings worldwide.

Marking 10-year celebration of NU-Q alums
Northwestern University in Qatar graduated its first class in 2012 and the school is celebrating its alumni to mark this 10th anniversary. Since its founding in 2008 in partnership with the Qatar Foundation, Northwestern Qatar has graduated more than 500 alumni who have become leaders and practitioners in media, journalism, government, business, and higher education.

Trustee News and Honors

Shannon awarded Lifetime Achievement Award
Michael Shannon, Co-founder and Chairman of KSL Capital Partners, LLC, received the Lifetime Achievement Award during the 21st annual Americas Lodging Investment Summit in January. The award is presented to an individual who has made significant contributions to the hospitality industry through their actions, deeds, and great accomplishments. KSL Capital Partners was founded in 2005 and has raised more than $15 billion in equity capital commitments and investments exclusively in travel and leisure businesses.

Leventhal tapped for Ambassador to the Kingdom of Denmark
Life Trustee Alan Leventhal was nominated on January 19, 2022, by President Biden to be the United States Ambassador Extraordinary and Plenipotentiary to the Kingdom of Denmark. The Senate will need to confirm this nomination before Leventhal assumes the role. Leventhal is the Chairman and CEO of Beacon Capital Partners, one of the leading owners and managers of office properties in the United States. In addition to serving as a Life Trustee at Northwestern, Leventhal is on the Executive Committee of the Corporation of Massachusetts Institute of Technology and trustee emeritus and former chair of the Board of Trustees at Boston University.

Administrative Update

Government Relations
In October, the Illinois General Assembly amended the 2019 Sports Wagering Act to permit betting on Illinois collegiate athletic teams, as long as such bets are placed in person at State-licensed sportsbooks. Wagers are also limited to the outcome of games, rather than individual performance. Despite opposition from Athletic Directors and institutions representing all thirteen Division I athletics teams, the amended bill removes the original ban designed to protect collegiate athletes from additional pressure both online and in-person.

In November, Chicago Mayor Lori Lightfoot offered remarks at the Pritzker School of Law annual Law Review Symposium, “Reimaging Property in the Era of Inequality.” She
provided an update about Chicago’s new housing policies and engaged in a question and answer with Pritzker Dean Hari Osofsky.

In early December, Senator Tammy Duckworth virtually visited campus to speak at the Buffett Institute fireside chat moderated by Annelise Riles. The conversation, including audience questions, examined the intersection of climate change, national security, climate justice, and how universities can partner with the government to achieve meaningful change across these topics.

In January, VPR Milan Mrksich attended an event hosted by World Business Chicago that featured the Serbian Foreign Minister, his Excellency, Mr. Nikola Selakovic, who spoke about potential collaborations between Chicago institutions and the Republic of Serbia.

**Community Relations**

**Northwestern Emeriti Organization wins innovation award for mini-courses**

The Northwestern Emeriti Organization has won the “Innovation Award” from the National Association of Retirement Organizations in Higher Education for establishing a series of “mini-courses” taught by retired faculty for residents of Evanston and other local communities. The courses began in the fall of 2019 in partnership with the Evanston Public Library. So far, the retired Northwestern faculty members have taught seven courses, with participation ranging from 50 to 300 people for each course. University leaders have said the initiative reflects another way Northwestern looks to strengthen relations with the local community.

**Global Marketing and Communication**

**Top Media Stories**

The University and its faculty continue to garner national and global media coverage. Since November, top stories include Feinberg’s Marilyn Cornelis’s research on the genetic predisposition of preferring black coffee (period reach: 19.1 million); Northwestern Law’s Deborah Tuerkheimer and Weinberg’s Sanford Goldberg’s commentary on the sex-trafficking trial of Ghislaine Maxwell (period reach: 18.6 million); McCormick’s Sam Stupp’s research on an injectable therapy that reverses paralysis and repairs tissue after severe spinal cord injuries (period reach: 17.5 million); Weinberg’s Raffaella Margutti’s observations of a red supergiant before, during and after a supernova explosion for the first time (period reach: 13.6 million); and Feinberg’s Robert Murphy, Robert Havey and Mercedes Carnethon’s commentary on why it is not a good idea to try to gain natural immunity by intentionally contracting COVID-19 (period reach 13.4 million).

**Top Northwestern Social Media Coverage**

OGMC continues to grow Northwestern’s top-level social media presence (Instagram, LinkedIn, Twitter, Facebook) by sharing stories both from OGMC as well as highlighting notable moments from all across the University. Posts celebrating the first Early Decision admits to the Class of 2026 reached 471.9K users and received 13.2K engagements. In collaboration with Athletics, posts around the Field Hockey team’s national championship run reached 4.3 million users and received 36.6K engagements. Posts promoting MLK Dream Week and recapping the keynote event with Nikole
Hannah-Jones in total reached 1.9 million users and received 4.1K engagements. Posts surrounding the Northwestern Magazine feature on Dwight White II & his new mural at the Black House reached 390.6K users and received 3.2K engagements.

**Athletics Update**

**Academic Excellence**
Northwestern student-athletes earned a school-record 163 Fall Academic All-Big Ten honorees in 2021, the fourth consecutive year the department has set a new high-water mark. Wildcats football set a new program record with 76 Academic All-Big Ten honorees, besting last year's total of 69 recipients.

**National Champions!**
Northwestern field hockey won the first NCAA Championship in program history, and the Wildcats first NCAA team title since 2012. Led by head coach Tracey Fuchs and the NHFCA Staff of the Year, the ‘Cats knocked off North Carolina, Iowa and Harvard on their way to the national championship game, where they defeated Liberty (coached by ‘Cats alum Nikki Parsley) 2-0 to claim the crown.

**Head Coach Contract Extensions**
The leaders of three of the last four Wildcats programs to win NCAA titles all received multi-year contract extensions in February. Field hockey head coach Tracey Fuchs, wrestling head coach Matt Storniolo, and Combe Family Lacrosse Head Coach Kelly Amonte Hiller all inked deals that will keep them in Evanston for years to come.

**Basketball Giant Slayers**
Both men’s and women’s basketball earned victories over top-ranked opponents in Big Ten play. Men’s basketball upset No. 9 Michigan State in East Lansing in January, while the women’s team knocked off No. 4 Michigan in double overtime at Welsh-Ryan Arena. Wildcats women’s basketball is led by senior Veronica Burton, the two-time Big Ten Defensive Player of the Year, who is on the short list for multiple national awards.

**High Expectations for Spring**
Wildcats lacrosse opened the season as the unanimous No. 1 team in the Big Ten – and No. 4 nationally, while both men’s tennis and softball began the campaign ranked inside the nation’s Top-30. Women’s golf teed off 2022 with a victory at the Big Ten Match Play Championship.