

Breakthroughs

Feinberg School of Medicine Research Office

June 2022



By Will Doss

Machine learning is a technical advance that enables computers to learn from new data without being explicitly told how to do so, according to [Abel Kho, MD](#), director of the Institute for Augmented Intelligence in Medicine ([I.AIM](#)) and a professor of [Medicine](#) in the Division of [General Internal Medicine](#).



Abel Kho, MD, director of the Institute for Augmented Intelligence in Medicine (I.AIM)

“As a parent, it’s the difference between telling your child to ‘go take out the garbage’ and instead saying ‘clean the house,’ and your child recognizes on their own that part of cleaning the house involves also taking out the garbage,” Kho said.

However, for an algorithm to perform this learning requires an immense amount of data, forcing investigators to build extensive data pipelines from scratch. I.AIM aims to simplify that process, helping investigators find the right collaborators, navigate administrative red tape and source the right data to feed into machine learning models.

“AI and machine learning analytic methods are at the top of a big pyramid. You need to build on top of a really strong data foundation,” Kho said. “We want to expand the Feinberg machine learning research portfolio, so we need to make these data pipelines less bespoke and more standardized, and help investigators find the right people and tools — the more investigators who work in this space, the more we can accomplish.”

Building connections

Machine learning in other fields has exploded, due in no small part to the wealth of data available for model training. Image classification systems can work with millions of images across the internet, but the healthcare arena is different, said [Yuan Luo, PhD](#), associate professor of [Preventive Medicine](#) in the Division of [Health and Biomedical Informatics](#) and chief AI officer at the Northwestern University Clinical and Translational Sciences ([NUCATS](#)) Institute and I.AIM.

“One of our biggest obstacles is that individual institutions don’t have the kinds of large, specific datasets with which to train models,” Luo said.

(continued on page 2)

Data Pipeline *(continued from cover page)*

To build a machine learning model that can, for example, detect sub-clinical changes to predict outcomes for patients in the intensive care unit (ICU), institutions must turn to collaborators. Compiling a large and diverse dataset in a specific patient population is a group effort, and with a National Institutes of Health U01 grant in tow, Luo is building this ICU dataset along with a handful of other U.S. institutions.



Yuan Luo, PhD, chief AI officer at the Northwestern University Clinical and Translational Sciences (NUCATS) Institute and I.AIM

Physicians are trained to recognize the signs of acute kidney injury or sepsis, but patients in the ICU are under intense monitoring, producing hundreds of measurements that can be difficult for physicians to synthesize. Instead, a machine learning model could summarize this data and alert the physician if there are subclinical signs of illness, allowing them to act on the information. This is only possible when pooling data together in the consortium, Luo said.

“We want to expand the Feinberg machine learning research portfolio, so we need to make these data pipelines less bespoke and more standardized, and help investigators find the right people and tools.”

“We can create a flagship dataset that is large enough and diverse enough to capture all aspects of the patient profiles, before and after their ICU stay,” Luo said. “That will make these datasets

really useful in terms of training a model to predict a patient’s outcome or training a model to recognize certain less frequent diseases, for example.”

Under the microscope

The consortium approach is especially necessary for rare diseases such as dystrophic epidermolysis bullosa (EB), a skin disease that causes widespread blistering and scarring due to missing or dysfunctional collagen VII, which anchors the skin together. Patients with EB are highly subject to infection and have a markedly increased risk of developing cutaneous squamous cell carcinoma, which in these patients quickly metastasizes and is often fatal.



Amy Paller, MD, chair of Dermatology

Identifying cancerous skin lesions in these patients is difficult due to the variable appearance of cancers and their masking by damaged skin that surrounds them. There’s an enormous need for improved detection, according to [Amy Paller, MD](#), the Walter J. Hamlin Professor and chair of [Dermatology](#).

“These patients are in constant pain, so nobody wants to unnecessarily do a biopsy,” said Paller, who is also director of the [Skin Biology and Diseases Resource-Based Center](#). *“I’ve been seeing these patients for decades, as we have a national center at Northwestern, and I still struggle with recognizing skin cancer in these patients.”*

Kho and Paller, along with Antonia Reimer-Taschenbrecker, MD, visiting scholar in the Department of Dermatology, are building a machine learning model that could distinguish between EB-associated skin damage and potentially cancerous lesions. In the first phase of the project, investigators have collected thousands of skin images from collaborators across the world, including from India and South Africa, important sites to ensure the model will work with darker skin tones.

Now, the group is annotating images of both typical EB skin and of potentially cancerous lesions to help the model learn, with the goal of creating a mobile app that patients or families could use to identify suspicious areas, and doctors could use to aid in deciding where to take a biopsy.

“We hope that the model will pick up some features we aren’t appreciating and will find clues to distinguish cancerous lesions,” Paller said. *“Overall, we want to reduce unnecessary biopsies in these patients for whom it’s so painful.”*

Both the ICU data and EB skin imaging projects are examples of Northwestern’s collaborative mission, especially in the context of big data, Paller said.

“We view Northwestern as a site where international collaborations are greatly prized and research can be achieved on a higher plane because of this collaborative spirit,” Paller said.

CONTENTS

2022 Mentors of the Year	3
Student Events & Opportunities/In the News	4
Faculty Profile: Lucas Pinto/ New Faculty	5
Student Profile: Vivek Sagar/ Featured Core	6
Staff Profile: Crista Brawley/Podcast	7
NUCATS /NIH News/Podcast	8
Sponsored Research	9
Funding/Podcast	10
Galter Library	11
Hi-Impact Factor Research	12

Feinberg Announces 2022 Mentors of the Year

By **Haleigh Ehmsen**

The Medical Faculty Council ([MFC](#)) honored the recipients of the 2022 Mentor of the Year awards at a virtual workshop on May 10, where the awardees shared insights from their experiences mentoring students, trainees and peers.



This year's recipients were [Katherine L. Wisner, MD, MS](#), (right, top) director of the Asher Center for the Study and Treatment of Depressive Disorders and the Norman and Helen Asher Professor of [Psychiatry and Behavioral Sciences](#), and [Harris R. Perlman, PhD](#), (right) chief of [Rheumatology](#) and the Mabel Greene Myers Professor of [Medicine](#).



Wisner and Perlman will be recognized for their awards at the 2022 [Lewis Landsberg Research Day in September](#).

Mentorship is fluid

[Elizabeth Gerard, MD](#), associate professor of Neurology, who nominated Wisner and introduced her during the Zoom session, said, "she truly inspires and develops anyone who is in her orbit from research coordinator to peers."

Gerard specifically praised Wisner's enthusiasm, her love of medicine, science and people as traits that make her an exceptional mentor.

"Dr. Wisner has this amazing skill to develop people. She gets to understand each individual, and their strengths and what they can bring to the table... she is very intentionally inclusive. She strives for diversity on her team," Gerard said.

She earned her medical degree at Case Western Reserve University and did a post-doctoral fellowship at the University of Pittsburgh. She was professor of Psychiatry, Obstetrics, Gynecology and Reproductive Sciences, Epidemiology and Women's Studies at the University of Pittsburgh, joining Feinberg's faculty in 2012 to found and direct the Asher Center.

Wisner, who is also a professor of [Obstetrics and Gynecology](#), discussed the fluidity of mentee-mentor relationship. "These relationships where we think of the mentor as somebody who is giving coaching or knowledge or wisdom, and the mentee as someone who is receiving is not my experience across time," she said. "My experience is that the mentor/mentee relationship is incredibly fluid."

Throughout her career, Wisner said she has realized the important investment of time in relationships, mentioning the work involved

for a mentor to provide exposure to opportunities, protect time and support and challenge their mentees.

Wisner noted that there is no single perfect mentor. "One of the things I do is support that mentees and colleagues have networks of career developmental relationships."

Social capital is critically important in career development, Wisner said, and mentees are critical to a mentor's success. Mentees ask questions and provide a sense of buoyancy to the academic space.

A finger on the pulse

Perlman was nominated for the Mentor of the Year award by [Carla Cuda, PhD](#), research associate professor of Medicine in the Division of Rheumatology, and she introduced him at the virtual workshop. Cuda described Perlman as a true visionary. "He's a forward-thinking scientist always with his fingers on the pulse of what's coming next."

Perlman earned his doctoral degree at Tufts University School of Medicine, and came to Northwestern in 1999 as assistant professor. He left in 2002 to take a position at Saint Louis University as assistant professor before returning in 2008 and being [named](#) Chief of Rheumatology in 2015.

In his presentation, Perlman discussed the mentors that have impacted his career and lifted him up, and sharing the lessons they have taught him. Perlman said his first experience in a lab at Columbia University taught him the importance of giving time to mentees. He also learned the importance of reading widely, to understand how science is moving and how it is changing.

One of his mentors at Tufts University taught him about the business side of science, how salary works and how do you get paid, which he has passed onto his mentees. "I really try to make sure all mentees learn where your salary comes from, how you get paid, and to know which times you can argue for more salary, and how that is handled."

Perlman mentioned the importance of supporting students and trainee projects and encouraging mentees to take ownership of their research and help them stay focused. Additionally, teaching about work-life balance is also an important role of a mentor, he said. "We have to make sure that people in our lab really get the help they need, directing them to use the resources that are available."

Many of Perlman's mentors were from universities across the country and he emphasized the importance of networking across institutions.

"You have to have emotional intelligence when you become a mentor, and as a mentee, and you have to remember that this is a marathon. It's not always a sprint. Our careers are marathons."

2021 Awardees

In 2021, [Robert Murphy, MD](#), executive director of the [Robert J. Havey, MD Institute for Global Health](#) and John Philip Phair Professor of [Infectious Diseases](#), and [Rod Passman, MD](#), director of the [Center for Arrhythmia Research](#) and Jules J. Reingold Professor of Electrophysiology, were presented with the Mentors of the Year awards. [Watch their videos here.](#)

Graduate Student/Post-Doc Events and Opportunities

2022 Juneteenth Celebration Friday, June 17, Noon to 1 p.m.

Join us for our Juneteenth celebration, where we will discuss Black History in Chicago, the importance of culture and place, and what it means to the people who live there. Featured guests include Sherman “Dilla” Thomas, an urban historian and TikTok sensation who has been actively preserving and sharing the rich history and culture of the city of Chicago, highlighting its people, architecture and impact on the world. As well as, Mary Pattillo, PhD, the Harold Washington Professor of Sociology and the chair of the Department of African American Studies at Weinberg College of Arts and Sciences at Northwestern University.

[Online via Zoom](#)

Community Geography, Food Systems and Health Equity Research and Action in Chicago and Beyond Tuesday, June 21, 9:30 to 10:30 a.m.

Community Geography is a growing subfield that utilizes geographic and other social science techniques to collaborate with community organizations to assist communities in accomplishing meaningful change. The presentation discusses Community Geography projects focusing on food access, food policy, and health equity in Chicago and beyond, utilizing varying levels of community engagement and geographic technology. Lessons from these partnerships are applied to a discussion of methods in community-university partnerships.

This seminar is offered as a hybrid event; join us in-person or online. [Registration is required for both in-person and online participation.](#)

Searle Meeting Room
Lurie Medical Research Building
303 E. Superior St., Chicago 60611

Lurie Cancer Center Symposium and Scientific Poster Session

Wednesday, June 22, 2 to 7 p.m.

Hear a keynote presentation from Marsha Rosner, PhD, of the University of Chicago titled “Rewiring Signaling Pathways as a Therapeutic Approach to Cancer.” Further, learn about groundbreaking research taking place in laboratories of Lurie Cancer Center members on Northwestern University’s Evanston and Chicago campuses.

Baldwin Auditorium
Robert H. Lurie Medical Research Center
303 E. Superior St., Chicago 60611

38th Annual Northwestern Ophthalmology and Vision Research Day

Friday, June 24, 8:45 a.m. to 4:30 p.m.

The primary goals of Research Day are to showcase the broad spectrum of ophthalmology and vision research taking place throughout the Northwestern community and to catalyze collaborations between investigators in different departments, schools and campuses. Highlights of the day include talks from Northwestern University researchers, poster presentations and the Robert Miller Memorial Lecture guest speaker and alumnus, Paul Palmberg, ’65 BSM, ’69 PhD, ’70 MD.

Feinberg Pavilion, Pritzker Auditorium
251 E. Huron St., Chicago, IL 60611

Research in the News

WebMD, May 5

[Why Do Clinical Trials Still Underrepresent Minority Groups?](#)
Clyde Yancy, MD, MSc, was featured.

Crain’s Chicago Business, May 11

[Northwestern sheds light on long COVID](#)
Eric Liotta, MD, MS, and Ayush Batra, MD, were featured.

WTTW, May 11

[With Vaping Up and COVID Lingering, Northwestern Recruiting Millennials for Lung Health Study in Chicago](#)
Ravi Kalhan, MD, MS, was featured.

WGN, May 13

[Improvement in hearing can hinge on little ear hairs](#)
Jaime Garcia-Anoveros, PhD, was featured.

US News & World Report, May 19

[Mystery of Hepatitis Cases in Kids Deepens as CDC Probe Continues](#)
Tina Tan, MD, was featured.

The New York Times, May 23

[For Some Parkinson’s Patients, Boxing Can be Therapy](#)
Danielle Larson, MD, was featured.

Understanding the Root Neurobiological Mechanisms of Cognitive Behavior

Lucas Pinto, MD, PhD, Assistant Professor of Neuroscience



[Lucas Pinto, MD, PhD](#), is an assistant professor of [Neuroscience](#) and a systems neuroscientist. His [laboratory](#) studies the neurobiological mechanisms underlying cognition, both at the local circuit level and in large-scale interactions between different brain areas.

What are your research interests?

I am interested in understanding the neural mechanisms that allow us to produce different cognitive behaviors to meet ever-changing demands from our environment. To me, this involves understanding cognitive behaviors quantitatively, understanding how different components of neural circuits carry our cognitive computations and how circuits across the brain interact with flexibility to support these different types of cognitive behavior. More specifically, at any given moment we need to set behavioral goals, select the appropriate information from the environment, process that information and then generate adequate actions to achieve those goals.

My lab is interested in understanding all these facets of cognitive behavior. To tackle this, we use a mixture of complex decision-making tasks for mice navigating in virtual reality and cutting-edge optical tools to record from and manipulate neural circuits, genetic tools to target specific circuit components and computational models to make sense of it all.

What is the ultimate goal of your research?

The ultimate goal of our research is to understand the neural circuit basis of cognition.

How did you become interested in this area of research?

I have been interested in these questions since the beginning of my training, originally as a

medical student. Because the questions are so multi-faceted, I slowly worked my way up, gaining expertise in sensory processing, genetic tools, optical tools, decision-making, etc. Now in my own lab, I feel like I am finally in the position to bring it all together and try to tackle these hard questions.

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

I do not have any collaborations at Northwestern yet. Currently, I collaborate with colleagues at Princeton, University of California, Davis and Universitat Autònoma de Barcelona. Most of my collaborations are with theoretical and computational neuroscientists developing statistical tools and theoretical models of brain function.

How is your research funded?

Our funding is a combination of BRAIN Initiative funding from the National Institutes of Health, my startup funds and private foundations like the Simons Foundation and the Alfred P. Sloan Foundation.

Where have you recently published papers?

We have papers published in [Neuron](#), [Nature Neuroscience](#) and [Nature](#).

New Faculty

[Erik P. Pioro, MD, PhD](#), joined in November 2021 as professor of [Neurology \(Neuromuscular Disease\)](#) in the Ken and Ruth Davee Department of Neurology, as Medical Director of the Neuromuscular Division, and as Vice-Chair of Translational Neurology. Pioro specializes in the clinical care and research of adult neurologic patients with motor neuron diseases (MNDs), particularly amyotrophic lateral sclerosis (ALS). Previously, Erik was director of the Section of ALS and Related Disorders at the Cleveland Clinic in Cleveland, Ohio for over 20 years.



Developing Computational Models and Cultivating Curiosity

Vivek Sagar, Northwestern University Interdepartmental Neuroscience (NUIN) program



Vivek Sagar, student in the Northwestern University Interdepartmental Neuroscience (NUIN) program, studies olfactory processing in the laboratory of [Thorsten Kahnt, PhD](#), adjunct associate professor of [Neurology](#) in the Division of Behavioral Neurology.

Where is your hometown?

I am from Chandigarh, India. It's a pretty little city north of Delhi, near Punjab. Occasionally one can see the foothills of the Himalayas above the sparse city lights; this vista is my most vivid memory of the city.

What sparked your interest in science or medicine?

Reading "A Brief History of Time" by Stephen Hawking while I was in high school had a significant impact on my perspective about the universe. Math, in all of her various forms, delighted me. I have been lucky to have people who coaxed out of me a genuine sense of wonder about the laws of nature and a curious appreciation of the complexity of conscious life.

What are your research interests?

I work at the interface of computational and human cognitive neuroscience. I enjoy constructing computational models of specific mental processes such as olfactory perception.

What are you currently working on?

My thesis project is focused on understanding the neural basis of subjective olfactory perception. We found that distinct brain regions encode odor percepts with different degrees of complexity and subjectivity.

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

I treasure moments with that subtle sense of being present and content while sitting in silence with a cup of coffee, in the backdrop of sunshine or snow and pondering upon a scientific problem. Those moments definitely find their meaning when added up over days, months and years.

What do you hope to do with your degree?

For now, I wish to continue this learning experience and gain some postdoctoral training. I am leaning towards understanding how our brains create hedonic value. But mostly, I am just curious about what comes next.

Featured Core: Neurodevelopmental Core

The mission of the [Neurodevelopmental Core](#), part of Northwestern's [Institute for Innovations in Developmental Sciences](#), is to ensure that rigorous neurodevelopmental research methods are accessible for all Northwestern investigators, faculty and students.

The core provides state-of-the-art neuroscience and developmental assessment methods for novel investigations and collaborations. The core is designed for trainees and investigators of all levels who are seeking to launch developmental research programs or incorporate cutting-edge neurodevelopmental methodologies into their ongoing research projects. The core supports research on all stages of the lifespan, from before birth, through infancy and childhood and into adulthood. Investigators can also expand their footprint with the core's two locations on the Evanston and Chicago campuses.

Core services include:

Contact:

Elizabeth Norton, PhD, Director
847-491-2519 | ndcore@northwestern.edu

- Providing consultation, training, data processing and analysis support, as well as data collection support via dedicated staff, for investigators in areas including:
 - EEG/ERP brain measures
 - Neuropsychological/neurodevelopmental/behavioral assessments and questionnaires
 - Eye tracking
 - Providing training to investigators in developmentally-sensitive MRI/fMRI (e.g., natural sleep MRI, pediatric MRI) participant training and data acquisition (in partnership with the Center for Translational Imaging)
 - Hosting cross-campus workshops and seminars by methodological experts, highlighting novel and emerging techniques
 - Consulting on new projects and research designs for grant submissions

Re-imagining Staffing and Process in the Office for Research

Crista Brawley, PhD, associate vice president of the Office for Research



Crista Brawley, PhD, associate vice president of the [Office for Research](#), is leading the charge on staffing a busy university office to keep up with the growth in overall awards.

Where is your hometown?

Bethlehem, Pennsylvania is my hometown. A funny thing here is that when this is an ice breaker

question at an event, I always say no one will know where this is, and it is a small town in Pennsylvania. Every time I reveal my hometown someone knows Bethlehem, and I have connected with so many people around my hometown. It is a little wild!

What led you to Northwestern?

I decided to apply to my current role from a LinkedIn posting after a particularly rough day. As soon as I started researching the role and the office, I got excited! I got that excited feeling like an elementary school student gets anticipating going on summer break. It starts kind of slowly and builds to something almost uncontainable by June.

What are you currently working on?

Currently, I am working with my teams in the Institutional Review Board (IRB) and Institutional Animal Care and Use Committee (IACUC) offices to address an understaffing situation. We are re-imagining the roles and creating job families in the regulatory operations buckets to better align the units for the Office for Research. We are also working hard to

bring in new talent to the teams to provide relief to our current staff who have been cranking for the past two years to keep the operations moving forward. We need to add additional staff to keep up with the tremendous growth we have experienced in research submissions in both units. But we also need to allow our leadership in the units the ability and space to think strategically and improve the processes for their unit. Becoming more efficient and effective is a goal we are striving for together. We use the hashtag (#BestPlacetoWork). We are actively creating a diverse and inclusive environment where all voices are represented to make us a better team.

How does your work support the research enterprise at Feinberg?

Our work is imperative to the research enterprise at Feinberg. We work hand-in-hand with Feinberg leadership, investigators and staff to uphold the regulations first and foremost, but also promote the scientific discovery that is pivotal to all of NU.

Why do you enjoy working at Northwestern?

Working at Northwestern University for the Office for Research has been a breath of fresh air for me. I am surrounded by smart, thoughtful individuals that want to be part of the solution to greatness. I feel very lucky to have secured a role where I am valued and I have a safe space to function within. I see so much potential at Northwestern, and I hope I can harness that potential to turn it into amazing opportunities for research and the University as a whole. Respectful collaboration is one of the keys to success. And I am lucky enough to live in that every working day now!

Breakthroughs Podcast

Music-Based Medical Interventions with Borna Bonakdarpour, MD

Music-based medical interventions can have remarkable therapeutic benefits for patients diagnosed with cognitive impairments such as Alzheimer's disease, dementia and aphasia. [Borna Bonakdarpour, MD](#), assistant professor of [Neurology](#) in the Division of Behavioral Neurology and member of the [Mesulam Center for Cognitive Neurology and Alzheimer's Disease](#), explains how he is using and studying these clinical interventions through the new Northwestern Music and Medicine Program.

[Listen to the episode.](#)





Access the Suite of Research Study Recruitment Tools

The NUCATS team has research study recruitment tools that can assist in promoting active trials. It is our goal to provide participant recruitment resources to study teams with distinct instructions, templates and editorial guidance to assist with implementation and dissemination of recruitment materials. Among the tools available:

- Northwestern Research Trials at Feinberg [Tip Sheet](#): How to set up public recruitment in Study Tracker
- Be The New Normal (TNN) Recruitment Match: Chicagoland clinical trial listings. To learn more, visit the NUCATS [Recruitment Toolkit](#) and view «web based recruitment portals.
- ResearchMatch: National Database of Clinical Trials. To learn more, visit the NUCATS [Recruitment Toolkit](#) and view web based recruitment portals.

Additional questions? Email [Toddie Hays](#).

Pilot Funding Page Now Live

A new [webpage](#) provides a comprehensive look at pilot and seed grant funding available throughout the medical school. The searchable database currently features nearly 30 opportunities.

The site is curated and managed by the NUCATS Institute. Please email [Roger Anderson](#) to add an opportunity.

The NUCATS Institute annually supports more than \$1 million in pilot research funding that seeds new NIH applications.

Breakthroughs Podcast



Lessons Learned from COVID-19 and HIV/AIDS Pandemics with Richard D'Aquila, MD

Director of NUCATS [Richard D'Aquila, MD](#), discusses some milestone discoveries and recent lessons from the COVID-19 and the HIV/AIDS pandemics. [Listen to the episode here.](#)

NIH News

[Congress strengthens NIH's ability to address harassment in NIH-funded activities](#)

Ensuring a safe workplace where both people and science can thrive has long been the goal of NIH policies on addressing harassment. Due to the efforts of Congress, NIH is implementing a general provision that mandates the NIH Director to require NIH-funded institutions to report to the NIH “when individuals identified as principal investigators or as key personnel in an NIH notice of award are removed from their position or are otherwise disciplined due to concerns about harassment, bullying, retaliation or hostile working conditions.”

[NIH announces antiviral drug development awards](#)

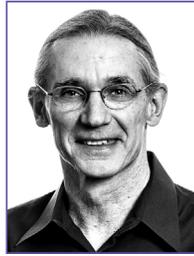
The National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, has awarded approximately \$577 million to establish nine Antiviral Drug Discovery (AViDD) Centers for Pathogen of Pandemic Concern. The AViDD centers will conduct innovative, multidisciplinary research to develop candidate COVID-19 antivirals, especially those that can be taken in an outpatient setting, as well as antivirals targeting specific viral families with high potential to cause a pandemic in the future. These include paramyxoviruses, bunyaviruses, togaviruses, filoviruses, picornaviruses and flaviviruses.

[Case Study in Research Integrity: Double, Double, Toil and Trouble](#)

While NIH allows the submission of identical applications to separate federal agencies, they required that the overlap be disclosed. Duplicative funding is a loss for biomedical research. It is a misuse of taxpayer funds. Another meritorious idea and researcher may fail to be funded because of this. There are several ways you and your institution can prevent this from happening. Improving internal institutional controls, such as running your applications through plagiarism software to identify duplication and handle it appropriately before submission.

Sponsored Research

PI: [Charles Heckman, PhD](#), **associate chair for research in the Department of Physical Therapy and Human Movement Sciences and professor of Neuroscience/Physical Medicine and Rehabilitation**



Sponsor: National Institute of Neurological Disorders and Stroke

Title: “Supercomputer-based Models of Motoneurons for Estimating Their Synaptic Inputs in Humans”

All motor commands flow through motoneurons in the spinal cord and brainstem. As for inputs to neural circuits throughout the central nervous system (CNS), these commands comprise three main components: two types of ionotropic input (excitation and inhibition) and a set of G-protein coupled inputs (neuromodulation). Lack of understanding of how these components produce output constitutes a fundamental uncertainty at the foundation of the neural control of movement. Fortunately, motor output in humans can be studied at the level of single neurons. Motoneuron action potentials are 1-to-1 with those of their muscle fibers, forming motor units whose action potentials can be recorded relatively easily in muscles. The potential for using these motor unit firing patterns for understanding motor commands has long been appreciated. Our goal is to maximize this potential by developing supercomputer-based techniques for reverse engineering motor unit firing patterns to identify the amplitudes and patterns of the excitatory, inhibitory and neuromodulatory inputs underlying motor commands in humans.

Recent advances that allow simultaneous recording of many motor units have allowed us to identify distinctive nonlinear behaviors in motor unit firing patterns. Our development of realistic models of motoneurons show that these nonlinearities arise from complex interactions between input components. We plan to use these models as the core of a reverse engineering (RE) approach that estimates these three components from nonlinear human motor unit firing patterns.

Our premise is that implementation of our models on supercomputers at Argonne National Laboratories will allow systematic exploration of the firing patterns generated by many thousands of input combinations. Those input organizations that accurately recreate a measured set of firing patterns will then be considered to be part of the “solution space” for that particular motor output.

[Read more about this project](#)

PI: [Betina Yanez, PhD](#), **associate professor in the Department of Medical Social Sciences**



Sponsor: National Cancer Institute

Title: “Technology Facilitated Behavioral Intervention for Depression among Diverse Patients in Ambulatory Oncology”

Depression is one of the most common psychological comorbidities experienced throughout the cancer continuum. Elevated depressive symptoms in oncology patients are a major concern as unmanaged depressive symptoms in cancer patients is associated with poor health-related quality of life (HRQoL), poor adherence to cancer treatments, delayed return to work and baseline function, greater emergency department visits, greater risk of suicide and higher all-cause mortality. Behavioral interventions for the management of depression are efficacious, but scalability and implementation of these evidence-based interventions in oncology is limited. Health information technologies (HIT) provide an ideal opportunity to expedite the administration, scoring and screening for depression with well-validated, brief and precise measurement tools that can actionable data to screen for depression and deliver pragmatic and scalable evidence-based interventions that are proven to reduce depressive symptomatology.

We will evaluate the effectiveness and the implementation of an evidence-based HIT behavioral treatment in both English and Spanish for cancer patients with elevated depressive symptoms. This HIT treatment combines systematic, electronic health record-integrated screening for depressive symptoms with an individually tailored HIT intervention to address gaps in the treatment of depression among cancer patients. The study takes place across two distinct health systems in two major metropolitan areas—Chicago and Miami (Northwestern Medicine and University of Miami Health System).

We aim to conduct a pragmatic Type I effectiveness-implementation hybrid trial of My Cancer Support — an evidence-based, tailored behavioral HIT program for the management of elevated depressive symptoms — in ambulatory oncology care settings within two large health systems. We will establish the effectiveness of My Cancer Support on depressive symptoms (i.e., primary outcome) and anxiety, HRQoL, and health services use (i.e., secondary outcomes) compared to usual care. We will evaluate the process of implementing My Cancer Support and its impact on patient and system-level outcomes, including reach, adoption, maintenance and acceptability. Next, we will identify facilitators and barriers to wide-scale implementation of My Cancer Support beyond Northwestern Medicine and University of Miami Health System. Finally, we will explore whether the effects of My Cancer Support vary across socioeconomic status, language, disease severity, severity of depressive symptoms, recruitment sites and other patient and clinical characteristics.

[Read more about this 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.](#)

Michelson Prizes (Immunology and Vaccines)

[More information](#)

Sponsors: Human Vaccines Project/Gary Michelson Medical Research Foundation

Submission deadline: June 26

Upper amount: \$150,000

The Michelson Prizes: Next Generation Grants are research grants given annually to support promising researchers who are applying disruptive concepts and inventive processes to advance human immunology, vaccine discovery and immunotherapy research for major global diseases. The committee will be looking for research aimed at tackling the current roadblocks that exist in human vaccine development and expanding our limited understanding of key immune processes that are fundamental to successful vaccine and immunotherapy development.

Rising Star Awards (Neuropsychiatric disorders)

[More information](#)

Sponsor: One Mind Institute

Submission deadline: June 6

Upper amount: \$300,000 over three years

The One Mind Rising Star Awards fund pivotal, innovative research on the causes of and cures for brain disorders. Proposals on any of a wide range of neuropsychiatric conditions are in scope, with studies focusing on bipolar disorder of special interest, including applications that would advance therapies for bipolar disorder. The award winners will be awarded a \$300,000 research grant over the course of three years to catalyze a deep mechanistic understanding of psychiatric disorders and therapeutic action, with the end goal of identifying or developing biomarkers and therapeutic interventions to better diagnose, treat and prevent such disorders.

Research Grants and Fellowships for SCI/D

[More information](#)

Sponsor: Paralyzed Veterans of America Foundation

Submission deadline: July 1

Upper amount: \$150,000

The Paralyzed Veterans of America Research Foundation is focused on funding projects grounded in basic laboratory science and the education of scientists working towards breakthroughs directed toward a cure for paralysis or the secondary medical conditions and technologies associated with spinal cord injury or disease (SCI/D). These projects should be designed to find better treatments and cures for paralysis and support efforts to improve the quality of life of individuals with SCI/D until improved clinical treatments, technologies or cures are discovered.

Cancer Prevention, Detection, Diagnosis and Treatment Technologies for Global Health (U01 Clinical Trial Optional)

[More information](#)

Sponsors: National Institutes of Health and National Cancer Institute

Submission deadline: June 18

Upper amount: \$475,000 per year, up to 5 years

The funding opportunity supports the development of cancer-relevant technologies suitable for use in low/middle-income countries. Specifically, this opportunity solicits applications for projects to adapt, apply and validate existing or emerging technologies in a new generation of user-friendly, low-cost technologies for preventing, detecting, diagnosing and/or treating cancers in people living in low/middle-income countries.

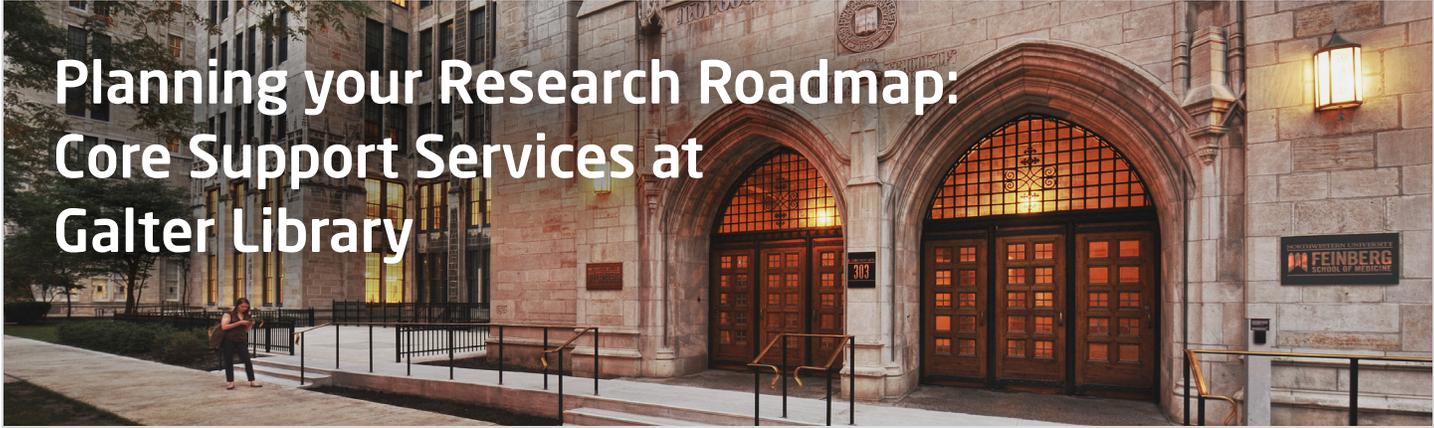
Breakthroughs Podcast

New Approaches for Heart Failure with Preserved Ejection Fraction with Sanjiv Shah, MD

Nearly half of all patients with heart failure have preserved ejection fraction, or HFpEF, yet there is much that is unknown about HFpEF and how to best prevent it and treat it. [Sanjiv Shah, '00 MD](#), leads the world's first clinical program dedicated to the study of heart failure with HFpEF. He discusses latest discoveries on the mechanisms of HFpEF and identifying therapeutic targets for it.

[Listen to the episode here](#)





Planning your Research Roadmap: Core Support Services at Galter Library

In addition to our physical and online collections, Galter offers specialized support services to meet the research needs of the Feinberg community. Below is a broad overview of some of the services you could add to your research itinerary to ensure you are utilizing all available resources.

Liaison Librarians

Every department, program, center and institute within the Feinberg School of Medicine is assigned an individual librarian who triages specialized information requests and is available for specific instruction and consultation. Galter's Liaison Librarian program offers collaborative support that takes an integrative approach to all aspects of your research. Connect with your [Liaison Librarian](#).

Systematic and Scoping Reviews

Galter offers support for systematic and scoping reviews by providing consultation and collaboration with varying levels of engagement based on your selected [service model](#). Contact your Liaison Librarian to receive specialized support in question formulation, protocol development and data collection. Our team is also equipped to assist you with citation management systems, capturing data for the PRISMA flow diagram and contributing to the final review process for manuscript submission. Check out our classes on the [review and reporting processes](#), [EndNote](#) and our GalterGuides related to [EndNote and Citation Management](#).

DataLab

Galter's [DataLab](#) provides training and development and facilitates collaborative innovations connecting faculty, staff and students to data-related resources. Through the DataLab you can connect with our free [DataClinic](#) that offers consultations, training support and expert assistance in resolving technical issues. Our services are centered around best practices related to data management, reproducibility, compliance with data sharing policies and open science. Check out our classes on [data management](#) and find out how we can best support you throughout all stages of the research data lifecycle. To request a DataClinic consultation fill out this [contact form](#).

Writing and Publication Support

Galter library offers curated instructional content to help you navigate the writing and publication process. In our

GalterGuide on [writing, citing and publication](#) you will find information on citation and style guides, copyright-terms and agreements and open access resources. The Galter team is also available to assist in grant preparation with a specific concentration on the fundamentals of the National Institutes of Health (NIH) grant process and requirements. We have compiled resources to guide you through [NIH BioSketch best practices](#), [NIH Compliance and Public Access Policy and obtaining PMCIDs](#) and [Data Policies from Funding Agencies](#). You can also attend our class on the [NIH Public Access Policy](#) that covers manuscript submission to PubMed Central and managing your bibliographies with MyNCBI's My Bibliography.

Research Impact and Dissemination

Galter's [Research Assessment and Communications](#) (RAC) department is available to assist you through the communication and dissemination of your research. Our RAC team manages [Northwestern Elements](#) which serves as a web-based warehouse of information about scholarly products and helps Feinberg faculty maintain current publications lists and reduce data entry. We offer support for [Open Researcher and Contributor ID \(ORCID\) Integration](#) and best practices to help make your research discoverable. Additionally, our [Metrics and Impact Core](#) (MIC) is designed to help you communicate the impact of your work by providing expertise in alternative and bibliometrics, research communication and preservation.

Clinical Informationist Service

Galter Library's clinical informationists can join your team on rounds and bring the resources and services of the library to you. This service answers clinical questions generated as a part of patient care discussions. Our team specializes in rapid support for dissemination of research findings, clinical support services and collaborations with key constituents on clinically-focused projects. To explore options for a clinical informationist to join your team on rounds, email clinicalquestion@northwestern.edu.

As you plan and navigate your research roadmap don't hesitate to add Galter support services to your itinerary. First stop: Connect with your [Liaison Librarian](#) to make sure you are using all the resources available to you. Whether you are in the planning phases of your research, working towards publication or assessing impact, we are here to support you.

High-Impact Factor Research

Billingham LK, Stoolman JS, Vasan K, Rodriguez AE, Poor TA, Szibor M, Jacobs HT, Reczek CR, Rashidi A, Zhang P, Miska J, Chandel NS. [Mitochondrial electron transport chain is necessary for NLRP3 inflammasome activation.](#) *Nature Immunology.* 2022;23(5):692.

Borlaug BA, Blair J, Bergmann MW, Bugger H, Burkhoff D, Bruch L, Celermajer DS, Claggett B, Cleland JGF, Cutlip DE, Dauber I, Eicher JC, Gao Q, Gorter TM, Gustafsson F, Hayward C, van der Heyden J, Hasenfuss G, Hummel SL, Kaye DM, Komtebedde J, Massaro JM, Mazurek JA, McKenzie S, Mehta SR, Petrie MC, Post MC, Nair A, Rieth A, Silvestry FE, Solomon SD, Trochu JN, Van Veldhuisen DJ, Westenfeld R, Leon MB, **Shah SJJ.** [Latent Pulmonary Vascular Disease May Alter the Response to Therapeutic Atrial Shunt Device in Heart Failure.](#) *Circulation.* 2022;145(21):1592-1604.

Benik BK, Sze CC, Ryan CA, Das S, Cao K, Douillet D, Rendleman EJ, Zha D, Khan NH, Bartom E, Shilatfard A. [A synthetic lethality screen reveals ING5 as a genetic dependency of catalytically dead Set1A/COMPASS in mouse embryonic stem cells.](#) *Proceedings of the National Academy of Sciences of the United States of America.* 2022;119(19):e2118385119.

Choi YS, Jeong H, Yin RT, Avila R, **Pfenniger A**, Yoo J, Lee JY, **Tzavelis A**, Lee YJ, Chen SW, Knight HS, Kim S, Ahn HY, Wickerson G, Vázquez-Guardado A, Higbee-Dempsey E, Russo BA, Napolitano MA, Holleran TJ, Razzak LA, Miniovich AN, Lee G, **Geist B**, Kim B, **Han S**, Brennan JA, Aras K, Kwak SS, Kim J, Waters EA, Yang X, **Burrell A**, San Chun K, Liu C, Wu C, Rwei AY, Spann AN, Banks A, **Johnson D, Zhang ZJ**, Haney CR, Jin SH, Sahakian AV, Huang Y, Trachiotis GD, **Knight BP, Arora RK, Efimov IR, Rogers JA.** [A transient, closed-loop network of wireless, body-integrated devices for autonomous electrotherapy.](#) *Science.* 2022;376(6596):1006-1012.

Choudhury A, **Magill ST**, Eaton CD, Prager BC, Chen WC, Cady MA, Seo K, Lucas CHG, Casey-Clyde TJ, Vasudevan HN, Liu SJ, Villanueva-Meyer JE, Lam TC, Pu JKS, Li LF, Leung GKK, Swaney DL, Zhang MY, Chan JW, Qiu ZX, Martin MV, Susko MS, Braunstein SE, Bush NAO, Schulte JD, Butowski N, Sneed PK, Berger MS, Krogan NJ, Perry A, Phillips JJ, Solomon DA, Costello JF, McDermott MW, Rich JN, Raleigh DR. [Meningioma DNA methylation groups identify biological drivers and therapeutic vulnerabilities.](#) *Nature Genetics.* May 2022;54(5):649.

Cruz Rivera S, Aiyegbusi OL, Ives J, Draper H, Mercieca-Bebber R, Ellis C, Hunn A, Scott JA, Fernandez CV, Dickens AP, Anderson N, Bhatnagar V, Bottomley A, Campbell L, Collett C, Collis P, Craig K, Davies H, Golub R, Gosden L, Gnanasakthy A, Haf Davies E, von Hildebrand M, Lord JM, Mahendraratnam N, Miyaji T, Morel T, Monteiro J, Zwisler AO, **Peipert JD**, Roydhouse J, Stover AM, Wilson R, Yap C, Calvert MJ. [Ethical Considerations for the Inclusion of Patient-Reported Outcomes in Clinical Research: The PRO Ethics Guidelines.](#) *JAMA-Journal of the American Medical Association.* 2022;327(19):1910-1919.

Garcia-Anoveros J, Clancy JC, Foo CZ, Garcia-Gomez I, Zhou YJ, Homma K, Cheatham MA, Duggan A. [Tbx2 is a master regulator of inner versus outer hair cell differentiation.](#) Article. *Nature.* 2022;605(7909):298.

Glinton KE, Ma WS, Lantz C, Grigoryeva LS, DeBerge M, Liu XL, Febbraio M, Kahn M, Oliver G, Thorp EB. [Macrophage-produced VEGFC is induced by efferocytosis to ameliorate cardiac injury and inflammation.](#) *Journal of Clinical Investigation.* 2022;132(9):15.

Guo H, Bai W, Ouyang W, Liu Y, Wu C, Xu Y, Weng Y, Zang H, Liu Y, Jacobson L, Hu Z, Wang Y, Arafa HM, Yang Q, Lu D, Li S, Zhang L, Xiao X, Vázquez-Guardado A, Ciatti J, Dempsey E, Ghoreishi-Haack N,

Waters EA, Haney CR, Westman AM, MacEwan MR, Pet MA, **Rogers JA.** [Wireless implantable optical probe for continuous monitoring of oxygen saturation in flaps and organ grafts.](#) *Nature Communications.* 2022;13(1):3009.

Guy C, Mitrea DM, Chou PC, Temirov J, Vignali KM, Liu XY, **Zhang H**, Kriwacki R, Bruchez MP, Watkins SC, Workman CJ, Vignali DAA. [LAG3 associates with TCR-CD3 complexes and suppresses signaling by driving co-receptor-Lck dissociation.](#) *Nature Immunology.* May 2022;23(5):757.

Heidenreich PA, Bozkurt B, Aguilar D, Allen LA, Byun JJ, Colvin MM, Deswal A, Drazner MH, Dunlay SM, Evers LR, Fang JMC, Fedson SE, Fonarow GC, Hayek SS, Hernandez AF, Khazanie P, Kittleson MM, Lee CS, Link MS, Milano CA, Nwacheta LC, Sandhu AT, Stevenson LW, Vardeny O, Vest AR, **Yancy CW.** [2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines.](#) *Circulation.* 2022;145(18):E895-E1032.

Hunt AC, Case JB, Park YJ, Cao L, Wu K, Walls AC, Liu Z, Bowen JE, Yeh HW, Saini S, Helms L, Zhao YT, Hsiang TY, Starr TN, Goreshnik I, Kozodoy L, Carter L, Ravichandran R, Green LB, Matochko WL, Thomson CA, Vögeli B, Krüger A, VanBlargan LA, Chen RE, Ying B, Bailey AL, Kafai NM, Boyken SE, Ljubetič A, Edman N, Ueda G, Chow CM, Johnson M, Addetia A, Navarro MJ, Panpradist N, Gale M, Jr., Freedman BS, Bloom JD, Ruohola-Baker H, Whelan SPJ, Stewart L, Diamond MS, Veesler D, **Jewett MC, Baker D.** [Multivalent designed proteins neutralize SARS-CoV-2 variants of concern and confer protection against infection in mice.](#) *Science Translational Medicine.* 2022;14(646):eabn1252.

Kim ES, Velcheti V, Mekhail T, Yun C, Shagan SM, Hu S, **Chaes YK**, Leal TA, Dowell JE, Tsai ML, Dakhil CSR, Stella P, Jin YL, Shames DS, Schleifman E, Fabrizio DA, Phan S, Socinski MA. [Blood-based tumor mutational burden as a biomarker for atezolizumab in non-small cell lung cancer: the phase 2 B-F1RST trial.](#) *Nature Medicine.* 2022;28(5):939.

Kouzu H, Tatekoshi Y, Chang HC, Shapiro JS, McGee WA, De Jesus A, Ben-Sahra I, Arany Z, Leor J, Chen CL, Blackshear PJ, Ardehalii H. [ZFP36L2 suppresses mTORC1 through a P53-dependent pathway to prevent peripartum cardiomyopathy in mice.](#) *Journal of Clinical Investigation.* 2022;132(10):16. e154491.

Kumar B, **Field NS**, Kim DD, Dar AA, Chen Y, Suresh A, Pastore CF, Hung LY, Porter N, Sawada K, Shah P, Elbulok O, Moser EK, Herbert DR, Oliver PM. [The ubiquitin ligase Cul5 regulates CD4\(+\) T cell fate choice and allergic inflammation.](#) *Nature Communications.* 2022;13(1):2786.

Kumar D, **Ison MG**, Mira JP, Welte T, Hwan Ha J, Hui DS, Zhong N, Saito T, Katugampola L, Collinson N, Williams S, Wildum S, Ackrill A, Clinch B, Lee N. [Combining baloxavir marboxil with standard-of-care neuraminidase inhibitor in patients hospitalised with severe influenza \(FLAGSTONE\): a randomised, parallel-group, double-blind, placebo-controlled, superiority trial.](#) *Lancet Infectious Diseases.* 2022;22(5):718-730.

Li KC, Huang LP, Tian MY, Di Tanna GL, Yu J, Zhang XY, Yin XJ, Liu YS, Hao ZX, Zhou B, Feng XX, Li ZF, Zhang JX, Sun JX, Zhang YH, Zhao Y, Zhang RJ, Yu Y, Li NI, Yan LJJ, **Labarthe DR**, Elliott P, Wu YF, Neal B, Lung TM, Si L. [Cost-Effectiveness of a Household Salt Substitution Intervention: Findings From 20 995 Participants of the Salt Substitute and Stroke Study.](#) *Circulation.* 2022;145(20):1534-1541.

Lu XD, Fong KW, Wang F, Gritsina G, Baca SC, Berchuck JE, **Ross J**, Corey E, **Chandel N, Catalona WJ, Yang XM**, Freedman ML, **Zhao JC, Yu JD, Brea IT**, Spisak S, Morrissey C. [HOXB13 suppresses de novo lipogenesis](#)

(continued on next page)

High-Impact Factor Research

[through HDAC3-mediated epigenetic reprogramming in prostate cancer.](#) *Nature Genetics*. 2022;54(5):670.

Mahajan A, Spracklen CN, Zhang WH, et al. (including **Joo, YY Hayes GM, Kho, AN, Rasmussen-Torvik LJ**). [Multi-ancestry genetic study of type 2 diabetes highlights the power of diverse populations for discovery and translation.](#) *Nature Genetics*. 2022;54(5):560.

Mangione CM, Barry MJ, Nicholson WK, Cabana M, Chelmos D, Coker TR, Davis EM, Donahue KE, Epling JW, Jr., Jaén CR, Krist AH, Kubik M, Li L, Ogedegbe G, Pbert L, Ruiz JM, **Simon MA**, Stevermer J, Wong JB. [Screening for Primary Open-Angle Glaucoma: US Preventive Services Task Force Recommendation Statement.](#) *JAMA-Journal of the American Medical Association*. 2022;327(20):1992-1997.

Mo X, Niu Q, Ivanov AA, Tsang YH, Tang C, Shu C, Li Q, Qian K, Wahafu A, Doyle SP, Cicka D, Yang X, Fan D, Reyna MA, **Cooper LAD**, Moreno CS, Zhou W, Owonikoko TK, Lonial S, Khuri FR, Du Y, Ramalingam SS, Mills GB, Fu H. [Systematic discovery of mutation-directed neo-protein-protein interactions in cancer.](#) *Cell*. 2022;185(11):1974-1985.e12.

Price AM, Olson SM, Newhams MM, Halasa NB, Boom JA, Sahni LC, Pannaraj PS, Irby K, Blinck KE, Maddux AB, Nofziger RA, Cameron MA, Walker TC, Schwartz SP, Mack EH, Smallcomb L, Schuster JE, Hobbs CV, Kamidani S, Tarquinio KM, Bradford TT, Levy ER, Chiotos K, Bhumbra SS, Cvijanovich NZ, Heidemann SM, Cullimore ML, Gertz SJ, **Coates BM**, Staat MA, Zinter MS, Kong M, Chatani BM, Hume JR, Typpo KV, Maamari M, Flori HR, Tenforde MW, Zambrano LD, Campbell AP, Patel MM, Randolph AG, Overcoming Covid I. [BNT162b2 Protection against the Omicron Variant in Children and Adolescents.](#) *New England Journal of Medicine*. 2022;386(20):1899-1909.

Principe DR, Aissa AF, Kumar S, **Pham TND**, Underwood PW, Nair R, Ke R, Rana B, Trevino JG, **Munshi HG**, Benevolenskaya EV, Rana A. [Calcium channel blockers potentiate gemcitabine chemotherapy in pancreatic cancer.](#) *Proceedings of the National Academy of Sciences of the United States of America*. 2022;119(18):e2200143119.

Qiu XT, Boufaied N, Hallal T, Feit A, de Polo A, Luoma AM, Alahmadi W, Larocque J, Zadra G, Xie YT, Gu SQ, Tang Q, Zhang Y, Syamala S, Seo JH, Bell C, O'Connor E, Liu Y, **Schaeffer EM**, Karnes RJ, Weinmann S, Davicioni E, Morrissey C, Cejas P, Ellis L, Loda M, Wucherpennig KW, Pomerantz MM, Spratt DE, Corey E, Freedman ML, Liu XS, Brown M, Long HW, Labbe DP. [MYC drives aggressive prostate cancer by disrupting transcriptional pause release at androgen receptor targets.](#) *Nature Communications*. 2022;13(1):17. 2559.

Quattrocchi M, Wintzinger M, Miz K, Panta M, Prabakaran AD, **Barish GD, Chandel NS, McNally EM**. [Intermittent prednisone treatment in mice promotes exercise tolerance in obesity through adiponectin.](#) *Journal of Experimental Medicine*. 2022;219(5).

Rawat R, Tunc-Ozcan E, McGuire TL, Peng CY, Kessler JA. [Ketamine activates adult-born immature granule neurons to rapidly alleviate depression-like behaviors in mice.](#) *Nature Communications*. 2022;13(1):12. 2650.

Shoda T, Collins MH, Rochman M, Wen T, Caldwell JM, Mack LE, Osswald GA, Besse JA, Haberman Y, Aceves SS, **Arva NC**, Capocelli KE, Chehade M, Davis CM, Dellon ES, Falk GW, **Gonsalves N**, Gupta SK, **Hirano I**, Khoury P, Klion A, Menard-Katcher C, Leung J, Mukkada VA, Putnam PE, Spergel JM, Wechsler JB, **Yang GY**, Furuta GT, Denson LA, Rothenberg ME. [Evaluating Eosinophilic Colitis as a Unique Disease](#)

[Using Colonic Molecular Profiles: A Multi-Site Study.](#) *Gastroenterology*. 2022;162(6):1635-1649.

Soflaee MH, Kesavan R, **Sahu U**, Tasdogan A, **Villa E, Djabari Z**, Cai F, Tran DH, Vu HS, **Ali ES**, Rion H, **O'Hara BP**, Kelekar S, Hallett JH, Martin M, Mathews TP, Gao P, Asara JM, Manning BD, **Ben-Sahra I**, Hoxhaj G. [Purine nucleotide depletion prompts cell migration by stimulating the serine synthesis pathway.](#) *Nature Communications*. 2022;13(1):14. 2698.

Straub L, Hernandez-Diaz S, Bateman BT, **Wisner KL**, Gray KJ, Pennell PB, Lester B, McDougle CJ, Suarez EA, Zhu YM, Zakoul H, Mogun H, Huybrechts KF. [Association of Antipsychotic Drug Exposure in Pregnancy With Risk of Neurodevelopmental Disorders A National Birth Cohort Study.](#) *JAMA Internal Medicine*. 2022;182(5):522-533.

Sun F, Ou JH, Shoffner AR, **Luan Y, Yang HB**, Song LY, Safi A, Cao JL, **Yue F**, Crawford GE, Poss KD. [Enhancer selection dictates gene expression responses in remote organs during tissue regeneration.](#) *Nature Cell Biology*. 2022;24(5):685.

Tang J, Novak T, Hecker J, Grubbs G, Zahra FT, Bellusci L, Pourhashemi S, Chou J, Moffitt K, Halasa NB, Schwartz SP, Walker TC, Tarquinio KM, Zinter MS, Staat MA, Gertz SJ, Cvijanovich NZ, Schuster JE, Loftis LL, **Coates BM**, Mack EH, Irby K, Fitzgerald JC, Rowan CM, Kong M, Flori HR, Maddux AB, Shein SL, Crandall H, Hume JR, Hobbs CV, Tremoulet AH, Shimizu C, Burns JC, Chen SR, Moon HK, Lange C, Randolph AG, Khurana S. [Cross-reactive immunity against the SARS-CoV-2 Omicron variant is low in pediatric patients with prior COVID-19 or MIS-C.](#) *Nature Communications*. 2022;13(1):2979.

Zhang YQ, Wang YN, Zhao GY, Tanner EJ, Adli M, Matei D. [FOXK2 promotes ovarian cancer stemness by regulating the unfolded protein response pathway.](#) *Journal of Clinical Investigation*. 2022;132(10):17. e151591.

Zinbarg RE, Williams AL, Mineka S. [A Current Learning Theory Approach to the Etiology and Course of Anxiety and Related Disorders.](#) *Annual Review of Clinical Psychology*. 2022;18:233-258.

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](#).

Follow Feinberg Social Media

