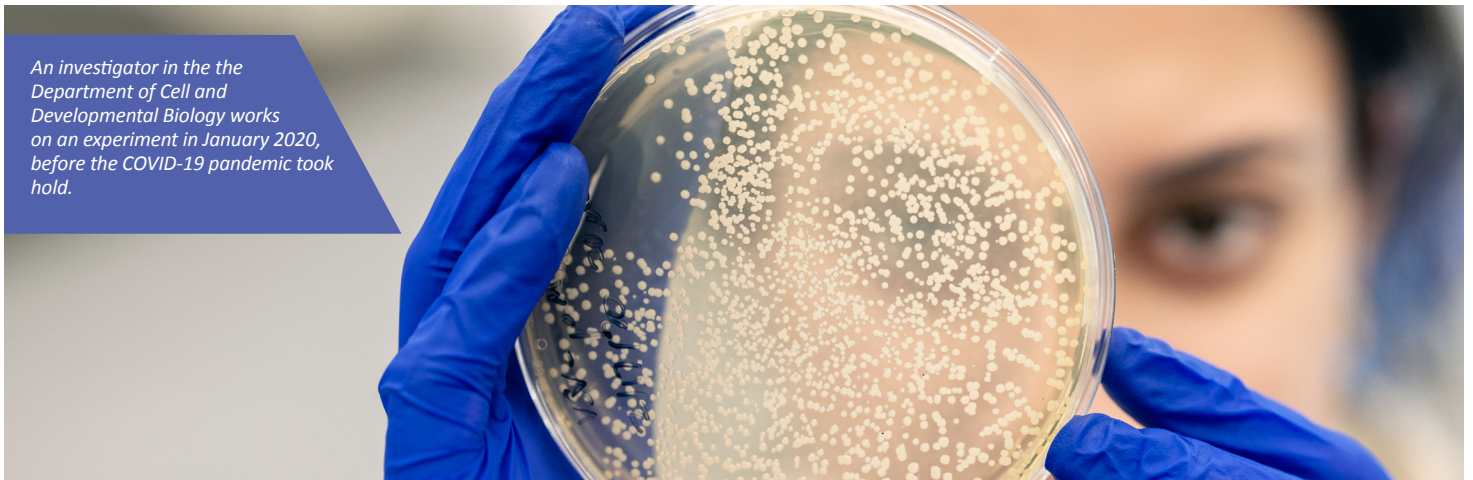


# Breakthroughs

Feinberg School of Medicine Research Office

December 2020

An investigator in the the Department of Cell and Developmental Biology works on an experiment in January 2020, before the COVID-19 pandemic took hold.



## 2020: A Year of Groundbreaking Discoveries During a Pandemic

By Melissa Rohman

In early March, when much of the world came to a halt because of the COVID-19 pandemic, medical practice and medical education were disrupted like never before. Within days of Illinois' stay-at-home order taking effect, Feinberg faculty rapidly transitioned to a almost completely [virtual medical curriculum](#), requiring students to quickly adapt and pursue this "new normal" without hesitation.

The pandemic's impact on Feinberg's [research enterprise](#) was no different: Projects deemed essential required some investigators to socially distance in laboratories and facilities, while others worked from home to analyze data, devise new experiments and conduct meetings with colleagues virtually. Many investigators transitioned their ongoing research to COVID-19, others had to rethink the execution of their clinical trials in order to abide by social distancing guidelines, and some working in wet laboratories were forced to temporarily stop their research altogether.

Despite these incredible challenges and obstacles, Feinberg kept moving onward and upward. In the 2019-2020 fiscal year, Feinberg principal investigators secured a record-breaking \$643 million in research funding and awards, an impressive 20 percent increase over the previous year. Of this total,

more than \$24 million in awards were awarded to Feinberg investigators for [COVID-19 related research](#).

This final issue of *Breakthroughs* for 2020 invites you to take a look back at a handful of groundbreaking research stories that marked one of, if not the most, unprecedented and transformative years for Feinberg.

**January:** [AI Model Improves Breast Cancer Detection](#)

An international team of investigators, including those from Northwestern Medicine, developed a new artificial intelligence (AI) model that predicted breast cancer in mammograms more accurately than radiologists, reducing false positives and false negatives. The study, [published](#) in *Nature*, was co-authored by [Mozziyar Etemadi, MD, PhD](#), research assistant professor of [Anesthesiology](#) and of Biomedical Engineering at the McCormick School of Engineering. "Breast cancer is one of the highest causes of cancer mortality in women," Etemadi said. "Finding cancer earlier means it can be smaller and easier to treat. We hope this will ultimately save a lot of lives."

**February:** [Uncovering the Cellular Mechanisms Behind Genetic Mutations in ALS](#)

A team of Northwestern Medicine scientists led by [Evangelos Kiskinis, PhD](#), assistant professor in the [Ken and Ruth Davee Department of Neurology](#), discovered that mutations in the largest genetic contributor to ALS leads to the dysfunction and eventual degeneration of motor neurons in the brain.

*(continued on page 2)*

## Groundbreaking Discoveries *(continued from cover page)*

[Published](#) in *Neuron*, the findings shed light on the mechanisms and consequences of a defect in a gene called *C9orf72*, which disrupts the localization of proteins involved in RNA and protein metabolism. The study may also aid the development of novel therapeutic interventions for patients with the neurodegenerative disease, which currently has no cure.

### March: [New Drug Target Found for COVID-19](#)

Northwestern Medicine investigators were charged with helping to widen the scope of research about the novel SARS-CoV-2 virus. Led by [Karla Satchell, PhD](#), professor of [Microbiology-Immunology](#) and director of the [Center for Structural Genomics of Infectious Diseases](#), a team of scientists identified a potential drug target in SARS-CoV-2: two critical proteins in a complex called nsp10/16. According to the investigators, a drug that can inhibit nsp10/16 would allow the immune system to detect the virus and eradicate it faster. “This is a really beautiful target, because it’s a protein absolutely essential for the virus to replicate,” Satchell said. The investigators also mapped the atomic structure of nsp10/16, which was published for public use on the [RSCB Protein Data Bank](#).

### April: [First Trial Shows Benefit for Genomically Targeted Prostate Cancer Treatment](#)

In a first-of-its-kind clinical trial, advanced prostate cancer was treated based on its genomic makeup, and delaying progression for patients with metastatic castration-resistant prostate cancer, a deadly and treatment-resistant form of the disease. Patients randomly selected to receive the drug olaparib experienced delayed disease progression for seven months on average compared to just three months for the standard treatment cohort. Additionally, about 60 percent of men in the olaparib group showed no disease progression at six months compared to 23 percent in the standard cohort. The clinical trial, [published](#) in the *New England Journal of Medicine* and led by [Maha Hussain, MBChB](#), the Genevieve E. Teuton Professor of [Medicine](#) in the Division of [Hematology and](#)

[Oncology](#), represents a breakthrough in treating this deadly cancer and for precision medicine more broadly.

### May: [Monitoring COVID-19 from Hospital to Home: First Wearable Device Continuously Tracks Key Symptoms](#)

Investigators at Northwestern University and the Shirley Ryan AbilityLab developed a novel wearable device to detect early signs and symptoms associated with COVID-19. The device, no larger than a postage stamp, can be worn 24/7 and continuously measures and interprets coughing and respiratory activity through custom-made AI algorithms. [John Rogers, PhD](#), professor of [Neurological Surgery](#) and the Louis Simpson and Kimberly Querrey Professor of Materials Science and Engineering, Biomedical Engineering and Neurological Surgery at the McCormick School of Engineering, led the technology development. [Arun Jayaraman, PhD](#), associate professor of [Physical Medicine and Rehabilitation](#), of [Medical Social Sciences](#) and of [Physical Therapy and Human Movement Sciences](#), led the AI algorithm development efforts. “We hope, and we believe, that these devices may help in these efforts by identifying and quantifying characteristics and essential features of cough and respiratory activity associated with this disease,” Rogers said.

### June: [Cancer Cells Hijack Nucleotide Metabolism to Boost Cell Proliferation](#)

[Issam Ben-Sahra, PhD](#), assistant professor of [Biochemistry and Molecular Genetics](#), was the lead author of a study [published](#) in *Molecular Cell*, which explored how genetic mutations associated with many cancers drive proliferation. Specifically, the team of investigators found that mutations in the genes RAS and RAF allow cancer cells to create their own nucleotides, one of the molecular building blocks of cells throughout the body. Although this molecular connection helps cancers spread, it reveals an opportunity for therapeutic intervention. “Now that we’ve identified this molecular connection, we can imagine targeting this pathway. This could be one of the achilles’ heel of the cancer,” said Ben-Sahra, who is also a member of the [Robert H. Lurie Comprehensive Cancer Center](#) of Northwestern University.

### July: [COVID-19 Complicates Cancer Treatment](#)

Cancer patients with other comorbidities have a higher risk of dying from complications due to COVID-19 and should discuss the risks and benefits of continuing cancer treatment with their physician, according to a recent [published](#) in *The Lancet*. The study was co-authored by [Alicia Morgans, MD, MPH](#), associate professor of [Medicine](#) in the Division of [Hematology and Oncology](#); [Mary Mulcahy, MD, ’00 GME](#), professor of Medicine in the Division of Hematology and Oncology; and [Firas Wehbe, MD, PhD](#), associate professor of [Preventive Medicine](#) in the Division of [Health and Biomedical Informatics](#) and chief research informatics officer. The findings were derived from clinical data collected over 30 days from more than 900 patients receiving cancer treatment at 100 different

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**Groundbreaking Discoveries** (continued from previous page)

participating institutions.

**August:** [AI-Enhanced Approach Offers New Hope for Earlier Autism Diagnoses](#)

A team of investigators from Northwestern Medicine, Ben Gurion University, Harvard University and the Massachusetts Institute of Technology developed a novel precision medicine technique that uses AI to identify a subtype of autism by overlaying an array of biomedical and healthcare data. The technique, detailed in a study [published](#) in *Nature Medicine*, successfully identified through elaborate data analysis dyslipidemia-associated autism, which represents 6.55 percent of all diagnosed autism spectrum disorders in the United States. “Today, autism is diagnosed based only on symptoms, and the reality is that when a physician identifies it, it’s often that early and critical brain developmental windows have passed without appropriate intervention. This discovery could shift that paradigm,” said [Yuan Luo, PhD](#), associate professor of [Preventive Medicine](#) in the Division of [Health and Biomedical Informatics](#) and co-first author of the study.

**September:** [Biological Sex Affects Genes for Body Fat, Cancer, Birth Weight](#)

[Barbara Stranger, PhD](#), associate professor of [Pharmacology](#), led a team of investigators that found biological sex influences gene expression in almost every type of human tissue. The study, [published](#) in *Science*, reports that these sex differences are observed for genes involved in many functions, including how people respond to medication, how women control blood sugar levels in pregnancy, how the immune system functions and how cancer develops. Furthermore, Stranger said that these findings underscore the importance of considering sex as a biological variable in human genetics and genomics studies.

**October:** [Utilizing B-Cells to Promote Glioblastoma Immunity](#)

Northwestern investigators developed a novel vaccine that utilizes a specialized group of B-cells to promote anti-tumor immunity against glioblastoma, with the findings [published](#) in the *Journal of Experimental Medicine*. The vaccine, which is still in pre-clinical stages, is the first of its kind and may be an alternative to currently available immunotherapeutic approaches to treat the fatal brain cancer. [Catalina Lee Chang, PhD](#), research assistant professor of [Neurological Surgery](#), was the first author of the study and [Maciej Lesniak, MD](#), chair and the Michael J. Marchese Professor of Neurosurgery, was the senior author. “With this vaccine, we are targeting the dual functionality of B-cells to tackle tumor immunosurveillance escape,” Lee Chang said. “We aim to utilize both the cellular and humoral immunity of B-cells.”

**November:** [New Path Forward for Pancreatic Cancer Treatment](#)

A study led by [Mazhar Adli, PhD](#), associate professor of [Obstetrics and Gynecology](#) in the Division of [Reproductive Science in Medicine](#), found that combining the current standard-of-care chemotherapy drug with a genetic inhibitor

may improve treatment for pancreatic ductal adenocarcinoma (PDAC). The study was [published](#) in *Proceedings of the National Academy of the Sciences* (PNAS). There are currently no targeted treatments for PDAC and chemotherapy comes with a host of side effects, so this combination drug strategy is promising. “Pancreatic cancer patients are desperately awaiting a new drug combination,” Adli said. “We are hoping that we can initiate a clinical trial in collaboration with these drug companies as soon as possible.”

**December:** [Scientists Unravel Zebrafish Epigenome](#)

Northwestern Medicine investigators identified tissue-specific epigenetic regulators in zebrafish, filling in a longtime gap in the understanding of the organism’s genome. According to [Feng Yue, PhD](#), the Duane and Susan Burnham Professor of Molecular Medicine and senior author of the study [published](#) in *Nature*, the findings could help scientists use the model organism to unravel human diseases such as cancer, since more than 70 percent of protein-coding genes in the zebrafish genome are also present in humans. “If you see something in the human genome and can’t establish a cause, you can use this data to perform experiments in zebrafish. This will be very valuable for researchers in this field,” said Yue, who is also the director of the [Center for Advanced Molecular Analysis](#) at the [Institute for Augmented Intelligence in Medicine](#).

## Top Breakthroughs Podcast Episodes of 2020

Of the more than 20 episodes of Feinberg’s *Breakthroughs* podcast produced in 2020, the most popular episodes focused on Feinberg experts talking about COVID-19 research and sharing knowledge about the pandemic.

Check out the top five episodes of the year:

1. [COVID-19: An Update on the Current Situation with Michael Ison, MD](#)
2. [Investigating the New Coronavirus with Karla Satchell, PhD](#)
3. [COVID-19 Antibody Testing with Elizabeth McNally, MD, PhD](#)
4. [Staying Positive During Social Isolation with Judith Moskowitz, PhD, MPH](#)
5. [At-Home Care for COVID-19 Patients with Jeffrey Linder, MD, MPH](#)

# Graduate Student Events and Opportunities

## Christmas Eve & New Year's Eve Mass

Location: Sheil Catholic Center, 2110 Sheridan Road, Evanston, IL 60208 [Map](#)

### Christmas Eve Mass

Thursday, December 24

Time: 4:00 p.m. to 5:00 p.m., 7:30 p.m. to 8:30 p.m.

### New Year's Eve Mass

Thursday, December 31

Time: 5:00 p.m. to 6 p.m.

Join Sheil Catholic Center at Northwestern University for Christmas Eve and/or New Year's Eve mass. To attend either day, make a separate reservation for every individual, using each person's name. [Read re-opening guidelines and register here](#)

**Contact:** Teresa Corcoran, [sheil@u.northwestern.edu](mailto:sheil@u.northwestern.edu)

## The Glass Menagerie

Available on-demand January 8 to 10, 2021

This refreshing new take on Tennessee Williams' *The Glass Menagerie* is told through the lens of a Chinese American family. The production is free to current full-time Northwestern students with registration and current Northwestern email address, or \$10 to the general public. [Buy tickets here](#)

**Contact:** Wirtz Center, [wirtz@northwestern.edu](mailto:wirtz@northwestern.edu)

[More information](#)

## Mindfulness-Based Stress Reduction (MBSR) Winter 2021

Wednesdays, January 13 to March 3, 2021

Time: 8:30 a.m. to 11 a.m.

### MBSR All-Day Retreat

Saturday, February 20, 2021

Time: 9:30 a.m. to 4:00 p.m.

Registration is now open for the winter 2021 MBSR cohort. This empirically based eight-week virtual program encourages participants in a supportive atmosphere through meditation, mindful movement and exploration of the science behind these practices. [Register here](#)

**Contact:** Eric Budzynski, [e-budzynski@northwestern.edu](mailto:e-budzynski@northwestern.edu)

[More information](#)

## Asian Pacific Islander Desi American (APIDA) Book of the Quarter (Winter 2021)

Discussion Date: Tuesday, January 26, 2021

Time: 4:30 p.m. to 6:00 p.m.

Join the Asian American Studies Program and Multicultural Student Affairs for a casual book club discussion on important works of APIDA literature. The winter 2021 quarter selection is, [Know My Name](#) by Chanel Miller. [Register here](#)

**Contact:** Christine Munteanu, [cmunteanu@northwestern.edu](mailto:cmunteanu@northwestern.edu)

[More information](#)

## Research in the News

### **Chicago Tribune, November 2**

[University of Chicago Medicine looking for 2,000 participants for COVID-19 vaccine trial](#). Northwestern Medicine, also involved with a COVID-19 vaccine trial, was featured.

### **The Washington Post, November 10**

[These venues are high-risk areas for spreading the coronavirus, model suggests](#). Jaline Gerardin, PhD, was featured.

### **U.S. News & World Report, November 11**

[One-Third of E-Cigarette Users Report Signs of Lung Damage: Study](#). Thanh-Huyen Vu, MD, PhD, was featured.

### **HealthDay, November 23**

[Black Americans Suffer More From Heart Disease: The AHA Wants to Change That](#). Donald Lloyd-Jones, MD, ScM, was mentioned.

### **CNN, November 24**

[New X-ray technique reveals clues about ancient 1,900-year-old mummy](#). Stuart Stock, PhD, was featured.

### **CBS Chicago, November 24**

[Northwestern Researchers Report Breakthrough Chest X-Ray Using AI to Detect COVID-19](#). Ramsey Wehbe, MD, was featured.

> This research was also featured in *Crain's Chicago Business*.

### **HealthDay, December 1**

[COVID-19 Can Damage Lungs So Badly That 'Only Hope' is Transplant](#). Scott Budinger, MD, and Ankit Bharat, MBBS, were featured.

> This research was also featured in *U.S. News & World Report* and *Yahoo! News*.

### **Chicago Tribune, December 3**

[Northwestern-led researchers unveil data dashboard that aims to spot COVID-19 surges faster](#). Lori Ann Post, PhD, was featured.

[More media coverage](#)



# Promoting Cardiovascular Disease Prevention through Population-Based Research

Norrina Allen, PhD, associate professor of Preventive Medicine in the Division of Epidemiology, of Pediatrics and director of the Center for Epidemiology and Population Health



[Norrina Allen, PhD](#), is an associate professor of [Preventive Medicine](#) in the Division of [Epidemiology](#) and of [Pediatrics](#). She is also the director the [Center for Epidemiology and Population Health](#) at Feinberg. Allen joined Feinberg faculty in 2011 after completing a postdoctoral fellowship in epidemiology at the medical school.

A cardiovascular epidemiologist, Allen's focus is on health services research, specifically studying the effect of environment and geographic area on cardiovascular disease, disparities in quality of care and patient outcomes, and the use of large databases to further examine these questions. She is also a member of the [Institute for Global Health](#), [Institute for Innovations in Developmental Sciences](#), the Institute for Public Health and Medicine ([IPHAM](#)) and the Northwestern University Clinical and Translational Sciences ([NUCATS](#)) Institute.

Her research is funded by the National Institutes of Health and the American Heart Association.

## Q&A

### What are your research interests?

As a cardiovascular epidemiologist, my research has progressed from being focused on the impact of quality of care and access to healthcare in the context of a specific cardiovascular event or hospitalization to a broader understanding of the development of cardiovascular disease (CVD) over an individual's lifetime. Most recently, my research has taken a life course approach to understanding the development of cardiovascular disease, particularly in examining blood pressure, a major risk factor for cardiovascular and cerebrovascular disease. My primary focus is on using and developing sophisticated methods to study cardiovascular health (CVH) across the life span including understanding the developmental origins of CVH, the trajectories and critical periods in CVH, and its impact on disease incidence and healthy aging.

### What is the ultimate goal of your research?

Ultimately, I hope that my work will help to preserve and promote cardiovascular health throughout the lifetime. We are working to understand the origins of CVD early in life so that we develop interventions that are personalized to the context, population and period in life. The goal is that these interventions will enable individuals in ideal CVH to maintain it and others to achieve ideal CVH, thereby reducing the burden of CVD in later life and promoting healthy aging.

### How did you become interested in this area of research?

My research was originally focused on understanding the care and outcomes of acute cardiovascular events and stroke. As my research evolved, it became clear that the greatest impact to reducing the burden of CVD and stroke would be if we could prevent them in the first place. Throughout my career, we have continued to move down the causal pathway with the goal of preventing CVD going from secondary prevention to primary prevention and now a focus on primordial prevention (i.e. preventing the risk factors). My research has been guided by finding the most effective ways of reducing the burden of cardiovascular disease and its risk factors and thereby enabling individuals to have a longer, healthier life.

### What types of collaborations are you engaged in across campus (and beyond)?

All of my work has been accomplished as a team. I strongly believe that collaboration is essential to successful research. A key focus of my own research and that of the Center for Epidemiology and Population Health, which I direct, has been on building a strong network of collaborators across Northwestern and globally. Much of our work has been to bring together large groups of individuals and cohorts in order to enable consortia capable of addressing novel research questions at a larger scale. We were recently funded to launch a new consortium, the Dementia Risk Prediction Project, which is a collaboration of 11 cohorts and centers in the U.S. and Europe. This is just one of the many large collaborative projects in which we are involved. In addition, we are actively engaged in collaborative projects with a variety of departments, centers and institutes across campus including the Division of [Cardiology](#), the Departments of [Neurology](#) and [Medical Social Sciences](#), the Institute for Innovations in Developmental Sciences, IPHAM and [NUDACC](#), among others. As our work has evolved to examine cardiovascular health in children, we have developed strong ties to Lurie Children's Hospital and the Chicago Department of Public Health.

### Where has your work been published?

Our papers are published in a wide variety of general medical, cardiology and epidemiology journals. Recent publications have been in [JAMA](#), [Circulation](#), [Journal of the American College of Cardiology](#), [Hypertension](#), [American Journal of Epidemiology](#) and more.

# Untangling Motor Learning

Ben Yang, PhD, 2020 Graduate, NUIN PhD Program



Ben Yang, PhD, recently defended his thesis and graduated from the Northwestern University Interdepartmental Neuroscience (NUIN) PhD Program in September 2020. Yang has engaged in many fields but settled on behavioral neuroscience — studying the mechanisms that undergird motor learning.

tone was delivered behind the mouse, mimicking predator chasing. The mouse needs to run to a certain speed within a certain time to cancel the tone. If this is not achieved, a mild electrical shock will be delivered to the tail as a punishment. By imaging the neural ensemble changes during this learning process, we are hoping to find the mechanisms of how motor learning is encoded.

## What attracted you to your program?

NUIN is an interdisciplinary neuroscience program that encompasses both NU campuses and many departments — it is a big family. The NUIN program provides me with a bigger picture of neuroscience and more opportunities for interdisciplinary collaborations.

## What has been your best experience at Feinberg?

It is hard to choose just one best experience. The seminars covering basic science, engineering and clinics is what I have really enjoyed over the past many years at Feinberg. Recently, I submitted a manuscript to *Neuron*, which received positive reviews from all three reviewers and required no further experiments, commending the high quality and significance of my work.

## How would you describe the faculty at Feinberg?

My advisor, thesis committee, NUIN directors and the big NUIN family have been very supportive during my doctoral training. I really appreciate my advisor, [D. James Surmeier](#), for his trust, which allowed me to explore my own interests, and his care about my research, career development and quality of life. He and my thesis committee — [Mark Bevan](#), [Indira Raman](#), and [Paul Schumacker](#) — always encouraged me to think of big and important questions. The NUIN directors ([Anis Contractor](#) and [Geoff Swanson](#)), NUIN office and Department of Physiology administrators have all been very helpful. Other NUIN faculty members, particularly [Jelena Radulovic](#), [Rajeshwar Awatramani](#), [Liming Li](#) and [Richard Miller](#) have all helped me in various ways. To sum it up, the faculty at Feinberg provides a nourishing environment for young scientists to grow.

## What do you do in your free time?

I spend my free time with my family, reading books to my kids, playing Lego sets, biking, ice-skating and snowboarding. I hope we will still be able to go snowboarding this winter.

## What are your plans for the future?

I recently defended my thesis, written during my time studying Parkinson's disease and stress disorders in D. James Surmeier's lab in the Department of Physiology. I have now started a joint postdoctoral training in [Jones Parker's](#) lab in the Department of Psychiatry and [Anis Contractor's](#) lab in the Department of Physiology, studying neural mechanisms encoding motor skill learning.

## Q&A

### Where is your hometown?

I was born in Wenzhou, China. Wenzhou is surrounded by mountains and the East China Sea, and is therefore relatively isolated and less influenced by dynasty changes in Chinese history. This led to one of the most famous things about my hometown — our dialect “Wenzhounese,” which is generally considered the most difficult dialect to understand in China. It's more than 1,500 years old and possibly the closest resemblance to the ancient Chinese language.

### What are your research interests?

My initial interest in science starts from a child's questions of “who am I?” and “where do I come from?” Driven by these questions, I have explored different fields of science, including evolution, developmental biology, cancer biology and now neuroscience. My current research interest is how motor learning is encoded in a brain structure called the striatum. Every time I saw my son suffering from learning new pieces of piano music and my daughter struggling to learn new ice-skating tricks, I kept wondering how these motor skills are encoded in the striatum.

If we know the neural activity ensemble changes in the striatum, can we manually reactivate these ensembles after training, like the hippocampal replay during memory consolidation, to facilitate motor skill consolidation? If we can achieve this, we may even be able to artificially create motor skills by activating neural ensembles without actual training.

### What exciting projects are you working on?

My previous project, which is in review in *Neuron*, studies how fear affects feeding. Currently, I am working on a new project exploring active avoidance learning. Basically, mice are head-fixed on a running wheel allowing imaging of striatum neural activity ensemble changes during behavior. Then an escalating

# Boosting Operational Efficiency

Maggie Grossman, senior project coordinator in the Feinberg Research Office



Maggie Grossman, senior project coordinator in the Feinberg Office of [Research](#), helps manage spaces and facilities on Northwestern's Chicago campus.

## Q&A

### Where are you originally from?

I grew up in Highland Park, IL, in the northern suburbs of Chicago.

### What is your educational background?

I attended University of North Carolina-Chapel Hill and earned a bachelor's in history and French — I also did a homestay study abroad program in Montpellier, France. Last year, I completed my master's degree in Higher Education Administration and Policy here at Northwestern.

### Please tell us about your professional background.

I previously worked at the Newberry Library and then the University of Chicago Special Collections Research Center, working with rare books and archives. Then I came to the Northwestern University Press. I was an editorial assistant at the Press for three years when I transitioned to a role at the Bienen School of Music as their facilities coordinator.

### Why do you enjoy working at Northwestern?

I've grown up around Northwestern, as both my dad and brother are alumni — go 'Cats — and also around higher education in general as my mom is an administrator and professor across town at DePaul University. I think universities are a really fascinating ecosystem where you can bring together

a lot of brilliant people to do an amazing variety of great work. Everything — from our medical school to an art museum to the fencing team to the philosophy books published at the Press — all happens at Northwestern.

### How do you help scientists or research students at the medical school?

I contribute to a lot of projects related to facilities and space management. I love problem solving and connecting people with the right resources they need so that their lab and office spaces can work as efficiently as possible, helping them achieve their best possible work.

### What is your favorite part of the job?

I enjoy connecting with every department in every building of the medical school — at one point or another, I may have the opportunity to work with any given unit. I'm still relatively new to Feinberg, so if I haven't met you yet, I hope I get the chance soon!

### What do you like to do in your spare time?

I love to watch movies, read comics and listen to podcasts — feel free to reach out if you'd like any recommendations! I am also part of a cookbook club that pre-pandemic would meet for a monthly dinner party — we would each bring a recipe we made out of that month's chosen cookbook. I'm a big baseball fan and in my spare time like to complain loudly about our hometown teams.

### Anything else we should know about you?

I play the bassoon in the [Northwestern Medical Orchestra](#) alongside an amazingly talented group of Feinberg faculty, staff, medical students and residents. They just performed a virtual chamber concert and we are looking forward to reconvening in full as soon as we can!

## Ophthalmology Awarded Research to Prevent Blindness Grants

Two separate grants from [Research to Prevent Blindness](#) (RPB) will bolster ongoing and new investigations in vision research within the [Department of Ophthalmology](#).

"These awards signify a critical partnership between Feinberg's Department of Ophthalmology and the nation's leading foundation supporting research in vision and preventing blindness," said [Nicholas Volpe, MD](#), Chair of Ophthalmology.

[Jeremy A. Lavine](#), MD, PhD, assistant professor of Ophthalmology and assistant professor of [Medicine](#) in the division of [Rheumatology](#), has been granted a \$350,000

RPB Sybil B. Harrington Career Development Award for Macular Degeneration to support eye research. The support is provided over a four-year period. He will focus on wet age-related macular degeneration, a common cause of vision loss caused by new blood vessel growth in the eye. He will focus on how macrophages may either activate or block these new, destructive blood vessels in the eye.



*Jeremy A. Lavine, MD, PhD*

*(continued on page 13)*



# NIH News

## NIH Holiday Schedule Notification

NIH, including help desks, will be closed Friday, December 25 and Friday, January 1, 2021 for the federal holidays (Christmas Day and New Year's Day). If a grant application due date falls on a [federal holiday](#), the application deadline is automatically extended to the next business day.

## New Federal Financial Report Requirement – Effective January 1, 2021

Award recipients will be required to submit the SF-425 Federal Financial Report (FFR), a statement of expenditures associated with their award, to the Payment Management System (PMS) instead of eRA Commons, effective January 1, 2021 (see NIH Guide Notice [NOT-OD-20-127](#)). The change in submission requirement is part of an HHS initiative to consolidate FFR reporting from all the HHS Operating Divisions into PMS.

Note: recipients should register with [PMS](#) and obtain log in credentials prior to submitting an FFR. Recipient organizations should be familiar with PMS as they use the tool to draw down grant funds. Additionally, recipients who have FFRs in the eRA Commons/FFR module that are a work-in-progress as of January 1, 2021 will need to start over in PMS.

The change to FFR submission requirements does not affect the timeline. Therefore, FFR due dates, as outlined in the NIH Grants Policy Statement ([8.4.1.5.2](#) and [8.6.1](#)) remain unchanged. FFRs that are submitted prior to January 1, 2021 will use the FFR module in eRA Commons.

A second guide notice will be issued soon. Training sessions offered by PMS for recipients will be posted as they become available [here](#).

## New eRA Commons Website Coming Soon

The newly redesigned eRA Commons log-in and landing screen, sporting a cleaner, modern interface that reflects user feedback, will be released in January 2021. The new design will also provide enhanced security and stability for the Commons module. Both the home and landing pages will give easier access to key information, such as queries to help users figure out if their institution is already registered in Commons, which grants are pending closeout and more. The redesign will also feature less cluttered navigation bars, with prominent buttons for status, personal profile and account management. For more information on the upcoming changes, a sneak-peak and/or demo, [click here](#).



NUCATS Corner  
Clinical and Translational Sciences Institute

## New KL2 Co-directors Named, RFA Released

[Tamara Isakova, MD, MMSc](#), the Margaret Gray Morton Professor of Medicine, has been named co-director of the Northwestern University Clinical and Translational Sciences (NUCATS) Institute's KL2 Program.

"I am very excited to join the Institute's Center for Education and Career Development," said Isakova, an associate professor of Medicine in the Division of Nephrology and Hypertension and Director of the Institute for Public Health and Medicine's Center for Translational Metabolism and Health. "I have worked with, learned from and have been inspired by the NUCATS Institute's Center for Education and Career Development exceptional team of leaders, and I look forward to sharing my experience in collaborative patient-oriented research, mentoring of young investigators, and training program leadership to foster the interdisciplinary career development of KL2 Scholars."

The Multidisciplinary Career Development Program ([KL2](#)) supports early-career faculty at Northwestern and is sponsored by the National Institutes of Health's National Center for Advancing Translational Sciences, Grant Number KL2TR001424. The program is designed to train a diverse workforce of investigators to drive future innovation and implement effective clinical and translational research. Three esteemed early-career investigators became KL2 Scholars as part of the [2020 cohort](#).

Isakova will lead the KL2 program alongside [Leena Sharma, MD](#), the Chang-Lee Professor of Preventive Rheumatology, who was named co-director earlier this year.

"Among the most important attributes of the KL2 program is the systematic, comprehensive, thoughtful, and proactive and interactive support during early — possibly the most vulnerable — research career stages," Sharma said.

## Accepting 2021 Applications

The NUCATS KL2 program has released a [Request for Applications](#). Letters of Intent are due March 21. The application deadline is April 12, with funds available September 1.

The Institute's KL2 program provides career development resources (formal coursework, peer mentoring and career guidance) to scholars across disparate areas of expertise. KL2 awardees also receive salary support and other resources to ensure protected time for mentored research and didactic training in clinical research. Among two-dozen previous KL2 scholars, nearly all remain engaged in clinical and translational science research. Since 2008, KL2 program alumni have authored or co-authored nearly 1,000 publications. [Learn more](#).



# Sponsored Research

**PI: Nicolae Valentin David, PhD, associate professor of Medicine in the Division of Nephrology and Hypertension**

**Sponsor: National Institute of Diabetes, Digestive and Kidney Diseases**

**Title: Regulation of FGF23 in Chronic Kidney Disease (CKD) by iron and inflammation**



Chronic kidney disease (CKD) is a costly public health problem that increases the risk of cardiovascular mortality. Disordered bone and mineral metabolism is a common complication of CKD that begins early and worsens progressively as kidney function declines. Fibroblast growth factor 23 (FGF23) is a phosphate-regulating hormone normally produced by bone. In chronic kidney disease (CKD), serum FGF23 levels are increased and associated with cardiovascular mortality. Current approaches that address alterations in mineral metabolism in CKD have inconsistent and limited impact in preventing FGF23 elevations. Thus, novel therapeutic approaches to reduce FGF23 levels and prevent adverse outcomes in chronic kidney disease (CKD) are desperately needed.

In this renewed R01 project, we will continue to investigate the impact of iron deficiency (ID) and inflammation on FGF23 regulation and function in CKD. Both iron deficiency and inflammation are powerful stimuli of FGF23 transcription and cleavage. During the previous cycle of the project, we showed that partial correction of ID or inflammatory component in mice with CKD reduced FGF23 transcription, corrected FGF23 levels and prevented development of cardiac disease and premature death. However, bone-specific deletion of FGF23 was not sufficient to fully correct FGF23 levels in iron deficient or inflamed mice, suggesting that additional cell targets produce FGF23 in response to ID and inflammation. We will test the hypotheses that additional cells beyond bone cells contribute to increased production of FGF23 in response to ID and inflammation in CKD.

[Read more](#)

**PI: Rosemary Braun, MD, MPH, assistant professor of Preventive Medicine in the Division of Biostatistics**

**Sponsor: National Institute on Aging**

**Title: Reconstructing the Temporal Landscape of Gene Regulation in Aging**



Abundant epidemiological evidence links circadian regulation to human health. In particular, sleep and circadian disruption is associated with neurodegeneration, where it is thought to be both a consequence and a risk factor for Alzheimer's disease (AD), which is rapidly becoming a public health crisis.

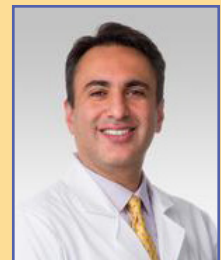
A wealth of existing transcriptomic data, coupled with the development of sophisticated computational tools for temporal reconstruction and analysis, provide an exciting opportunity to identify dysregulation in oscillatory patterns of gene expression associated with aging and AD. We propose to develop novel computational strategies to decipher the oscillatory patterns of gene expression using existing untimed transcriptomic datasets and to apply them to existing data from studies of AD to identify dysregulation in the oscillatory patterns associated with AD.

Our methods address a number of analytical challenges, including the need to reconstruct temporal information from untimed samples; ensuring generalizability and accuracy across different transcriptomic profiling technologies; addressing the fact that untimed samples may not span the full day; and identifying changes in complex, non-sinusoidal rhythms. Together, these studies will reveal oscillatory patterns of gene expression associated with aging and Alzheimer's disease and will provide innovative new methods for the circadian analysis of untimed data that can be applied to other phenotypes.

[Read more](#)

## Welcome New Faculty

Amir Borhani, MD, joins as associate professor of Radiology and medical director of CT at Northwestern Memorial Hospital. His main clinical and research areas of interest include imaging of hepatopancreaticobiliary diseases, spectral CT, radiomics and quantitative imaging. Borhani graduated from the Tehran University of Medical Science and completed his residency in diagnostic radiology followed by an abdominal imaging fellowship at University of Pittsburgh Medical Center. Prior to joining Feinberg, he served as chief of CT at University of Pittsburgh Medical Center.



# Funding

## Life Science Research Grants (Neurobiology)

[More information](#)

**Sponsor:** Whitehall Foundation

**Letter of Intent Due:** January 15, 2021

**Application Deadline:** June 1, 2021

**Amount:** Up to \$225K – research grants;

Up to 30K – grants-in-aid

**Synopsis:** The Whitehall Foundation assists scholarly research in the life sciences. The foundation is interested in basic research in neurobiology, defined as “invertebrate and vertebrate (excluding clinical) neurobiology, specifically investigations of neural mechanisms involved in sensory, motor and other complex functions of the whole organism as these relate to behavior.” The Foundation does not support research focused primarily on disease(s) unless it will also provide insights into normal functioning.

- Research grants are available to established scientists of all ages working at accredited institutions in the United States.
- The Grants-in-Aid program is designed for researchers at the assistant professor level, but may also consider senior investigators.

## Stem Cell Investigator Award

[More information](#)

**Sponsor:** New York Stem Cell Foundation

**Application Deadline:** February 17, 2021

**Amount:** \$1.5M

**Synopsis:** The New York Stem Cell Foundation (NYSCF) is soliciting applications from early-career investigators for awards to be used for exploring the basic biology and translational potential of stem cells. The goal of this initiative is to foster bold and innovative scientists with the potential to transform the field of stem cell research and advance understanding and use of stem cells in the development of treatments for human disease. In addition to providing funding, NYSCF partners with investigators to advance and translate their research. Investigators must have completed their MD, PhD and/or DPhil degree and be within six years of starting a faculty or comparable position on June 1, 2021.

NYSCF also offers a \$1.5M award in the field of neuroscience. Additional details are linked [here](#).

## Advanced Development of Informatics Technologies for Cancer Research and Management (U24 Clinical Trial Optional)

[More information](#)

**Sponsor:** National Cancer Institute (NCI)

**Letter of Intent Deadline:** May 9, 2021

**Application Due:** June 8, 2021

**Amount:** NCI intends to commit \$3.6M in fiscal year 2022 to fund four awards

**Synopsis:** NCI solicits applications for advanced development and enhancement of emerging informatics technologies to improve the acquisition, management, analysis and dissemination of data and knowledge across the cancer research continuum including cancer biology, cancer treatment and diagnosis, early cancer detection, risk assessment and prevention, cancer control and epidemiology and/or cancer health disparities. As a component of the NCI’s Informatics Technology for Cancer Research (ITCR) program, this announcement focuses on emerging informatics technology, defined as one that has passed the initial prototyping and pilot development stage, has demonstrated potential to have a significant and broader impact, has compelling reasons for further improvement and enhancement and has not been widely adopted in the cancer research field. The central mission of ITCR is to promote research-driven informatics technology across the development lifecycle to address priority needs in cancer research. A successful application should include development plans with a clear rationale on why the proposed technology is needed and how it will benefit the cancer research field. In addition, mechanisms to solicit feedback from users and collaborators throughout the development process must be included.

[View COVID-19 funding opportunities](#)

[View more funding opportunities](#)

# Responsible Metrics



By: **Annette Mendoza, Research Impact Librarian**

Over the past few months, the significance of accurate and methodical counting and reporting has never been more important. When counting is used to measure and evaluate the quality of something, it is imperative that it be done correctly. Using metrics to evaluate scholarship helps to tell the story of the outputs that we offer to the world. Whether the metrics you are using are traditional bibliometrics, e.g. how often your work has been cited, or alternative metrics, e.g. the number of mentions of your articles on social media, they need to be used in a responsible manner.

The idea of using metrics responsibly has been discussed widely in academic circles, resulting in at least three prominent statements on the topic. The Declaration on Research Assessment ([DORA](#)), developed in 2012, aims to raise awareness of the responsible use of metrics, assist in the development of new policies with regard to hiring and promotion, and help to improve equity in academia. To date, over 2,000 organizations and more than 16,000 individuals have signed the DORA declaration in support of the 18 recommendations that it outlines. [The Metric Tide](#), a framework finalized in 2015, includes 20 recommendations outlining the successful and responsible use of metrics. In this report, the history of research metrics use are traced in the UK and across the globe, and five dimensions of responsible metrics are defined: robustness, humility, transparency, diversity and reflexivity. Finally, [The Leiden Manifesto](#) outlines 10 principles on the importance of using metrics in a responsible fashion. Named after the conference where the ideas were formalized, this 2015 document published in *Nature* encourages a combination of both quantitative and qualitative evaluation of research for proper assessment.

There are commonalities in the message of the three statements: choose the correct metric for what you are trying to measure, understand that there are limitations to every metric, and be explicit and transparent in evaluation that involves the use of metrics. Not only have organizations signed on pledging to follow one of the three statements noted above, many have written their own responsible metrics statement. These types of individual [statements](#) can be tailored to and promoted within the organization. Recently, there has even been [discussion](#) about funding institutions requiring organizations to have a responsible metrics statement in place before receipt of funding. The importance of responsible metrics is gaining traction at several levels.

Bibliometrics experts recommend that institutions stay ahead of the curve and embrace responsible metrics. Make a [responsible metrics statement](#) a reality in your department, institute, or center. Of course, there are known [challenges](#) surrounding metrics and institutional rankings and [problems](#) with regard to the reliance on some indicators over others. Fortunately, we have tools available to help in the selection and understanding of indicators. For instance, the [Metrics Toolkit](#) is a free resource where you can learn about 28 different indicators and how those indicators can be used.

The [Metrics and Impact Core](#) at the Galter Health Sciences Library and Learning Center is committed to using metrics responsibly and strives to keep abreast of changes in the metrics landscape. We can help identify metrics that can assist you in telling your research story. [Contact us](#) to learn more about our services and the use of responsible metrics today.



# High-Impact Factor Research

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## Ophthalmology *(continued from page 8)*

“With the knowledge gained from our research, new therapies can be designed that will target macrophages and provide new treatment options for patients who are resistant to current blood vessel blocking intraocular injections,” Lavine said.

The RPB Career Development Award was established in 1990 to attract early-career physicians and basic scientists to eye research. To date, the program has provided awards to 223 vision research scientists in departments of ophthalmology at universities across the country.

The Department of Ophthalmology has also been awarded a Challenge Grant by RPB in the amount of \$75,000 a year, for four years, to support eye research conducted by the department. The funds will provide opportunities for creative planning and research program development that go beyond the scope of restricted project grants. Feinberg holds one of four RPB Challenge Grants nationwide.

“These unrestricted resources will undoubtedly fuel new ideas, creative collaborations across Northwestern’s vision research community and ultimately lead to new funded projects,” Volpe said.

Since it was founded in 1960, RPB has channeled more than \$383 million into eye research. As a result, RPB has been identified with nearly every major breakthrough in vision research in that time. For information on RPB’s grants program, listings of RPB institutional and individual grantees, and findings generated by these awards, go to [rpbusa.org](http://rpbusa.org).

## COVID-19 Information for Feinberg

Due to the COVID-19 outbreak in Illinois, a variety of considerations are necessary to accommodate the life cycle of our clinical work, educational programs and clinical training activities. We are committed to the health of our students, faculty and staff, and to the communities and patients we serve.

Every effort is being made by our hospital affiliates to conduct our patient care activities thoughtfully, and each entity will exercise their preferred processes to maximize everyone’s safety.

Continue to check Feinberg’s [Coronavirus/COVID-19 website](#) for updates and resources.

## Featured Core

### NUSeq Core

The [NUSeq Core](#) is a shared resource facility that provides next-generation sequencing (NGS), microarray processing options and other genomic services to Northwestern investigators, affiliated institutions and external academic and commercial organizations. The core was created in 2015 by the [Center for Genetic Medicine](#) to better meet the needs of the Northwestern investigators for state-of-the-art genomics technologies with integrated bioinformatics support. NUSeq is staffed by a team core specialist, technologists, and bioinformaticians.

Major NUSeq services include:

- [Next-Generation Sequencing](#)
- [Microarray Processing](#)
- [Bioinformatics](#)
- [NanoString Target Gene Profiling](#)
- [DNA Extraction](#)
- [DNA/RNA Sample Quality Control](#)
- [Cell Line Authentication](#)
- [Digital Droplet PCR and qPCR \(equipment use\)](#)

Those interested in initiating new projects with the Core are advised to contact the Core Director via email to schedule a meeting and receive a free consultation and service quote upon request. All Core [services](#) can be ordered using [NUcore](#).

COVID-19 service update: NuSeq has fully resumed operations with the implementation of a new sample submission procedure. Please notify the core of sample drop-off via email ([nuseq@northwestern.edu](mailto:nuseq@northwestern.edu)). At this time, project consultations are conducted remotely via phone or virtual meeting platforms.

#### Contact:

Director, Xinkun Wang, PhD  
[xinkun.wang@northwestern.edu](mailto:xinkun.wang@northwestern.edu)  
 (312) 503-3331

#### Location:

**Wet Lab** 300 E. Superior St., Tarry 2-770

**Bioinformatics** 750 N. Lake Shore Dr., Floor 11

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