



Wendy Wall:
Why the
Humanities
Matter 4



O'Halloran
Among Those
Honored for
Research
Impact 13



Adam to Discuss
Discrimination's
Lasting Effects
at Tonight's
Science Café¹⁰

Star Turn for Solar Fuels, Thanks to Northwestern Research

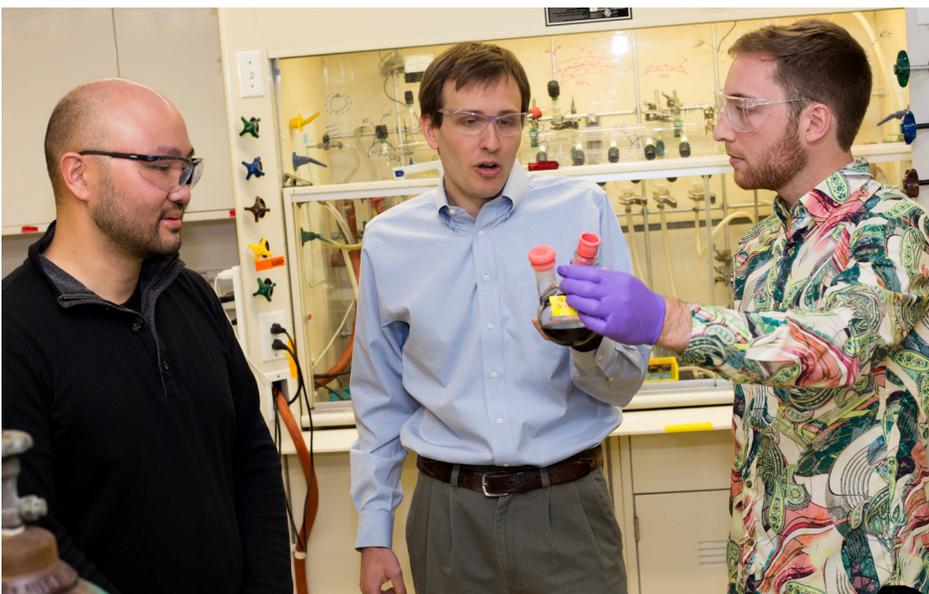
Walking through campus, Justin Notestein envisions solar fuel where others see only shadows. He's looking to bring the sun down to earth in a new way that could help power cars and illuminate communities.

"Nature has provided a perfect example – in photosynthesis – for turning sunlight into energy," says Notestein, chemical and biological engineering. "One of the challenges for Northwestern's Solar Fuels Institute (SOFI) is to hyper-localize this artificial process by engineering a clean fuel source for individual homes."

SOFI's "artificial tree" is a modular system that uses a renewable energy source – the sun – to help capture carbon dioxide in the air and convert it into methanol.

This spring, Notestein and first-year graduate student **Alex Grant** started work on the initial portion of a four-phase Demo Project that will result in SOFI's first prototype. Notestein's lab is developing a small-scale carbon dioxide to methanol reactor that will anchor the project.

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Photos by Eileen Maloney

From left: Dick Co, managing director of Northwestern's Solar Fuels Institute (SOFI), talks with Justin Notestein, chemical and biological engineering, and graduate student Alex Grant about the first phase of SOFI's Demo Project, which aims to turn sunlight into liquid fuel.

Water Sustainability the Focus of New OR Research Center



Aaron Packman

Water sustains all life on the planet, but conserving the natural resource - stretched and stressed by climate change, economic development, and global population growth - is one of the world's most critical challenges.

To catalyze research and education on complex water issues, the University has established the interdisciplinary Northwestern Center for Water Research (NCWR).

Northwestern is also contributing to a larger initiative called "Current," launched by Chicago Mayor Rahm Emanuel, to make the Chicago region a water hub for economic and technological innovation. *continued, page 5...*

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“As currently practiced, the CO₂ to methanol reaction is exactly the type of process you would never want to put in your garage,” says Notestein. “The required catalyst is extremely sensitive, and presents an engineering challenge to make it practical. Our team is exploring new materials that we feel will be more robust and allow us to operate at lower, safer pressures.”

Carbon-neutral methanol attracted SOFI's interest, in part, because of the substance's flexibility. Methanol is already a proven drop-in fuel for internal combustion engines. In fact, gasoline in China often features a blend of methanol, similar to how ethanol is a frequent additive in the United States.

Dick Co, SOFI managing director, began talking with Notestein and Grant about the final conversion in a functional solar fuel generator about six months ago. The project's modular nature will allow elements in each phase of the prototype to evolve, merge, or be replaced by new breakthrough technologies over time.

“Our research is focused on this critical end component — the chemical conversion of CO₂ to methanol,” says Grant. “Ultimately, our module will be built upon in subsequent phases and the resulting system will maintain an ability to make energy dense fuels cheaply from carbon waste.”

SOFI launched in 2011 as a global research consortium of universities, industry members, and government labs — including Argonne National Laboratory — committed to developing and commercializing a liquid solar fuel. The Demo Project relies on solar energy to generate the electrical and thermal energy needed to drive water electrolysis for renewable hydrogen, direct air capture of CO₂, and ultimately methanol production.

“Our vision is for distributed energy generation and storage, in the form of a liquid hydrocarbon,” Co says. “This device, perhaps the size of a washing machine, would take carbon dioxide out of the air, combine it with water, and convert collected solar energy into a liquid fuel. We'd effectively be turning your garage into a pumping station while bypassing the drilling for oil, refining, and transporting the fuel parts of today's fossil fuel process.”

Rather than take a catalyst “off the shelf” and run it as a miniaturized version of existing chemical plants, Notestein and Grant have identified several materials that might be optimized for small-scale use.

“This research, like many of the most interesting projects in my group, is driven by the students,” says Notestein. “We're really a design group, so the goal is to make new materials for specific applications or take an existing material and drive it in a totally new direction.”

The remaining phases of the Demo Project will begin during the next year at Northwestern, starting with hydrogen generation from water, then incorporation of solar power, and finally direct air capture of CO₂. Completion of the next three phases will supply Notestein and Grant's reactor with renewable feedstock (hydrogen and CO₂) and power, allowing the Demo Project to be truly carbon-neutral.

“There are already ways to complete the reactions in each of the four phases that make up our Demo Project,” says Co. “By optimizing each — beginning with a catalyst designed in the Notestein lab — and keeping an eye on systems integration, we can make solar fuel a reality in the near future and provide the community a platform to collaborate and continually improve upon.”

Knowledge Map

Northwestern's Solar Fuels Institute believes that its Knowledge Map can transform how scientists interact with published data to allow them to work more effectively. The approach — analogous to how today's travelers manipulate landing and arrival times on websites to find an ideal itinerary — can help limit researcher error propagation and facilitate more appropriate comparisons among different studies.

Typically, when a scientific paper is accepted for publication, its experiments and results are compiled into paragraphs of text, figures, and tables. This final product is packaged into a downloadable PDF, where the results are digitally inaccessible. This system works for journals and scholars looking to understand the specific methods and significance behind a single finding, but makes it very challenging to locate or compare different data on similar topics. The SOFI Knowledge Map is a science-specific taxonomic system that is working to solve this challenge.



Research Note: Northwestern Innovation Promises a Better World – Today and Tomorrow

Complex global challenges often demand robust, collaborative responses – including partnerships among academia, government, and the market.

For example, when the Flint, Michigan, water crisis made national headlines this year, it reminded us about the vital importance of this natural resource. It also highlighted the crucial role that economics, infrastructure, and technology play in treating and transporting safe water to our communities. In Flint, tragically, water contamination has exposed thousands of children to dangerous levels of lead. As Flint tries to recover from this crisis, other communities across the United States are assessing their aging and neglected water infrastructure.

At Northwestern, we're playing a leadership role in strengthening the future of our cities and their resources. Our recently launched [Center for Water Research](#) showcases the University's interdisciplinary expertise and our ability to harness that expertise to spur innovation. The center, led by [Aaron Packman](#) (civil and environmental engineering), will bring together experts from various knowledge domains – including engineering, policy, law, and medicine. The center's research will advance fundamental water science that enables new water technologies and processes. Existing Northwestern University Research Centers, including [NAISE](#), [ISEN](#), and the [Environmental Advocacy Center](#), will also be partners in this new research focus.

This cross-disciplinary collaboration within Northwestern is mirrored in a broader public-private partnership called [Current](#). The initiative combines Northwestern's research talents with the efforts of the City of Chicago, Argonne National Laboratory, UI Labs, the University of Chicago, the University of Illinois, McKinsey, and World Business Chicago. Other key partners include The Nature Conservancy and the Chicago Botanic Garden. [Current's](#) approach to using science and technology to create a sustainable,

secure water future has earned it national visibility, including at the White House Water Summit, held in conjunction with the United Nations World Water Day on March 22.

Next-generation thinking with far-reaching implications is also fueling another exciting Northwestern research initiative: the [Center for Synthetic Biology](#). Launched in March and co-directed by [Milan Mrksich](#) (biomedical engineering, chemistry, and cell and molecular biology) and [Michael Jewett](#) (chemical and biological engineering), the center combines the tools of engineering, medicine, physics, and computer science to harness biological processes. The research promises to impact a range of fields and deliverables, including targeted therapeutics, sustainable chemicals, and ultramodern materials.

In fact, synthetic biology has been heralded as the "Field of the Future" thanks to the diverse possibilities it offers through reengineering living systems – including using "cells as factories" to produce novel pharmaceutical proteins and biomolecules. "Designer microbes" have the potential to find and destroy tumors, help clean up toxic spills, and more. Such outcomes can help eradicate disease, create environmentally friendly fuels, and improve agriculture.

Synthetic biology as a field is little more than a decade old, yet it's already made important progress: for example, synthetic biologists have successfully produced an anti-malarial drug in the lab, which offers huge benefits for nearly half the world's population – 3.2 billion people – annually at risk for contracting malaria, according to World Health Organization figures. Northwestern has developed significant research strength in synthetic biology. That strength continues to grow, thanks to the new center and because of University-wide commitment to promoting innovative discovery.

Northwestern is distinguished by this diverse, high-impact research – research that's often the result of great minds coming together across disciplines to find solutions

Photo by Nathan Mandell



to complex problems. These newest centers exemplify Northwestern's longstanding commitment to knowledge creation that makes life better for people and the planet.

Vice President for Research

April is Spring Cleaning Month!

The Office for Research Safety (ORS) asks each research group to schedule a spring cleaning day in April.



RESEARCH

[Click here for the spring cleaning checklist.](#)

Origins: Exploring the Journey of Discovery

Drawing on centuries of knowledge, humanities scholar Wendy Wall provides insights that help define who we are today

A caricature of scientific endeavor might place discovery at a remove from the people whose talents and curiosity drive progress, or those who benefit from it.

Of course, knowledge is actually rooted in the lived ideas, values, and challenges of individuals in society across time and space. That's why at Northwestern the humanities are a vibrant, essential complement to the University's excellence in the STEM fields. Disciplines as diverse as history, anthropology, philosophy, language, religion, and law appear under the humanities banner. These and other fields provide a powerful lens through which to explore human culture today and over the centuries.

For **Wendy Wall**, English and director of the [Alice Kaplan Institute for the Humanities](#), these subjects exemplify Northwestern's commitment to wide-ranging inquiry. By preserving and extending traditional forms of knowledge, the humanities offer a rich, fascinating guide for how to live in a changing world. They help articulate our identity and aspirations. In doing so, they also inform our approach to science and technological innovation.

Yet, making the case for the humanities can encounter challenges in the Big Data era.

"Our society appreciates problems that can be answered by data," says Wall, an expert in early modern (1500-1700) literature and culture, including Shakespeare and the role of women in literary history. "But we often don't acknowledge the humanistic skills that underwrite that process."

The humanities teach critical and creative thinking, says Wall. They also provide the "foundational ethical evaluation of which problems to address." These disciplines offer the historical framework and "interpretive sophistication" to put modern solutions in context. "I don't think that the question of what makes us human is one that will be

decided by a technological discovery," she says.

Wall is an award-winning scholar and teacher who, most recently, was elected president of the Shakespeare Association of America. *Research News* asked Professor Wall to share her perspective on the humanities, her research, and her professional journey

What was your earliest "scholarly" interest or discovery?

As a child and teenager, I worked during the summer in my father's printing shop doing chores like cleaning ink and sorting paper. Eventually, I proofed copytext. On the few occasions that I was allowed to operate the press, I was mesmerized by the bulky machinery that could duplicate pages at lightning speed. My earliest "discovery" was the epiphany that the books I loved to read were also material artifacts, and that their incarnation as physical objects was very much part of their meaning. In fact, my dissertation became a story about how printing technology prompted Renaissance poets to reshape conceptions of authorship and reading. I found that this collision between technology and literary form was also a story about changing gender roles. All of my work to date has involved the study of women and gender in literature and history.

What shaped your interest in English and language?

My mother was a ninth-grade English teacher in a rural Alabama school. She wanted to offer students tools for appreciating literature but also for managing conflict — including heightened racial unrest. She taught Harper Lee's *To Kill a Mockingbird* and Shakespeare's *Romeo and Juliet*. My first introduction to Shakespeare was through the lens of its relevance to lived experience. I grew up listening to stories about how her students struggled with



Shakespeare's dense language and how she made these texts come alive for people deeply suspicious about obscure and seemingly impractical artistic creations. From her stories, I saw how instrumental and empowering fictions could be for grappling with tough social issues. So from an early age, I had hands-on experience with books as typographical artifacts and as imaginative scripts that could have an impact on communities.

What most appeals to you about the humanities and your Shakespeare research?

I first became intrigued by Renaissance literature because of its immense cultural power and the dazzling complexity of its language. After all, the Renaissance was a time when politicians, scientists, and preachers prized literary writing as an essential skill and they used literature to achieve practical vocational aims. In my research, I enjoy tracking the ways that poems and plays — and even writing that we consider trivial, such as recipes — allow people to explore and test identities, political ideas, gender roles, fantasies, and

emotions. Shakespeare's works offer a stunning archive in this regard.

What can science learn from the humanities, and vice versa?

I'm particularly interested in Shakespeare's era because the sciences and the humanities were not separate paths of knowledge-production. During this time, scientists wrote literary allegories to explain their experiments and playwrights tested new theories of cosmology as they spun their plots. Today these disciplines seem separate, but they have much to say to one another. Almost any issue that scholars tackle — the environment, urban problems, or the human body — involves some knowledge that is deemed "fact" and some that is deemed "interpretation."

If you weren't a humanities scholar, what path might you have chosen?

I took a personality test in college to see what career might suit me. It matched me with three professions: teacher, librarian, or military officer. I never considered the latter, though I did think about being a lawyer. I don't really fantasize about other careers because I can't think of a profession in which I could so freely reinvent my sphere simply by choosing new intellectual challenges. My projects have ranged from studies of domestic labor to the politics of devotional poetry; from the conditions of theater, to digital ways to map Shakespeare's works as they travelled across the globe over 400 years. My first book [*The Imprint of Gender*] was sparked by a question that at first blush seems quirky: Why did early publishers present their books as imperiled maidens spied upon by voyeuristic publics? My latest project [*Recipes for Thought*] took me into the world of Renaissance recipes where I found that women in the kitchen sometimes wrote on food — a new form of literacy indeed! — while also conducting scientific experiments. Being a literary scholar and a teacher allows me immense intellectual scope.

...Water Center continued from cover

"The Current public-private partnership will make Northwestern's Water Center even stronger," says center director **Aaron Packman**, civil and environmental engineering. "Working with strong industrial, governmental, and community partners will help us achieve our goal of developing global solutions for regional problems."

NCWR will integrate research efforts across the University and focus on long-term solutions to ensure water security and sustainability, regionally and globally. Outside collaborations with research institutions and conservation organizations, as well as with educational initiatives and through public outreach, will prove crucial to the center's success.

"We have a tremendous capability at Northwestern to solve diverse problems related to the global water crisis, as well as to advance Chicago's water economy through technological innovation," says Packman. "Water sustainability and security touch every area of Northwestern, including science, engineering, law, and medicine, and I know people are eager to be involved. The center will bring experts together to contribute to solutions through science, technology and policy."

To facilitate collaborations at Northwestern and elsewhere, the center has partnered with the Institute for Sustainability and Energy at Northwestern (ISEN), Northwestern-Argonne Institute of Science and Engineering (NAISE), and Northwestern Pritzker School of Law's Environmental Advocacy Center. Important outside partners include Argonne National Laboratory and conservation organizations such as The Nature Conservancy and the Chicago Botanic Garden.

[Learn more.](#)

Kaplan Institute Names New Fellows

The Alice Kaplan Institute for the Humanities has named its 2016-17 fellows. This competitive residency — juried by eminent humanities faculty members outside of Northwestern — allows recipients either a full year of leave or a teaching reduction in order to further develop their interdisciplinary research projects.



Héctor Carrillo,
sociology

John Alba Cutler,
English

Jonathon Glassman,
history

Brannon D. Ingram,
religious studies



Nitasha Tamar Sharma,
African American studies

Erica Weitzman,
German

Michelle M. Wright,
African American studies

University Board of Trustees Appoints Named Professorships

Northwestern's Board of Trustees has appointed 10 faculty members to named professorships. The faculty and their appointments are:

Jaehyuk Choi, dermatology, has been named the Ruth K. Freinkel, MD, Research Professor

Richard D'Aquila, medicine: infectious diseases, has been named the Howard Taylor Ricketts Professor of Medicine

Francis Giles, medicine: hematology/oncology, has been named the Johanna Dobe Professor Hematology/Oncology

Daniela Matei, medicine: hematology/oncology and obstetrics and gynecology: gynecologic oncology, has been named the Diana, Princess of Wales, Professor of Cancer Research

Kelly Michelson, pediatrics: critical care, has been named the Julia and David Uihlein Professor of Bioethics

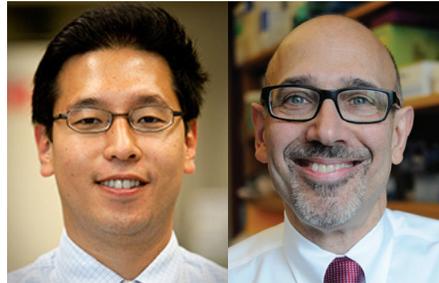
Aaron Naber, mathematics, has been named the Kenneth F. Burgess Professor of Mathematics

Guillermo Oliver, medicine: nephrology, has been named the Thomas D. Spies Professor of Lymphatic Metabolism

Thomas Shanley, pediatrics, has been named the Founders' Board Centennial Professor

Michael Terry, orthopaedic surgery, has been named the Dr. Charles and Leslie Snorf Professor of Orthopaedic Surgery

Robert Vogelzang, radiology, has been named the Albert Nemcek Education Professor of Radiology



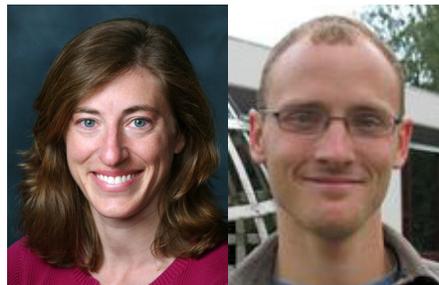
Jaehyuk Choi

Richard D'Aquila



Francis Giles

Daniela Matei



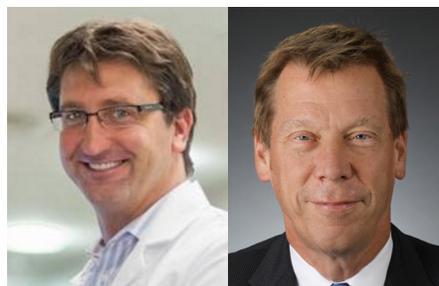
Kelly Michelson

Aaron Naber



Guillermo Oliver

Thomas Shanley



Michael Terry

Robert Vogelzang

Northwestern Creates Faculty Diversity Award and Grant

Northwestern has developed two new funding programs in an ongoing effort to foster and recognize faculty excellence in diversity and equity.

The Provost Award for Faculty Excellence in Diversity and Equity celebrates outstanding people or groups who are working collaboratively to build a more diverse, inclusive, and equitable climate at Northwestern. Two \$5,000 awards will be given each year.

The Provost Grant for Faculty Innovation in Diversity and Equity funds novel and innovative practices that will enhance education and research through improved diversity and inclusion. Funding is expected to range from \$2,000 for modest proposals to \$25,000 for extensive proposals that may include multiple faculty partners or extend across units or schools.

[Learn more.](#)

Foundation Relations and Corporate Engagement have launched a new monthly publication to promote select funding opportunities. View or subscribe to the newsletter [here.](#)

Harel, Stern Receive Navy Young Investigator Award

The Office of Naval Research (ONR) has selected **Elad Harel**, chemistry, and **Nathaniel Stern**, physics and astronomy, to receive its prestigious 2016 Young Investigator Award.

ONR Young Investigator grants typically provide more than \$500,000 of research support over three years, with additional funding available for equipment.

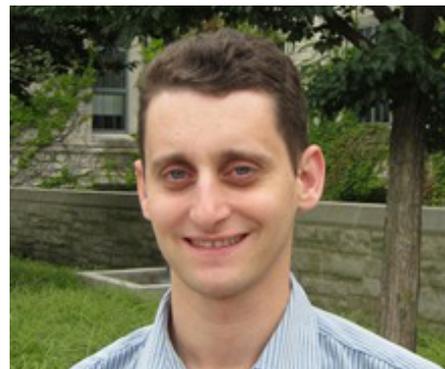
Harel's research focuses on highly interdisciplinary discovery that melds biology, materials chemistry, mathematics, and engineering. He is a recognized leader in the field of spectroscopy and imaging of condensed phase chemical and biological systems. His work in magnetic resonance and optics has enabled Harel to develop new methods that allow deep insights into how energy flows in materials at the extremes of time and space.

Stern's research develops methods to use light to study the unique properties of nanoscale systems that emerge from quantum physics. When materials are reduced to their fundamental size limits, new and often counterintuitive behaviors appear that can be probed and manipulated with high precision using light. Stern's work will investigate new ways for controlling the dimensionality of nanomaterials barely a single atom thick. The findings could impact many electronic and information technology applications.

[Read more.](#)



Elad Harel



Nathaniel Stern

Major Funding Bolsters Innovative Discovery at Northwestern

Northwestern's entrepreneurial culture continues to thrive, and now aspiring entrepreneurs and innovators will benefit from two new commercialization resources.

The \$10 million N.XT Fund for faculty and students will support early-stage innovations based on Northwestern technologies (patented by the University) that are too advanced for federal funding but too early for private investment. Applications for the first funding cycle are due April 21.

The \$4 million NUseeds Fund will support student startups with or without Northwestern-owned technologies. The goal is to accelerate the successful launch of innovations from Northwestern by financing the most promising early-stage ventures. NUseeds is being supported by philanthropic gifts as part of the University's "We Will" campaign. The inaugural NUseeds funding cycle is now open.

N.XT and NUseeds advance the University's discovery ecosystem — including the efforts of The Garage, an innovation space established last year at Northwestern, as well as the robust entrepreneurial curricula from the Farley Center for Entrepreneurship and Innovation, the Larry and Carol Levy Institute for Entrepreneurial Practice, and the Donald Pritzker Entrepreneurship Law Center.

[Learn more.](#)

I3 Doubles Grant Support

The Innovative Initiatives Incubator (I3) program is now accepting applications. I3 is a component of *NU-Interdisciplinary Program 1-2-3*, an effort that promotes high-risk, high-gain initiatives in a risk-tolerant environment.

Supported by a partnership between the Office for Research and Northwestern's colleges, the I3 program invites proposals for bold, innovative research. Designed to draw on Northwestern's interdisciplinary strengths, the proposal must include faculty from at least two schools and at least three departments.

The I3 program provides up to \$120,000 annually for up to two years, doubling the level of support previously available.

The application deadline is June 10.

[Learn more.](#)

Northwestern Launches Interdisciplinary Center for Synthetic Biology

Northwestern continues to strengthen its place in an exciting multidiscipline domain with the launch of the [Center for Synthetic Biology](#). The initiative harnesses the thought leadership of the University's engineering, medical, and liberal arts schools.

"This center will rapidly raise our leadership profile in the field," says center director **Milan Mrksich**, biomedical engineering, chemistry, and cell and molecular biology. "It will create a community where the best faculty, students, and postdoctoral fellows find an intellectual home with partners from diverse backgrounds, a suite of technologies that allow research to be performed at the highest level, and a vibrant program for visitors from within and outside Northwestern. This will create an ecosystem for synthetic biology that is second to none."

Synthetic biology uses tools and concepts from physics, engineering, and computer science to harness biological processes. Much of this research focuses on reprogramming cells by changing their DNA to take on new, specialized purposes, such as creating sustainable chemicals, next-generation materials, or targeted therapies.

"The center will focus on research that lies at the intersection of science and technology, creating opportunities for technology transfer, clinical translation, and commercialization," says center co-director **Michael Jewett**, chemical and biological engineering. "Our educational priorities will help create a tightknit community that further enhances this field." [Learn more.](#)



Photo by Sally Ryan

Pictured from left: Jay Walsh, vice president for research; Neda Bagheri, chemical and biological engineering; Joshua Leonard, chemical and biological engineering; Keith Tyo, chemical and biological engineering; Julio Ottino, McCormick dean; Julius B. Lucks, chemical and biological engineering; Milan Mrksich, center director; Eric G. Neilson, Feinberg dean; and Michael Jewett, center co-director.

Today's NICO Lecture: Economist Notowidigdo on 'Wealth Effect'

Today's Northwestern Institute on Complex Systems (NICO) presentation, "The Effect of Wealth on Individual and Household Labor Supply: Evidence from Swedish Lotteries," features the work of Matthew Notowidigdo, economics.

Notowidigdo studies the effect of wealth on labor supply using the randomized assignment of monetary prizes in a large sample of Swedish lottery players. His findings reveal that winning a lottery prize modestly reduces labor earnings, with the reduction being immediate, persistent, and similar by age, education, and sex.

NICO's Wednesday lecture series takes place from noon until 1 p.m. at Chambers Hall.

Learn more about upcoming NICO events, [here](#).

Northwestern Spinout Wins Clean Energy Contest

Northwestern spinout company Hazel Technologies took home the top prize of \$500,000 at the sixth annual Clean Energy Trust Challenge on April 12.

Drawing a crowd of venture capitalists, civic leaders, and industry executives, the Challenge aims to support clean tech innovation in the Midwest by combining access to capital with access to premier mentorship and national exposure.

"Clean tech innovation, particularly deep tech innovation tied to fields such as materials science and chemistry, takes time and is extremely expensive," says **Erik Birkerts**, CEO of the Clean Energy Trust. "We need to do more to take clean energy to market."

Since 2011, the CET Challenge has awarded \$3.2 million in funding to 29 teams.

Hazel Technologies, whose FruitBrite™ technology extends the shelf life of produce, flowers, and plants by up to 400 percent, took home the Illinois Clean Energy Fund award, amounting to half of the \$1 million of funding handed out at this year's Challenge.

"At this level of the competition, you're competing with the highest caliber of companies in this stage of clean tech innovation," says **Aidan Mouat**, CEO of Hazel Technologies.

The team will use the funding for optimization of the technology and full commercialization of the product.

Hazel Technologies spun out of Northwestern's 2015 NUvention: Energy class, a clean tech commercialization course co-sponsored by the Farley Center for Entrepreneurship and Innovation and the Institute for Sustainability and Energy at Northwestern (ISEN).

[Read more.](#)

Record-Breaking Research Day at Feinberg

Nearly 400 students, trainees, staff, and faculty presented abstracts at Feinberg's 12th Annual Lewis Landsberg Research Day on April 7. Participation reached a new high for the event, which showcases the medical school's diverse, innovative research and celebrates the University's passion for scientific discovery.

"I hope that research remains a big focus for me as I go forward in my career," says **Hawkins Gay**, an internal medicine resident who won first prize in the public health and social sciences category during the event's scientific poster competition.

For his project, Gay compared the effectiveness of different dietary approaches to reducing hypertension, conducting a meta-analysis of 24 studies involving nearly 24,000 participants.

"Understanding dietary patterns can improve the health of populations," says Gay, who hopes to apply what he learned when practicing preventive health with patients. "Research Day is a great platform for me to show this research that I've spent so much time working on."

[Read more.](#)



New Operations Directors Join Core Facilities

The Office for Research is pleased to announce the addition of three new operations directors at a trio of Shared and Core Facilities: **Valerie Tokars**, research associate professor of pharmacology (Structural Biology Facility); **Xinkun 'Sequen' Wang**, research associate professor of biochemistry and molecular genetics (Next-Generation Sequencing Core); and **Young Ah Goo**, research assistant professor in the Proteomics Center of Excellence (Proteomics Core).

"We would like to welcome these talented investigators to the Office for Research," says **Phil Hockberger**, assistant vice president for research. "It's a testament to the University's growing reputation that we were able to recruit these top-notch scientists to run our core facilities."

Tokars has a longstanding interest in molecular machines that was further developed while earning her PhD in molecular biophysics and biochemistry at Northwestern. An expert on x-ray structural studies of kinases, proteases, and cytoskeletal architecture, she has published nearly two dozen papers. Tokars completed postdoctoral fellowships at Northwestern and Rosalind Franklin University, and was a faculty

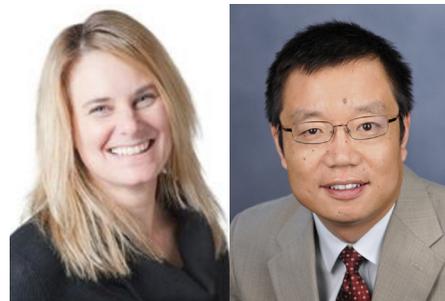
member at the University of Illinois-Chicago before joining Northwestern's faculty in 2010.

Before his recent arrival at Northwestern, Wang was founding director of the Genome Sequencing Core and the Genomics Facility at the University of Kansas where he supported projects related to a range of biomedical research interests, including cancer, diabetes, hepatitis, pediatric diseases, and psychiatric disorders. He also has directed research related to neurological and neurodegenerative diseases. Wang earned his PhD in cell and molecular biology at Oklahoma State University and has 13 years of experience building genome research infrastructure and directing genomics facilities.

Goo's research focuses on using mass spectrometry-based proteomics applications and applying global systems approaches to study biological questions, with an emphasis on discovery of diagnostic/prognostic biomarkers and therapeutic targets for human diseases. She earned her PhD in genome sciences/pathobiology with Leroy Hood at the University of Washington (UW) and did postdoctoral training in the Institute for Systems Biology before joining the

faculty at the UW School of Nursing.

She subsequently moved to the School of Pharmacy at the University of Maryland where she was research assistant professor and associate director of the Mass Spectrometry Center. She arrives at Northwestern on May 1.



Valerie Tokars

Xinkun 'Sequen' Wang



Young Ah Goo

Emma Adam to Discuss Discrimination's Lasting Effects at Tonight's Science Café



Recent research suggests that unequal treatment of racial or ethnic minorities in daily life, known as everyday discrimination, can have cumulative negative biological effects. Discrimination, along with other forms of race-related stress, impact biological processes, such as stress hormones and sleep, which are important for health and daily performance.

This month's Science Café explores new theories and data on how race-related stress "gets under the skin" to affect biology, health, cognition, and academic performance. The presentation by **Emma Adam**, human development and social policy, will include data from a 20-year study linking racial discrimination in adolescence to stress biology and academic attainment in adulthood.

Adam will share her research insights tonight (April 20) from 6:30 to 8 p.m. at the Firehouse Grill in Evanston.

Ready Set Go Applications Due May 1

Graduate student researchers and postdoctoral fellows are encouraged to apply for Ready Set Go's summer session, which runs from June 21 through September 14.

Students participating in the course will attend three lunchtime keynote addresses and weekly workshop events. RSG focuses on three important and basic communication components: building confidence in all communication roles, enhancing message clarity, and establishing audience connection.

The deadline to apply is May 1.

Discoveries

Kathleen J. Green, pathology and toxicology, and her research team produced a study that revealed the pathways causing the buildup of fibrous scar tissue seen in arrhythmogenic cardiomyopathy, a cardiac disease. Their findings may advance our understanding of the signals that lead to scar tissue in cardiac disease. The research also has implications for skin disease and cancer, among other illnesses. [Learn more.](#)

A study lead by **Suena Massey**, psychiatry and behavioral sciences, revealed that higher oxytocin levels in the third trimester of pregnancy predict the severity of postpartum depression symptoms in women who previously suffered depression. This finding may assist researchers in identifying predictive biomarkers for postpartum depression; it also can prove valuable in developing novel preventative treatments that can help mothers destined to develop postpartum depression. [Learn more.](#)

Nine innovative digital projects aimed at enhancing student learning and proposed by Northwestern faculty are slated to receive funding in the 2016-2017 academic year.

Among them: massive open online courses (MOOCs), which will allow faculty and the University to experiment with modern learning technologies while showcasing Northwestern's teaching excellence. [Learn more.](#)

Northwestern is a leading partner among several who are embarking on a Chicago-based collaborative project called Current. The project will address municipal water problems while galvanizing the Chicago economy. The public-private partnership will bring water research discoveries out of the lab and into the marketplace. [Learn more.](#)

A new technology has allowed scientists to see inside the brains of people living with a rare type of language dementia called primary progressive aphasia (PPA), which is caused by buildup of a toxic protein found in Alzheimer's disease. Using this technique, **Emily Rogalski**, cognitive neurology and Alzheimer's disease, led a study that revealed a greater buildup of plaque on the left hemisphere's language processing regions in the brains of those living with PPA. Understanding how the plaque accumulates at disease onset and over time will yield

greater opportunity for developing early, targeted treatment. [Learn more.](#)

Stephen Schueller, preventive medicine, was among a research team that analyzed the effectiveness of digital voice assistants in dealing with health crises. Their research revealed that although smartphone personal assistants can recognize spoken words, some are ill-equipped to respond to a user who is feeling suicidal, or who has been abused or raped. This discovery prompted Apple to modify its iPhone "Siri" software in response to such information, now directing users to the National Suicide Prevention Hotline. [Learn more.](#)



Emily Rogalski

Data Security Topic of Today's IRB Brown Bag

Medical school faculty compiling health information on research participants may be particularly interested in the April 20 Institutional Review Board (IRB) Office brown bag session.

Senior information security analysts **Martina Roebuck** and **David Gundrum** will discuss Feinberg's Data Security Plan policy, provide guidance for completing these mandatory plans, and answer audience questions.

All Feinberg research studies that collect health information require documented Data Security Plans, which are reviewed by Feinberg IT Security. Additional security considerations will also be discussed during the presentation.

Today's event begins at noon in Rubloff 750 on the Chicago campus.

[Learn more.](#)

ANSER Solar Fuels Symposium set for April 28

The Institute for Sustainability and Energy at Northwestern (ISEN) and the Argonne-Northwestern Solar Energy Research Center (ANSER) are hosting their ninth annual ANSER Solar Energy Symposium on April 28 and 29.

The event features invited speakers from around the world to outline advancements in the development of nanotechnology, catalysts, and novel materials for use in obtaining solar fuels.

At ANSER, researchers are working to create the next generation of energy technologies by producing a liquid fuel from sunlight, using only water and carbon dioxide from the air.

Click [here](#) to learn more and to register for the symposium.

Nanofabrication Facilities Renamed to Enhance Integration

A task force of senior faculty and administrators has recommended closer integration and cooperation between Northwestern's two nanofabrication facilities on the Evanston campus in anticipation of growth in micro and nanofabrication research. The growth will be driven by the arrival of John Rogers this fall and his research in biocompatible microelectronic devices. In addition, there will be increased use of the facilities by external researchers facilitated by a five-year \$5 million National Science Foundation (NSF) grant to **Vinayak Dravid**, materials science and engineering, to create the Soft and Hybrid Nanotechnology Experimental (SHyNE) Resource.

The facility at Tech Institute (formerly called the Northwestern Fabrication Facility, NUFAB) will be renamed NUFAB_Tech, and will be managed through the Northwestern University Atomic and Nanoscale Characterization Experimental (NUANCE) Center. NUFAB_Tech is a 6,000 square-foot class-100 clean room that provides a range of nanofabrication equipment and technical expertise to Northwestern faculty and to other academic and industrial researchers. Dravid has served as the founding director of the NUANCE Center since 2001, and he will continue as faculty director of NUANCE while also serving as the new faculty director of NUFAB_Tech.

The Cook facility (formerly called the Materials Processing and Microfabrication Facility, MPMF) will be renamed NUFAB_Cook to facilitate integration and coordination with NUFAB_Tech. **Bruce Wessels**, materials science and engineering, has served as faculty director of MPMF since 1984 and led its development in microfabrication and thin film processing capabilities as well as materials and device characterization for Northwestern, government, and industrial researchers. As faculty director of NUFAB_Cook, he provides expertise in electronic, magnetic, and photonic materials



Vinayak Dravid

Bruce Wessels

applications with emphasis on semiconductor and ferroic oxide thin films.

"It's an exciting time for nanoscale research at Northwestern and the addition of John Rogers — a materials scientist and pioneer in the field of biocompatible electronic devices — this fall will signal a new wave of activity at our facilities," says Dravid. "By improving nanofabrication capability for research and education, we remain state-of-the-art."

In addition to traditional nanotechnology tools, SHyNE, a collaboration with the University of Chicago, ensures the integration of soft (biological) nanostructures with the backbone of enabling hard materials, beneficial for applications such as microfluidic modules for bio-sensors and synthetic scaffolds for tissue regeneration, among other uses.

"SHyNE Resource streamlines our nanotechnology facilities, providing unique and integrated capabilities for internal Northwestern and University of Chicago researchers as well as external users, especially small and medium enterprises and startup companies," says Dravid, SHyNE director. "This NSF award and expansion of NUFAB_Tech further cements our leadership in nanotechnology and related advanced materials research, education, and outreach."

Spotlight: Research in the News

Mobile health apps are proving to be an effective tool to help mental health patients while reducing healthcare costs, according to new research from **Northwestern's Center for Behavioral Intervention Technologies**. In clinical trials, featured in *Healthcare IT News*, mental health patients are learning cognitive behavioral therapy techniques through the software. The techniques help improve symptom self-management and, in turn, decrease an individual's overall healthcare utilization.

A study co-authored by **Edith Chen**, psychology, on the health effects of parental empathy was highlighted in the *Telegraph* and *Parent Herald*, among other publications. While children of empathetic parents were found to have higher self-esteem and exhibit less depressive or aggressive behaviors, their parents conversely suffered immune compromise, demonstrated by chronic, low-grade inflammation in their cells.

The White House Council of Economic Advisers' 2016 economic report to Congress emphasized a need for policies that reduce inequality in America, citing evidentiary support from some of the nation's leading academics, including six experts from the **Northwestern's Institute for Policy Research (IPR)**. The report was informed by IPR research that considered how to address economic challenges that impact the early health, nutrition, and education of low-income children.

Benjamin Jones, entrepreneurship and strategy, and **Aaron Chatterji**, Duke University Fuqua School of Business, have developed an innovative online platform called EDUSTAR that rates education technology, or "ed tech." This web-based program aims to present simple, reliable product reviews — similar to those in *Consumer Reports* — which will assist teachers in evaluating the effectiveness of K-12 classroom technologies. *Education World* and *Chicagolno* reported on the technology's development.

Research teams led by **Carola Salvi**, cognitive psychology, published two papers analyzing how people arrive at a solution to a problem. Their research found that problem-solving approaches of liberals and conservatives differ significantly. Those who identify as liberals use a more flexible method guided by sudden insights while those who identify as conservatives use a more structured, methodical process to arrive at a conclusion. This research was featured in numerous publications, including *Tech Times* and *The Daily Beast*.

The life-changing work of Northwestern's award-winning **Science Club** for underserved youth was celebrated in the inaugural issue of *Connected Science Learning*, a journal dedicated to high-quality science, technology, engineering and mathematics (STEM) education. Through the Club, Northwestern staff and faculty provide inquiry-based science instruction after school to students in grades 5 to 8 to supplement the often inadequate science education in some urban schools.

A groundbreaking study conducted by Northwestern Medicine revealed that non-Hispanic white teens are more likely than their African American or Latino peers to abuse hard drugs. The study's senior author, **Linda A. Teplin**, psychiatry and behavioral sciences, was quoted in the *Atlanta Black Star*, challenging the disproportionate incarceration rates of African Americans for drug-related crimes against the study's findings that they are "less likely than other racial/ethnic groups to abuse hard drugs."

Genetics do not predetermine whether someone will, or will not, experience depression in their life, according to a new Northwestern study lead by **Eva Redei**, psychiatry and behavioral sciences. The research, featured in publications including *Psychology Today* and *Chicago Tribune*, revealed that even if someone is genetically predisposed to depression, environmental factors can successfully modify this predisposition.



A team of Chicago middle school students in Science Club at the Pedersen-McCormick Boys & Girls Club in Uptown work on lab experiments with a Northwestern graduate student. Science Club, an initiative of Science in Society, was recently featured in the inaugural issue of *Connected Science Learning*.

Honors

Isaac Adewole, medicine, and a native of Nigeria, has been sworn in as the African country's minister of health.

Sir Richard Blundell at University College London and **János Kollár** at Princeton University are the 2016 recipients of the University's prestigious Nemmers prizes in economics and mathematics, respectively. In connection with the Nemmers awards, Blundell and Kollár will deliver public lectures and participate in other scholarly activities at Northwestern during the 2016-17 and 2017-18 academic years.

William J. Catalona, urology, was among three physicians recognized for excellence in clinical medical practice in March at the annual Castle Connolly National Physician of the Year Awards. Recipients of the Clinical Excellence Award are distinguished from among thousands of doctors and researchers nominated nationwide.

The Northwestern University Clinical and Translational Sciences Institute has announced its first cohort of TL1 scholars. They are **Michael DiVito**, a postdoctoral fellow in surgery; **Brian Burmeister**, a postdoctoral fellow in pharmacology; and **Susan Slattery**, a pediatrics fellow. The TL1 Multidisciplinary Training Program in Child and Adolescent Health provides postdoctoral fellows in pediatrics and engineering with the opportunity to apply translational science approaches to challenges in child and adolescent health research while receiving mentorship, extensive training opportunities, and additional dedicated research time.

Patrick Eccles, associate director of global engagement programs at the Buffett Institute, accepted the Ashoka U-Cordes Innovation Award on behalf of Buffett's Global Engagement Studies Institute study abroad program. The award is presented to educational programs that demonstrate an innovative approach to social impact entrepreneurship.

Chemists **Joseph Hupp** and **Teri Odom** have been named fellows by the Materials Research Society (MRS). The MRS fellowship recognizes a select few scientists who have made significant contributions to materials research. Hupp was selected for "enabling discoveries in the syntheses of functional porous materials" while Odom was honored for her "pioneering contributions to scalable nanofabrication tools" and the resulting meta-materials with extraordinary optical properties.

Eric Liotta, neurology, and **Matthew Tate**, neurology and neurological surgery, have been awarded KL2 awards from the Northwestern University Clinical and Translational Sciences Institute. The KL2 is a multidisciplinary mentored career development program that provides career development resources, educational opportunities, and salary support for mentored research.

Senior **Jessie Moravek** is one of 18 young American leaders to be named a Luce Scholar. The fellowship, launched by the Henry Luce Foundation in 1974, is meant to enhance the understanding of Asia among potential leaders in American society. In July, Moravek will begin a yearlong experience living and working in Asia, where she will investigate how people and cultures are affected by environmental change.

Pembe Hande Ozdinler, neurology, was recently recognized as one of the 30 most influential Turkish-American women in United States. Ozdinler received a plaque at the annual Turk of America award gala in March and also was honored in a letter from President Obama for her accomplishments.

George C. Schatz, chemistry and chemical and biological engineering, received the 2016 American Chemical Society's Irving Langmuir Award in Chemical Physics, sponsored by GE Global Research and the ACS Division of Physical Chemistry. The award recognizes scientists who have made an outstanding contribution to interdisciplinary research in chemistry and physics.



P. Hande Ozdinler



Thomas O'Halloran

The Feinberg School of Medicine has risen two spots to rank 17th among the best research-oriented medical schools in the country, according to the latest *U.S. News & World Report* survey. This is the ninth consecutive year that Feinberg has earned a top 20 position from the publication; this year's ranking represents an all-time high. Additionally, Feinberg is ranked 18th overall among US medical schools in terms of total National Institutes of Health funding.

In his capacity as Chicago Region Physical Science-Oncology Center director, **Thomas O'Halloran**, chemistry, was asked to share his expertise with the President's Council of Advisors on Science and Technology in March. Specifically, he was in Washington, D.C., to present insights related to President Obama's recently launched "cancer moonshot" initiative, which aims to accelerate research in that field. O'Halloran's proposals included the creation of a large-scale national network of centers that use tools and perspectives of the physical sciences to collaborate on early diagnosis and treatment of cancer.

Proposal and Award Report: Through February 2016

Northwestern has received a total of \$168.3 million in award funding this fiscal year, through February. This figure reflects a 2 percent decrease (\$4 million) compared with February 2015. The number of awards to date (1,047) is equal to this time last year.

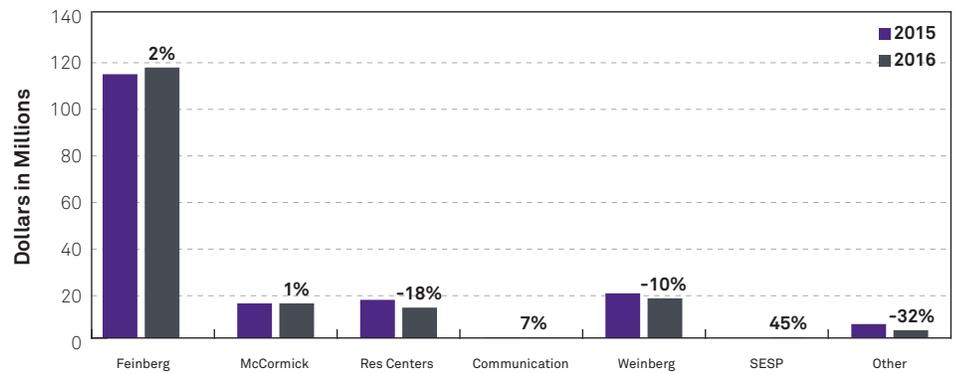
The dollar volume of awards from federal agencies increased 5 percent (\$5.4 million). Awards from industrial sponsors declined about 27 percent (\$9.5 million). Foundation funding is down 19 percent (\$2.1 million), while voluntary health organization funding decreased 35 percent (\$2.5 million).

The dollar volume of proposals submitted through February is \$1.387 billion, an increase of 3 percent compared to last year. The number of proposals submitted (1,827) is down 2 percent.

The dollar volume of proposals submitted to federal agencies increased 5 percent (\$64.4 million), while proposals to industrial sponsors were down 42 percent (\$20.6 million). Proposal activity to voluntary health organizations is up 5 percent (\$1.7 million) and foundation proposals declined by 36 percent (\$14.2 million).

Click [here](#) to access the full report.

Notable Award Total \$ Comparison February (FY to date)



Notable Proposal Total \$ Comparison February (FY to date)

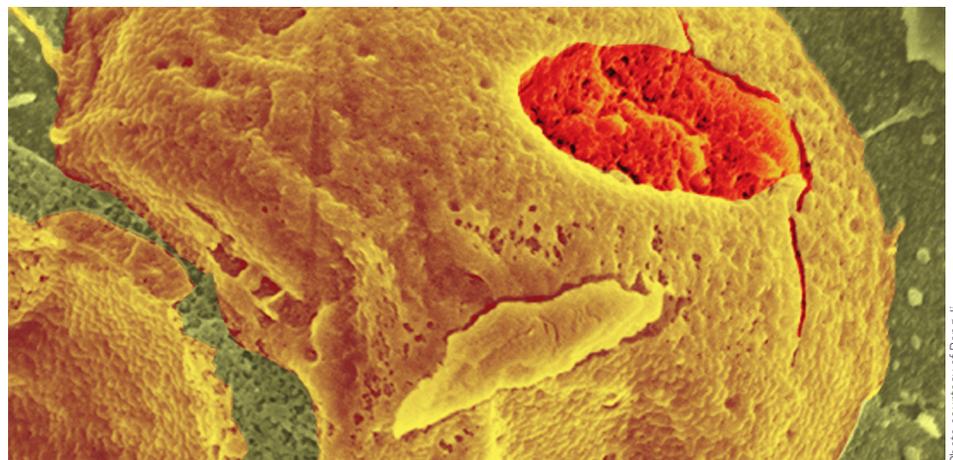
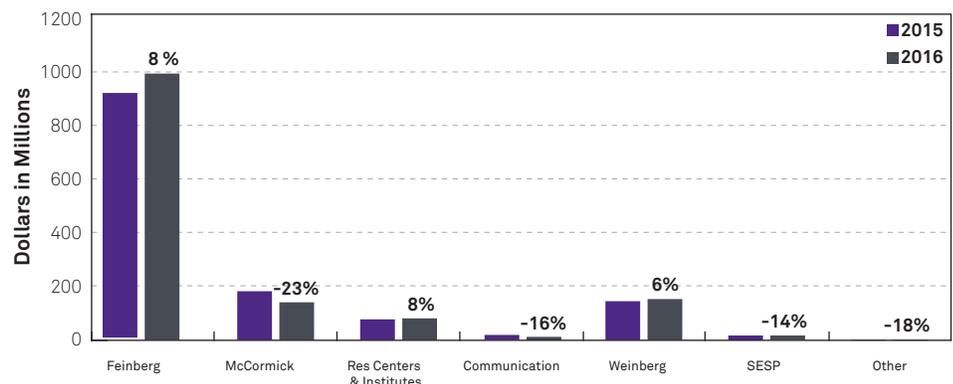


Photo courtesy of Peng Ji

Northwestern Scientist Discovers Crucial Step in Red Blood Cell Development

As immature cells differentiate into mature red blood cells, their nuclei and the genetic material inside them — called chromatin — condense, a process that scientists did not fully understand until now. Led by **Peng Ji**, pathology, researchers found an opening on the nuclear membrane (yellow) from which proteins in the nuclei called histones (red) are released. This is a critical step for the development of mature red blood cells. This image, from a mouse fetal liver, was acquired using cryo-scanning electron microscopy. Ji compares this transient, recurring opening on the nucleus to a volcano on the earth's surface, with histones pouring out like lava. [Learn more.](#)

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