

# Breakthroughs

Feinberg School of Medicine Research Office

October 2022

## Preventing Maternal Mortality and Morbidity



By Haleigh Ehmsen

A recent report by the CDC found that four out of five deaths during pregnancy, delivery or even up to a year postpartum could have been prevented. The U.S. has the highest maternal death rate of any high-income country, and research is needed to pinpoint why as well as determine how to prevent maternal deaths.

Additionally, maternal mortality will only increase in the wake of the Supreme Court's overturning of Roe v. Wade in June, according to [Melissa Simon, MD, MPH](#), vice chair for research in the Department of [Obstetrics and Gynecology](#).



"Overturning this law will increase the already rising U.S. maternal mortality rates. This Supreme Court decision is dangerous for women," Simon said.

The Supreme Court ruling in Dobbs v. Jackson Women's Health Organization has created confusion for many women seeking medical care when pregnant. Nevertheless, Feinberg investigators continue to pursue research that identifies important factors that impact maternal health.

### Discovering Patterns and Risk Factors

Through research into women's heart health and experience during pregnancy, Northwestern scientists have learned the ways women's health is impacted by social determinants, including what part of the country they live in.

[Sadiya Khan, '09 MD, '14 MSc, '10, '12 GME](#), assistant professor of [Medicine](#) in the Division of [Cardiology](#), was the senior author of a study [published](#) in *Circulation* that found more than half of young women between the ages of 20 and 44 who gave birth in 2019 had poor heart health before becoming pregnant.



"We tend to think about the baby's health once we become pregnant, but what so many women don't realize is the very first thing they can do to protect their babies (and themselves) is to get their heart in shape before they even conceive," Khan said.

In the study, the investigators compared data by geographical region. Even as good heart health was declining overall across the country, there were differences based on geography. The percentage of women with good heart health was lower in South (38.1 percent) and Midwest (38.8 percent) states, compared with states in the West (42.2 percent) and Northeast (43.6 percent).

"The geographic patterns observed here are, unfortunately, very similar to what we see for heart disease and stroke in both women and men," Khan said. "They indicate how factors such as social determinants of health play a critical role in heart health as well as maternal health."

Another study [published](#) in *JAMA* led by Khan found that over the past decade the rate of gestational diabetes has risen 30 percent in young U.S. women. For U.S. women who identify as

**Preventing Maternal Mortality** *(continued from cover page)*

Asian-Indian, the rate has more than doubled when compared with non-Hispanic white women.

“The consistent and continued increase over the last decade could have significant impact on not just pregnancy health and outcomes for the mom and baby, but also long-term health for both,” Khan said. “Gestational diabetes is linked to a higher risk of cardiovascular disease for the mom and child.”

The study also reported that chronic diabetes present prior to pregnancy (Type 1 or 2) rose more than 20 percent since 2011 and was nearly twice as high in non-Hispanic Black and Puerto Rican individuals.

“The pandemic could push these gestational diabetes numbers even higher due to lifestyle changes in exercise, eating and increased stress,” Khan said.

Knowing these staggering statistics is important to intervening. Some of the interventions Northwestern is involved with include using artificial intelligence (AI) to develop low-cost ultrasound and applying patient-centered interventions that empower pregnant people.

**Identifying Interventions**

In collaboration with Google, [Mozziyar Etemadi, MD, PhD](#), assistant professor of [Anesthesiology](#), is leading a project to bring fetal ultrasound to developing countries by combining AI, low-cost hand-held ultrasound devices and smartphones.



The project will involve developing algorithms that enable AI to read ultrasound images from these devices taken by trained community health workers and even pregnant people at home, with the aim of assessing the wellness of both the birthing parent and baby.

The AI will receive professional and amateur images across the many conditions that physicians typically want to monitor, such as the age of the fetus and whether it has a heart defect. By having these side-by-side image captures, the AI can adapt to interpret the amateur image capture and learn to interpret the images more accurately.

“The real power of this AI tool will be to allow for earlier triaging of care, so a lightly trained community health provider can conduct scans of birthing parents. The patients don’t have to go to the city to get it. The AI will help inform what to do next – if the patient is OK or they need to go to a higher level of care. We really believe this will save the lives of a lot of birthing parents and babies,” Etemadi said.

Another Northwestern study [published](#) in *JAMA* found that women with early, nonviable pregnancies who were given an active management strategy, which was defined as either with methotrexate alone or uterine evacuation with methotrexate as needed, had more successful pregnancy resolutions than those given an expectant management strategy. [Emily Jungheim, MD](#), the Edmond Confino, MD, Professor of Obstetrics and Gynecology, was a co-author of the clinical trial.



“When it comes to pregnancy and women’s health, we really are trying to get to a place where we can be more patient-centered, and I think this particular study is in that spirit,” said Jungheim, who is also chief of Reproductive Endocrinology and Infertility in the Department of Obstetrics and Gynecology and a member of the [Robert H. Lurie Comprehensive Cancer Center](#) of Northwestern University. “It provides us more information to help educate our patients when they’re faced with these tough decisions of what makes the most sense for them.”

Further research is needed to address this complex issue of maternal mortality and morbidity. Simon is leading this work with her NIH-funded studies: [Enhancing Perinatal Care Support to Improve Maternal Mortality Disparities](#) and [The OPTIMIZE Study: Optimizing Patient Navigation for Perinatal Care](#).

*Marla Paul, Kristin Samuelson and Melissa Rohman contributed to this story.*

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## Breakthroughs Podcast

Cardiovascular disease is the leading cause of pregnancy-related deaths in the U.S. According to a study published in the journal [Circulation](#), about sixty percent of pregnant women in the U.S. have poor heart health. Study authors [Sadiya Khan, MD](#), and [Natalie Cameron, MD](#), explain the results of the study and what needs to be done to reverse this alarming trend. [Listen to the podcast here.](#)

# Center for Genetic Medicine Announces New Director for Transgenic and Targeted Mutagenesis Laboratory

## Doglio steps down, Markoulaki named new director

By Yesenia Navarro

After 28 years of distinguished leadership, [Lynn Doglio, PhD](#), research associate professor of [Pharmacology](#), is stepping down as director of the Transgenic and Targeted Mutagenesis Laboratory (TTML), a core facility, and part of the [Center for Genetic Medicine](#). Doglio, who led the TTML from its inception, plans to retire.



*Lynn Doglio, PhD, steps down as the director of TTML.*

“We have seen such enormous growth in targeted mutation technology, especially in the last decade with gene editing, and under Lynn’s guidance and leadership, the TTML has been able to adapt and optimize all of these trends,” said [Elizabeth McNally, MD, PhD](#), the Elizabeth J. Ward Professor of Genetic Medicine and director of the Center for Genetic Medicine.

Doglio is succeeded by [Styliani \(Stella\) Markoulaki, PhD](#), who joins Northwestern as research professor of [Cell and Developmental Biology](#) from the Whitehead Institute of Biomedical Research at Massachusetts Institute of Technology (MIT), effective September 1.

“I am very honored and excited to join Northwestern University’s TTML and Cell and Developmental Biology department,” Markoulaki said. “I am stepping into very big shoes with a hope to continue the important work that TTML’s founding director, Dr. Lynn Doglio, started and spearheaded.”

Markoulaki will serve in the core facility’s mission to produce genetically engineered mouse models, giving Northwestern investigators access to cutting-edge techniques such as CRISPR gene editing – all with the broader aim of advancing understanding of fundamental mechanisms as well as genetics and the biology of human diseases.



*Styliani (Stella) Markoulaki, PhD, joins Northwestern as director of TTML.*

In this next chapter, Markoulaki looks forward to addressing the emerging needs of scientists at Northwestern and beyond by adapting genome editing technology and by developing and establishing new tools and databases to track progress and resources.

“We have tremendous expertise in the TTML,” McNally said. “Stella will work with the great scientists who are already part of TTML and bring the approaches she has learned in her time at MIT.”

Markoulaki, who previously established and developed the Whitehead Institute’s Genetically Engineered Models Center, is a leader in embryo and stem cell genetic engineering, transgenic and assisted reproductive technologies and somatic cell nuclear transfer. A collaborative scientist, her work has resulted in several innovative publications that have advanced the field of mouse genetics and epigenetics.

She earned her doctorate in cell and developmental biology from Tufts University School of Medicine, focusing on mammalian egg activation research, and completed her postdoctoral fellowship at the Whitehead Institute.

“I was lucky to be part of challenging and exciting research that always fueled my curious and problem-solving nature,” Markoulaki said. “I can’t wait to team up with scientists who can benefit from my passion for this work.”

# Graduate Student/Post-Doc Events and Opportunities

## Freedom For Everyone: Slavery and Abolition in 19th Century America

Now through December 30

Juneteenth marks a momentous celebration – the end of the American slavery – but it was not the end of the story about Black Americans’ struggle for freedom and equality. As Northwestern marks its first observance of the new federal holiday, we examine how deeply slavery was ingrained in 19th century America, how abolitionists forced a nation to face its inhumanity – and how that work must continue today. Curated by Marquis Taylor, history PhD student. Materials are drawn from the Charles Deering McCormick Library of Special Collections and University Archives; and the Melville J. Herskovits Library of African Studies. On display in Deering Library as well as an [online exhibit](#).

**Deering Library, Lobby**  
1937 Sheridan Rd., Evanston  
[More information](#)

## Cite Smarter & Manage Your Research: Zotero Workshop

November 4  
11 a.m. to noon

In an increasingly complex and fractured information landscape, keeping track of your research can be an overwhelming task. Fortunately, tools are available to help. In this session, we will introduce you to the bibliographic tool Zotero that can help you organize your research materials and save you countless hours during your reading and writing. Zotero is a freely available citation management software that works through a web browser. Zotero is easy to use and allows you to collect, manage and cite your research sources.

Online, [register here](#)  
[More information](#)

## Global Health Pre-Departure Seminar: Global Health Ethics

November 10  
Noon to 1 p.m.

Please join the Robert J. Havey, MD Institute for Global Health Pre-Departure Series. Feinberg students receiving Global Health Experience awards are required to attend this seminar in addition to completing the Analytic Memo prior to their international rotations. [Ashti Doobay-Persaud, MD](#), associate professor of [Medicine](#) and co-director of the Center for Global Health Education will present. A light lunch will be provided.

**Kellerman Classroom (2-322)**  
**Second floor**  
**McGaw Pavilion**  
240 E. Huron St., Chicago  
[More information](#)

## Fall Arts and Crafts Fair

November 21  
3 to 7 p.m.

Take a break from studying and join us on the ground floor of Norris to support Northwestern artists. There will be art from multiple students and community members for sale ranging across diverse art mediums. While you’re browsing, enjoy free hot chocolate and cookies and DIY craft tables with your friends.

**Norris University Center**  
**Ground floor**  
1999 Campus Dr., Evanston  
[More information](#)

## Research in the News

### **CNN, September 6**

[How Extreme Heat Can Kill and How You Can Stay Safe](#)  
Scott Dresden, MD, MS, was featured.

### **Crain’s Chicago Business, September 7**

[Maternal Stress During Pregnancy Leads to Sad Babies, Study](#)  
Leigha MacNeill, PhD, was featured.

### **Associated Press, September 7**

[Candy, Cash, Gifts: How Rewards Help Recovery From Addiction](#)  
Sara Becker, PhD, was featured.

### **Chicago Tribune, September 19**

[Researcher Says Improved Public Transportation Routes, Mobile Clinics Could Increase Healthcare Access](#)  
Lindsay Allen, MA, PhD, was featured.

### **WebMD, September 21**

[Eviction Rise is Threat to Health](#)  
Karen Sheehan, MD, PhD, was featured.

### **WBEZ Chicago, September 26**

[Telemedicine Abortions Just Got More Complicated for Health Providers](#)  
Katherine Watson, JD, was featured.

# Improving Healthcare Quality, Systems and Outcomes

Rinad Beidas, PhD, chair, Ralph Seal Paffenbarger Professor of Medical Social Sciences



[Rinad Beidas, PhD](#), is an international leader in implementation science. Her research uses key findings from implementation science and behavioral economics to improve how healthcare providers and organizations use best practices to enhance the quality and equity of care and patient outcomes. She has led two National Institutes of Health (NIH) centers on behavioral

economics and implementation science and is an associate editor for *Implementation Science*.

## What are your research interests?

I am an implementation scientist. That means my work focuses on reducing the gap between research and practice. My research leverages insights from implementation science and behavioral economics to make it easier for clinicians, leaders and organizations to use best practices to improve the quality and equity of care and enhance health outcomes. I work across areas, including mental health, firearm safety promotion, cancer, HIV and cardiovascular disease.

## What is the ultimate goal of your research?

My vision for my research program is to ensure that our incredible scientific discoveries equitably change healthcare quality, systems and outcomes. I see implementation science as a way to advocate and amplify the needs of our communities in pursuit of achieving population health impact and social justice at scale.

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

As a practicing clinician, I kept observing a pattern that kept me up at night. I was working in a research-based clinic that developed an evidence-based practice for pediatric anxiety, cognitive behavioral therapy (CBT). I kept treating young people who had not received this gold standard treatment in the community, and often by the time they made their way to our clinic, they felt hopeless about how to cope with their anxiety. After receiving an adequate dosage of

CBT, I saw my patients improve and gain back their hope. I became very interested in understanding how to partner with clinicians and organizations to implement evidence-based practices. As I worked across health areas, I realized that many implementation questions are ubiquitous across settings and interventions. I have spent the last two decades doing this work in collaboration with partners including patients, clinicians, health system leaders, payers and policymakers.

## How is your research funded?

I have been incredibly fortunate that my research as a principal investigator is funded by the NIH, including the National Institutes of Mental Health, the National Cancer Institute, National Heart, Lung, and Blood Institute, and the National Institute of Nursing Research. My collaborative research is also funded by other institutes within the NIH, the Patient-Centered Outcomes Research Institute, the Centers for Disease Control and Prevention, and foundations such as the National Psoriasis Foundation.

## Where have you recently published papers?

I have recently published in [Implementation Science](#), our field's flagship journal. Other recent publications include *JAMA* journals, [NEJM Catalyst](#), and [Science Advances](#).

## Who inspires you?

Every good idea our team has ever pursued comes directly from our community. I am inspired by the partners we work with: (1) the people doing the frontline work providing care and leading healthcare organizations; (2) the people we serve in healthcare – our patients and communities; (3) and our incredible team. Our partners are what gets me up in the morning and makes the work meaningful.

My family also provides endless inspiration. My mom and dad were immigrants to this country and sacrificed so much for me to have the opportunities that I have today. My husband, Karl, and my kids, Miles and Emme, inspire me every day to make sure that everyone has equitable access to high quality healthcare and in sharing me with the work that I love so much.

# Utilizing Computational Tools to Look at the Brain

Qiaohan Yang, PhD student, Interdepartmental Neuroscience (NUIN) Program



## Where is your hometown?

I was born and raised in a small town called Pan'an in southeastern China. It is nice and hilly with a small river running across the town.

## What sparked your interest in science or medicine?

There is no absolute definitive moment but I have been into science since I was very little. I loved to take things apart and put them back together to see how they function in grade school and dreamed of becoming an astrophysicist for quite a long time (although I would say these are pretty generic childhood experiences for people who end up in grad schools). But I didn't know what I'd like to do until my last year of undergraduate study, when I decided to try taking the path of becoming a scientist.

## What are your research interests?

I'm interested in using computational tools to examine how the human brain (especially the amygdala) codes contextual information during sensory processing.

## What are you currently working on?

I just joined my thesis lab two months ago, so I'm primarily working on solidifying a thesis project.

## You were first author [a study published in PLOS Biology](#). Tell me about what you found.

In this paper, we characterized the spectrotemporal properties of brain activity induced by sniffing an odor in the human primary olfactory cortex. We found that the high-frequency oscillation is particularly important for the accurate perception of odor identity. This lays the groundwork for future studies to further explore the functional role of the different aspects of the human cortical olfactory response.

## Please tell us about a defining moment in your education at Feinberg thus far.

When I decided to join NUIN for my graduate study. That is the moment I decided to make scientific research a very important part of my life.

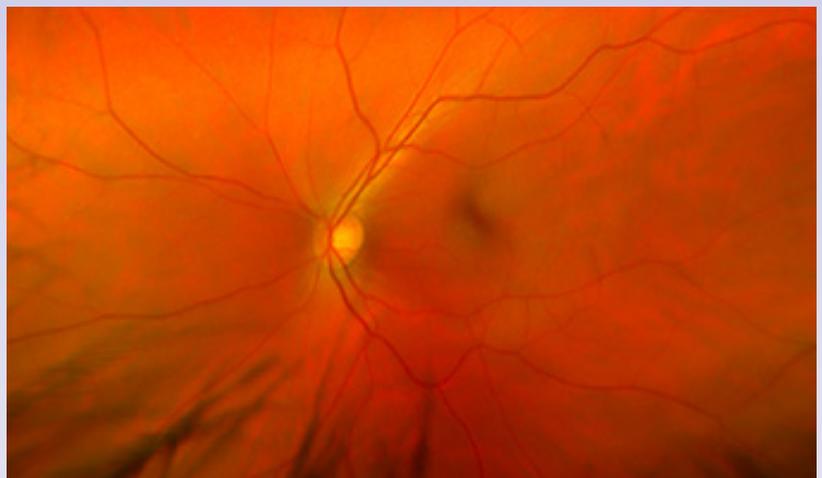
## What do you hope to do with your degree / what are your plans for post-graduation?

I hope to keep doing data-driven work that could tell us more about how the human brain functions.

## Breakthroughs Podcast

A celebrated molecular neuroscientist, Jeremy Nathans, MD, PhD, is responsible for landmark discoveries that have changed our understanding of how humans see the world. He is an investigator of the Howard Hughes Medical Institute and professor at Johns Hopkins University School of Medicine and recipient of Northwestern's [2022 Mechthild Esser Nemmers Prize in Medical Science](#).

[Hear Nathans discuss his research and career.](#)



# Illustrating Complex Biomedical Research

Brianna Monroe, MS, Senior Medical Illustrator/Animator



## Where is your hometown?

I was born outside of Orlando, Florida which is where I began my love of wildlife and art. During my brother's baseball games you could find me sitting on a blanket drawing or catching toads and frogs in a water bottle. When I was around 10 years old, we moved to Ames, Iowa which I would later find out

had one of the only, and largest, undergraduate programs for Biological/Pre-Medical Illustration (BPMI) at Iowa State University.

## What led you to Northwestern?

After graduating from the BPMI program at Iowa State in 2018, I came to Chicago to receive my master's in Biomedical Visualization (BVIS) at the University of Illinois Chicago, which is the largest of the four accredited programs in the field of medical illustration. My research project was a partnership with Northwestern University, so I knew it would be a wonderful institution to work for. The Shilatifard Lab had worked with BVIS students in the past and they had created amazing molecular animations to captivate the public on groundbreaking research being conducted in the lab. I had also worked on a freelance animation with the current medical illustrator in the lab at the time, where I was able to use the molecular visualization skills I learned in graduate school. When the position of medical illustrator/animator at the Simpson Querrey Institute for Epigenetics became available, I was really excited for the opportunity and knew I would love it. If interested, you can view the animation and a recent animation created for Yuki Aoi, PhD, on the [Shilatifard website](#) or my current [personal website](#).

## What are you currently working on?

I am currently collaborating with multiple research assistant professors and post-doctoral fellows in the Shilatifard Lab to

create animations to educate the public and other researchers in three minutes or less about their upcoming publications. I am working on figures for publications and presentations as well as continually updating the [Department of Biochemistry and Molecular Genetics](#), [Simpson Querrey Institute for Epigenetics](#), and [Shilatifard Laboratory](#) websites. The goal is to continue to create engaging visuals that aid in community outreach, funding and understanding of the research happening in the lab.

## How does your work support the research enterprise at Feinberg?

I may not support the research enterprise at Feinberg in the traditional sense, but my visuals for the research provide more accessibility to a variety of audiences in a clear and engaging manner. Clear communication is very important in science, and as a medical illustrator I have the skills to translate complex information into a clear and accurate story to support the research at Feinberg. By working directly with the scientists, the illustrations and animations that I create are meant to explain the science in a way words cannot.

## Why do you enjoy working at Northwestern?

I love the variety of work I do and the inspiring investigators I work with. It is always fun to bring the research they have worked so hard on to life. I love the challenge of working with molecular structures and having the freedom to decide the color scheme, materials and atmosphere. I have also been a part of the new [SQE Inspire program](#) with the generous support of Kimberly Querrey and Lou Simpson. The goals of this program are to expose and inspire students ranging from elementary school to high school to a variety of STEM careers and the academics that complement those careers. It is really fun to be able to share what I do and hear students consider medical illustration as a career path for them because it's something I didn't even know about until my senior year of high school.

## New Faculty

[M. Cecilia Berin, PhD](#), joined as the inaugural Bunning Professor for Food Allergy Research and professor of Medicine in the [Division of Allergy and Immunology](#) in September 2022. Formerly the Hugh A. Sampson Professor of Food Allergy Research and professor of Pediatrics at Mount Sinai in New York, her lab is dedicated to understanding the immunology of food allergic disorders. She will join the [Center for Human Immunobiology](#) and conduct research around understanding mechanisms responsible for reactions to foods, determining how immunotherapies lead to successful treatment of food allergy and finding factors that predispose to food allergy in early life. Berin received her PhD from McMaster University and did her postdoctoral work at the University of California, San Diego.



## NUCATS Corner

Clinical and Translational Sciences Institute



### NUCATS Launches New Website

The NUCATS Institute is excited to announce the launch of its new website. Among the biggest features of this new site is the NUCATS [Research Resource Directory](#), which is designed to make it easier for users to find the information they are looking for. Users can search by resource name or resource type. Educational and career development resources (for staff and faculty, including the TL1 and KL2 NIH funding opportunities) can now be found under the [training section](#).

### 2022-23 Navigating the Research Enterprise Series

[Navigating the Research Enterprise](#) is an annual seminar series for early-career faculty and postdoctoral fellows at Northwestern University who have protected research time. Each one-hour session is designed to provide attendees with needed support to promote development of the key skills young scientists require to progress beyond “just doing good research.” Registration can be accessed via the link atop the [NUCATS Service Request form](#). The complete series schedule and session archives can be found [here](#).

### KL2 Career Development Program RFA

The NUCATS Multidisciplinary Career Development Program (KL2) is an NCATS-sponsored career development award supporting early-career faculty at Northwestern. Current [KL2 Request for Applications](#) key dates are listed below:

- February 1 — Letters of Intent deadline
- March 1 — Application deadline
- July 1 — Funds available

KL2 awardees receive salary support and other resources to ensure protected time for mentored research and didactic training in clinical and translational research. Among two-dozen previous KL2 scholars, nearly all remain engaged in clinical and translational science research. Since 2008, KL2 program alumni have contributed to 981 publications, with 70 percent serving as PIs or co-PIs on NIH funded awards.

NUCATS and the KL2 program are committed to creating and nurturing a diverse and inclusive community. It is the Institute’s mission to value the whole of each scholar’s experience — past, present, and future. Scholars from diverse backgrounds and life experiences are strongly encouraged to apply.

[Learn more.](#)

## NIH News

### [Reminders About Financial Conflicts of Interest and Other Support](#)

A new study from the HHS Office of the Inspector General (OIG) affirmed that NIH grant recipients play a key role in protecting the integrity and security of U.S. biomedical research, in part through requiring investigators to disclose all of their significant financial interests and all other sources of other support. As noted by the OIG, failures by some recipients to disclose substantial contributions of resources from foreign entities have raised concerns about threats to the integrity of NIH-supported research. Recently, NIH released [NOT-OD-22-210](#) that provides important reminders about the FOCI regulation and other support policy requirements. We encourage all those involved in the NIH grants process to review this information carefully to ensure compliance.

### [Center for Scientific Review 2022-2027 Strategic Plan](#)

The Center for Scientific Review (CSR) is entrusted with most of the peer review that enables NIH to support a broad range of biomedical research. Their primary goal is to ensure that peer review identifies the strongest, most promising science, which depends upon an evaluation process that is fair, independent, expert, timely and free from inappropriate influences. The updated strategic plan includes five overarching goals that organize CSR’s current and future initiatives in support of the mission. These include maintaining scientific review groups that provide appropriate scientific coverage and review settings for all of NIH science, developing a large cadre of diverse, well-trained and scientifically qualified experts to serve as reviewers, developing an outstanding, engaged and diverse staff, implementing changes to the peer review process to make it more fair, effective and efficient, and achieving the mission through transparency, engagement with the scientific community and a data-driven approach to decision making.

### [Health Literacy Month – October 2022](#)

Each October, NIH joins others around the country to raise awareness about the importance of health literacy and its impact on the health of Americans. Tips to improve health literacy in writing include using common, everyday language, using active voice, eliminating jargon and getting feedback from others. Health literacy is important because it impacts how well people can find, understand and use health information to inform health-related decisions.

# Sponsored Research

**PI: Carla M. Cuda, PhD**, assistant professor of Medicine in the [Division of Rheumatology](#)

**Sponsor: National Institute of Allergy and Infectious Diseases**

**Title: The Relationship Between Brain Macrophages and Cognitive Dysfunction in Systemic Lupus Erythematosus**



Systemic lupus erythematosus (SLE) is a chronic autoimmune disease involving genetic and environmental factors culminating in multiple detrimental comorbidities. One such comorbidity is the onset of what is referred to as neuropsychiatric lupus (NP-SLE). Despite the impact of NP-SLE on health-related quality of life and although numerous mechanisms have been proposed, none can solely account for NP-SLE pathogenesis. We published that expression of NP-SLE-specific disease signatures in microglia, a tissue-resident macrophage-like population in the brain, correlates with the severity of behavioral deficits in two NP-SLE models prior to overt systemic disease. Further, our single-cell RNA sequencing (scRNA-seq) data identify homeostatic and disease-associated states in microglia of aged control and NP-SLE-prone mice. However, the disease-associated microglia subset in NP-SLE is depleted for genes associated with phagocytosis, which contrasts with their known phagocytic role in other diseases. We also find that restricted expression of the disease-associated transcriptional program in NP-SLE microglia corresponds to improved behavioral outcomes in NP-SLE-prone mice following treatment with fingolimod. These discoveries mark the first to implicate this disease-associated microglia subset as a potentially pathogenic population in NP-SLE, which contrasts with their proposed protective role in the literature.

We hypothesize that pathogenic disease-associated microglia are crucial for NP-SLE development and targeting this population may represent a new therapeutic avenue for treating NP-SLE. In Aim 1, we will determine whether tissue-resident brain cells or infiltrating immune cells are required for NP-SLE using reciprocal head-shielded bone marrow chimeric mice of WT and NP-SLE-prone donors and recipients. We will test whether blocking transition from the homeostatic state to the disease-associated state via deletion of TREM2 (a critical functional regulator of this population) in microglia prevents NP-SLE. We will delineate the role that type I interferon (IFN) plays in the development of NP-SLE-like disease by examining the role for the upstream receptor (IFNAR) and downstream signaling protein IFN regulatory factor 5 (IRF5), which have been linked to SLE susceptibility, via microglia-specific deletion of these signaling mediators. We identified a cell subset in human cerebrospinal fluid (CSF) that transcriptionally resembles disease-associated microglia. Moreover, classical monocytes can repopulate a compromised microglia niche and we see numerical expansion of these cells in NP-SLE models. In Aim 2, we will obtain paired CSF and peripheral blood (PB) from SLE patients with and without NP-SLE for transcriptional profiling of CSF microglia and PB monocytes to correlate with clinical outcomes. Despite investigation of microglia in the brain in other disciplines, we will be the first to examine their role in NP-SLE. These data will be invaluable for downstream development of improved diagnostics or targeted therapies.

[Read more about the project.](#)

**PI: Siobhan Phillips, PhD, MPH**, associate professor of Preventive Medicine in the Division of Behavioral Medicine and **David Victorson, PhD**, professor of Medical Social Sciences



**Sponsor: National Cancer Institute**

**Title: Fit2ThriveMIND: Optimizing a mHealth Physical Activity Intervention with Mindful Awareness Lessons in Breast Cancer Survivors**

There are approximately four million breast cancer survivors (BCS) in the U.S., and this population is expected to increase by one million in the next 10 years. Increased moderate-to-vigorous intensity physical activity (MVPA) is consistently associated with reductions in treatment-related side effects, cancer recurrence and mortality, and increased quality of life in BCS. Yet, the majority of BCS (~70%) do not meet MVPA recommendations (i.e., 150 mins/week). Existing studies of MVPA in BCS are largely resource-intensive, costly and deliver multiple components (i.e., coaching calls, supervised exercise) simultaneously limiting scalability. Three evidence-based strategies have been identified that may be particularly useful for overcoming these barriers and increasing MVPA in BCS: 1) electronic delivery of a MVPA program, 2) social support, and 3) mindfulness training. However, little is known about the unique roles of social support and mindfulness in MVPA promotion. More granular information about the discrete effects of these components is needed to optimize intervention configuration in order to maximize an effective and scalable MVPA program for BCS.

The purpose of this study is to apply the Multiphase Optimization Strategy (MOST), to determine which types of social support and mindfulness training intervention components optimally increase and maintain MVPA in a six-month mHealth MVPA intervention with a six-month follow-up. MOST is a framework adapted from engineering that uses highly efficient factorial experiments to evaluate individual, and combined, effects of intervention components to determine which ones can be reduced, eliminated, or replaced to improve efficiency. Inactive BCS (n=304) will receive a core intervention consisting of the Fit2ThriveMIND app and Fitbit and be randomly assigned to four components under consideration for inclusion in the optimized intervention: 1) general mindfulness training; 2) MVPA-specific mindfulness training; 3) text-coaching; and 4) engagement of a buddy. We will also examine the effects of increasing MVPA on symptom burden, other intensity activities (i.e. light and sedentary), and sleep quality and duration and potential mediators and moderators of component effects. All components will have a six-month duration except text coaching which will include “boosters” personalized to an individual’s MVPA goal- attainment during the six-month follow-up period. The proposed study represents the first systematic effort to use MOST to design an optimized, scalable mHealth MVPA intervention in BCS that incorporates mindfulness and specifically tests a maintenance strategy.

Knowledge gained from this study will inform the development of more effective and scalable interventions to improve health and disease outcomes among BCS. This study will lead to an improved understanding of how to effectively change and maintain BCS’ MVPA and inform the development of more effective and scalable interventions to improve health and disease outcomes among BCS.

[Read more about the project.](#)

# Funding

The Feinberg School of Medicine has increased seed funding up to \$50,000 for application preparation to initiate new multi-investigator program project or center grant applications involving Feinberg faculty. [Learn more on the website here.](#)

## Stanley Fahn Junior Faculty Award – Parkinson's Disease

[More information](#)

**Sponsors:** Parkinson's Foundation  
**Letter of intent due:** November 1  
**Invited full proposals due:** February 24  
**Upper amount:** \$300,000 over three years

The Parkinson's Foundation seeks clinical, pre-clinical or basic research proposals that will directly impact the understanding of Parkinson's or its treatment from promising early career scientists. Successful projects should include novel PD hypotheses and be inventive in methodology or approach. The award acts as a bridge to ensure promising early career scientists stay in the Parkinson's research field, hoping to solve, treat and end the disease.

## Next Gen Pregnancy Initiative

[More information](#)

**Sponsors:** Burroughs Wellcome Fund  
**Submission deadline:** December 1  
**Upper amount:** Up to \$500,000 over four years

Growing evidence suggests the interrelatedness of the duration of pregnancy, fetal growth and adverse pregnancy outcomes such as preterm birth, preeclampsia, intrauterine growth restriction, stillbirth and maternal medical complications including maternal mortality. The initiative is designed to stimulate both creative individual scientists and multi-investigator teams to approach healthy and adverse pregnancy outcomes using creative basic and translational science methods.

## Neurobiology of Brain Disorders Awards

[More information](#)

**Sponsors:** McKnight Foundation  
**Submission deadline:** December 12  
**Upper amount:** Up to \$300,000 over three years

The Foundation is interested in proposals that address the biological mechanisms of neurological and psychiatric disorders. This includes proposals that provide mechanistic insights into neurological functions at the synaptic, cellular, molecular, genetic or behavioral level across different species, including humans and vertebrate and invertebrate model organisms. A new additional area of interest is the contribution of the environment to brain disorders, particularly, proposals that incorporate new approaches and those that provide potential paths for therapeutic interventions.

## Schizophrenia and related disorders during mid- to late-life (R01 Clinical Trial Optional)

[More information](#)

**Sponsors:** National Institutes of Health and National Institutes of Mental Health  
**Submission deadline:** February 22  
**Letter of intent due:** 30 days prior to the application due date  
**Upper amount:** \$3,000,000 to fund 5-7 awards, maximum project period of 5 years

The purpose of this funding opportunity is to encourage applications that will advance translational research to better understand the emergence, trajectory and outcomes of schizophrenia and related psychotic disorders in mid- to late-life, and to identify targets for future development of prevention and treatment interventions. Since on average, person with schizophrenia and related psychotic disorders have a shorter lifespan, the mid- to late-life period is defined as 35 years and above.

Read more about the highlights of our educational programs, innovative research and discoveries, and our outstanding students, faculty, and staff in the [Feinberg News Center](#).

# Introducing the NIH Comparative Genomics Resource (CGR)

The National Institutes of Health (NIH) [Comparative Genomics Resource \(CGR\)](#) is a National Library of Medicine (NLM) project to maximize the biomedical impact of eukaryotic research organisms and their genomic data. NIH charged the [National Center of Biotechnology Information \(NCBI\)](#) at NLM to lead this trans-NIH funded project and establish an ecosystem that facilitates reliable comparative genomics analyses for all eukaryotic organisms. This ecosystem will feature a centralized suite of NCBI repositories and knowledge bases enhanced with community-supplied content and primed for compatibility with organism resources external to NCBI. CGR is also providing public tools to promote high-quality eukaryotic genomic data submission to GenBank to build the core genomic foundation needed to support reliable comparative analyses of eukaryotic research organisms. Examples of CGR benefits include:

**High Quality Genomic Data:** Newly accessible and improved NCBI tools will provide the genomics community with a core foundation of uncontaminated and consistently annotated eukaryotic genomes.

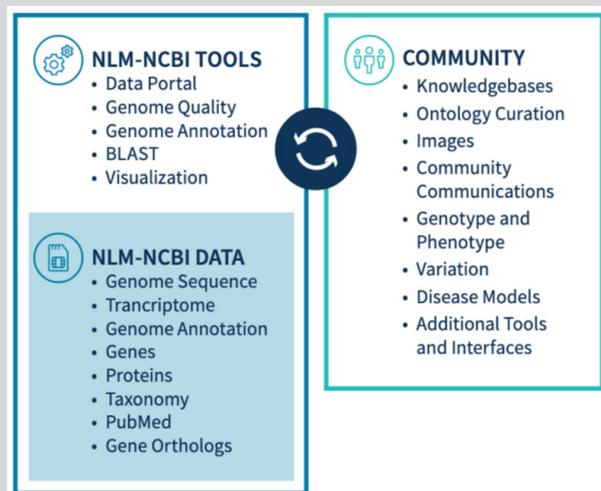
**Data Standardization:** By implementing [FAIR standards](#) (Findable, Accessible, Interoperable, Reusable), NCBI genome-associated data can be searched, browsed and downloaded seamlessly. NCBI data can also be used with a range of standard bioinformatics platforms and tools.

**New and Improved Comparative Genomics Tools:** In addition to tools promoting high-quality genomic data, NCBI will enhance existing tools and develop new ones to improve and simplify comparative analyses.

**Seamless User Experience:** NCBI will offer new and improved web and programmatic interfaces that facilitate discovery, analysis and delivery of eukaryotic genomic-related content.

**Discovery Amplification:** By providing equal access to genomic data and tools for all eukaryotic research organisms—including those not represented by organism-specific resources—and improving the connectivity of their data, NCBI is increasing their potential contributions to research. CGR will enhance NCBI-held content with community-supplied content and connect NCBI resources with community-provided resources to amplify the impact of such data and resources in support of greater scientific discovery.

**Scalable Analyses:** NCBI is developing content and tools to support emerging big data approaches to comparative genomics analyses, such as facilitating the creation of Artificial Intelligence (AI)-ready datasets and cloud-ready tools. This will meet new research needs and accommodate anticipated data growth.



## How can you get involved?

Community collaboration is critical to CGR project success. Feedback from the genomics community will inform improvements made to existing NCBI data, tools and interfaces and help guide new developments in these areas. The CGR team engages with the scientific community through meetings, workshops, webinars, surveys, small group sessions, user testing and interviews. Let the CGR team know what you need to support your comparative genomics analyses and give direct feedback on CGR at [cgr@nlm.nih.gov](mailto:cgr@nlm.nih.gov) or click the yellow **Feedback** button on the bottom right of the [CGR page](#).

[Check out the CGR project](#) for ongoing updates and to learn more about the data resources and tools for the eukaryotic research organism community. Follow CGR on [Twitter](#) (#NCBICGR), [Facebook](#), [GitHub](#), [Insights](#) news and [subscribe to the CGR mailing list](#) for news and for new opportunities to get involved. The CGR team is excited to hear from you.

[Kristi Holmes, PhD](#)  
Chair, CGR Working Group  
Director, Galter Library

# High Impact Factor Research

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## Featured Core

### Analytical bioNanoTechnology Equipment Core (ANTEC)

ANTEC provides Northwestern investigators, visiting scientists and local industry investigators 3D scientific illustration services and research equipment for the evaluation of materials and biological preparations. Equipment in the core is self-service and training is required. To start using ANTEC, the core invites investigators to open a [NUCore account](#).

### Core equipment and services include:

- Azure300 Chemiluminescent Gel Imager (Azure Biosystems)
- Centrifuge Sorvall Legend X1R (Thermo Fisher)
- CFX Connect Real-Time PCR System (Bio-Rad)
- Cytation3 Cell Imager and Plate Reader (BioTek)
- Freezer/Mill (Spex SamplePrep)
- IncuCyte Live Cell Analysis System (Sartorius)
- Lyophilizers – FreeZone 6 and 6+ (Labconco)
- Nanosight300, available at SQI Evanston (Malvern Panalytical)
- Plasma Cleaner (Harrick Plasma)
- Piuma Nanoindenter (Optics11)
- Rheometer MCR302 (Anton Paar)
- Zetasizer Nano ZSP (Malvern Panalytical)
- 3D scientific illustration

### Contact:

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### Location:

303 E. Superior St., 11th floor – Room 210

The Simpson Querrey Institute (SQI) community is mourning [the loss of ANTEC director](#) Alexandra Kolot, MS, the longest-standing staff member at the Institute.

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