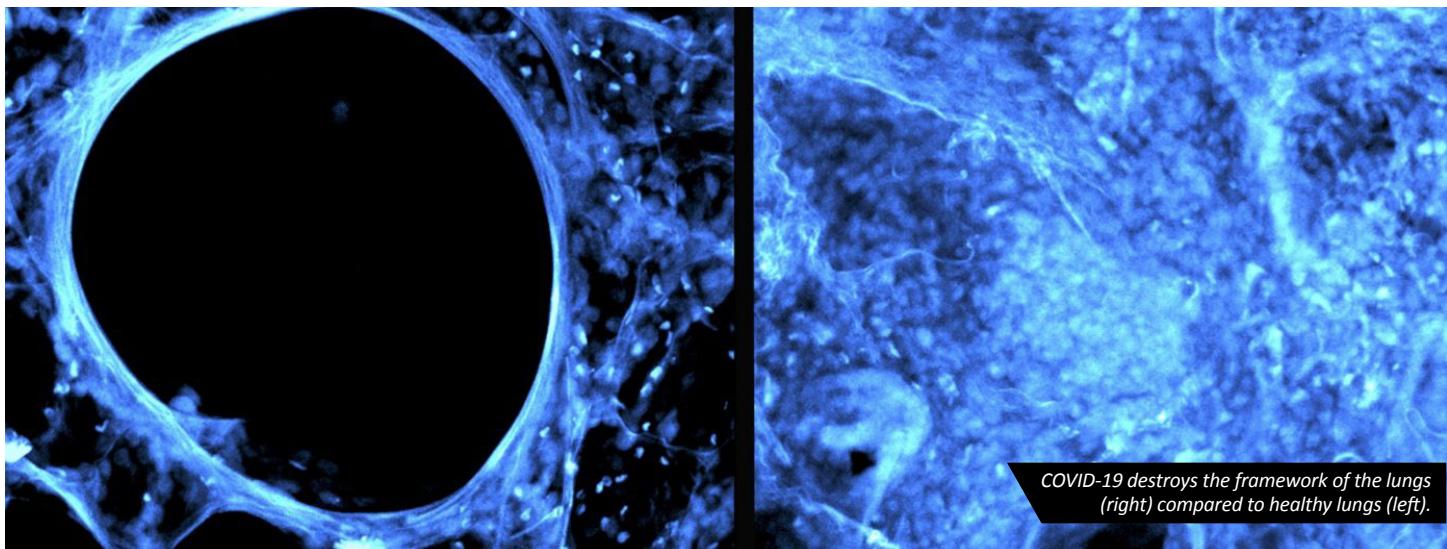


# Breakthroughs

Feinberg School of Medicine Research Office

February 2021



## Northwestern's Lung Transplant Team Takes on COVID-19

By Will Doss

Before 2014, Northwestern Medicine did not have a lung transplant program. Now, just six years later, Northwestern Medicine is a world leader in double lung transplants performed on patients with COVID-19-associated fibrotic lung damage. The strength of this lung transplant program is one reason why Northwestern Medicine is rated 13th in the nation for pulmonology and lung surgery in the latest [U.S. News and World Report](#) rankings.

In addition to refining the medical and surgical techniques for preparing patients, performing surgeries and helping transplant recipients recover, Feinberg investigators have made groundbreaking discoveries in both basic science and clinical research. From preventing post-operative infections to developing new quantitative methods for selecting ideal transplant candidates, Feinberg investigators have been hard at work to not just perform lung transplants but improve them.

"Lung transplants are the most difficult transplants among all the solid organs; the survival rate is far worse than heart or liver transplants," said [Scott Budinger, MD](#), the Ernest S. Bazley Professor of Airway Diseases and chief of [Pulmonary](#)

and Critical Care in the Department of [Medicine](#). "We didn't want to just do more of something that wasn't working very well. From the get-go, we partnered our clinical program with a strong research program so we can really make improvements."

### Underserved Chicagoland

Lung transplant surgery is grueling, stretching to 10 hours long in some cases, and is paired with a long and complex recovery. The lungs are one of the only organs that are exposed to external air and must withstand pathogens, pollution and other irritants, so transplanted lungs are predisposed to complications.

Chicago has historically been underserved for lung transplants, according to Budinger. Within the state of Illinois, about 250 lungs are offered for transplant every year. However, with just three programs in the Chicago area, only about 60 to 70 transplants are usually performed every year — forcing some patients to travel out of state or risk missing out on a lifesaving procedure.

Budinger, along with [Ankit Bharat, MBBS](#), the Harold L. and Margaret N. Method Research Professor of [Surgery](#) and chief of [Thoracic Surgery](#), were key figures in starting Northwestern Medicine's lung transplant program. Their first transplant was performed in 2014, and as a result of the tight-knit bench-bedside integration, scientific discoveries followed shortly afterwards.

(continued on page 2)

## Lung Transplant *(continued from cover page)*

### Making Discoveries

One of their first transplant patients was affected by hyperammonemia syndrome, an often-fatal disorder that's plagued lung transplantation since its inception. This spurred Bharat and other investigators to uncover the mechanism of this syndrome, and they found that the cause was a rare bacterial infection. Their study, [published](#) in *Science Translational Medicine*, eventually led to a bacterial screening procedure and treatment that's been adopted by transplant centers across the country.

"For several years since it was first identified, recipients have been dying of hyperammonemia. And now with this discovery, everyone can be effectively treated," said Bharat, who is also an associate professor of Medicine in the Division of Pulmonary and Critical Care.

Hyperammonemia is not the only issue haunting lung transplant recipients: Another syndrome called primary graft dysfunction is the leading cause of death after lung transplantation. Led by Bharat, a team of immunologists at Feinberg discovered that a subset of immune cells called nonclassical monocytes (NCMs) played a key role in the syndrome, [publishing](#) their findings in *Science Translational Medicine*.

In transplants, the donor lung is perfused, or flushed with solution prior to transplantation — a process akin to sterilization. However, the investigators found a population of NCMs that were hidden in the donor lung even after perfusion. Two years later, the investigators published [two studies](#) in *The Journal of Clinical Investigation*, drilling down into the inflammatory mechanisms of primary graft dysfunction and opening a pathway to therapies.

"Now that we know what leads to the early injury following lung transplantation, we can start working on developing treatments to target this," Bharat said.

Central to the success of the scientific half of the program is an intense focus on using samples collected during clinical care in research, according to Budinger. Samples from both healthy and diseased patients can now be analyzed at single-cell resolution to inform new therapies.

"Every clinical sample that comes out of a patient, we can bring that to the lab and use it to inform our research," Budinger said.

In that vein, Feinberg investigators compiled a single-cell genetic atlas of the lung, creating a one-stop-shop for scientists and clinicians who needed genetic data to perform experiments. The atlas was originally [published](#) in the *American Journal of Respiratory and Critical Care Medicine* and is available to the public at the Division of Pulmonary Care and Critical Medicine [webpage](#).

"We're not going to keep it for ourselves, we're creating resource datasets that inform our own research, as well as the research of others," Budinger said. "That's what our patients want when they participate in our research: They know they might not benefit, but patients know we're going to take that information and use it to better the care for others."



*Scott Budinger, MD, the Ernest S. Bazley Professor of Airway Diseases, chief of Pulmonary and Critical Care in the Department of Medicine, and a professor of Cell and Developmental Biology.*



*Ankit Bharat, MBBS, the Harold L. and Margaret N. Method Research Professor of Surgery, chief of Thoracic Surgery and associate professor of Medicine in the Division of Pulmonary and Critical Care.*

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### COVID-19 Emerges

If a standard lung transplant is difficult, transplanting healthy lungs to a patient with severe COVID-19 is nearly impossible. Most lung transplant patients have single-organ lung disease and are relatively stable, but patients with severe COVID-19 have often been on mechanical ventilation and extracorporeal life support for months and may be suffering from a myriad of other complications.

In addition, the risk of infection forces Northwestern care providers from every department involved — pulmonary, cardiology, radiology to name a few — to change how they conducted diagnostic exams and pre-operative preparation.

"It cannot be overemphasized, these are very difficult patients to transplant and they have a long recovery," Budinger said.

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## Lung Transplant (continued from previous page)

The Northwestern team has now performed 10 of these procedures from which investigators across Feinberg have collected data.

Using a newly-developed extracellular matrix imaging technique combined with single-cell RNA sequencing, Bharat and his team examined the damaged lung tissue from patients who underwent transplants and also from patients who died from COVID-19-associated pneumonia, [publishing](#) their findings in *Science Translational Medicine*. The investigators found severe damage resembling that of end-stage pulmonary fibrosis, according to Bharat.

"Matrix imaging shows, for the first time, that COVID-19 destroys the basic framework of the lung — that's what makes it unrecoverable in some patients," Bharat said.

In addition, RNA sequencing allowed the investigators to "map" the lungs of COVID-19 patients onto those of fibrosis patients, a tool that could one day identify which patients are recovering well and which patients might require a transplant.

Tools like this may be in demand going forward, as Budinger said he believes that even vaccinations and herd immunity will not completely eliminate the risk of COVID-19.

"I think that this is going to become a new and constant indication for lung transplant," Budinger said. "Certainly, the much better strategy is to prevent the disease altogether with vaccination, or to make the disease less severe with medical therapies. But as a last resort, I think lung transplantation will continue to be something that patients with COVID-19 require."

[Read](#) more about the biology of SARS-CoV-2 and how it spreads, discovered by Budinger and other investigators, and [listen to Bharat](#) talk about lung transplants for patients with COVID-19 in the [Breakthroughs podcast](#).

## Watch Recently Recorded Videos From the IPHAM Webinar Series

### [Beyond Detention: New Findings from the Northwestern Juvenile Project](#)

Linda Teplin, PhD, is the Principal Investigator of the Northwestern Juvenile Project, a 20-year epidemiologic study of mental health needs and outcomes of youth after they leave detention. She sampled 1,800 youth in the late 90s and has tracked and reinterviewed them ever since, up to their 30s. Teplin presents key findings on psychiatric disorders; educational, social, and socioeconomic outcomes; and death rates.



### [Reducing Disparities in Perinatal Depression: Impact & Innovation of the Mothers and Babies Program](#)

Darius Tandon, PhD, talks about Mothers and Babies, an evidence-based program that has been highlighted as one of the most effective interventions for the prevention of postpartum depression, with a proven record of success. It is guided by cognitive behavioral therapy and attachment theory and is being implemented throughout the U.S. and internationally.



### [Racial Bias in Perceptions of Disease and Policy](#)

James N. Druckman, PhD, shares insights from his research on political preference formation and communication. His recent work examines how citizens make political, economic and social decisions in various contexts. He also researches the relationship between citizens' preferences and public policy, and how political elites make decisions under varying institutional conditions.

## Quaggin Selected to Lead American Society of Nephrology

[Susan Quaggin, MD](#), the Charles H. Mayo, MD, Professor and chief of [Nephrology and Hypertension](#) in the Department of [Medicine](#), has been elected president of the American Society of Nephrology (ASN).

"It is an honor and a privilege to lead such an incredible organization," said Quaggin, who is also director of the Feinberg Cardiovascular and Renal Research Institute ([FCVRI](#)). "ASN staff, councilors and members are all working towards one goal — a world without kidney diseases — and their dedication, commitment and tireless work to advocate for patients with kidney diseases is incredible."

During her term, Quaggin said she expects to focus on reducing disparities in kidney care and education through programs such as loan mitigation for trainees who are underrepresented in medicine and initiatives to ensure access to new therapies for as many patients as possible.



# Graduate Student/Post-Doc Events and Opportunities

## 40 Days of Spiritual Wellness

*February 1 to March 12*

It's not too late to join 40 Days of Spiritual Wellness, an annual series of programs and opportunities hosted by [Religious and Spiritual Life](#) and designed to create an intentional time and space to renew, reflect and become more aware of one's self and those around them. Inspired by practices of many spiritual traditions to set aside a portion of the year for contemplation, this program invites all to join the tradition to be nourished by these events.

Programs include a [daily calendar](#), labyrinth walks, mindful pilgrimage, meditation drop-ins, Snack and Substance and [Soul Food: The Spirituality of Hula](#).

[More information](#)

## Virtual Cardio Kickboxing

*Monday, February 22, March 1, 8 and 15*

*Time: 4:30 p.m. to 5:00 p.m.*

Please remember to review the [Virtual Group Exercise Online Consent](#) before participating in any virtual group exercise classes.

[Register here](#)

**Contact:** Northwestern Recreation

[recreation@northwestern.edu](mailto:recreation@northwestern.edu)

[View and register for other virtual group exercise classes](#)

## Gender Equity in Academic Research Symposium

*Thursday, May 6 and Friday, May 7*

*Time: 9:00 a.m. to 1:00 p.m.*

Graduate Women Across Northwestern is now accepting abstracts for the Gender Equity in Academic Research Symposium, taking place virtually.

[Submit abstract](#) by March 1

## Welcome New Faculty

Brian Popko, PhD, joins as the William Frederick Windle Professor of Neurology and scientific director of the [Division of Multiple Sclerosis and Neuroimmunology](#) in [The Ken & Ruth Davee Department of Neurology](#). Popko's team works to uncover fundamental aspects of myelinating glial cell development, the myelination process, as well as the detailed function of the myelin sheath. The Popko laboratory is particularly interested in the role that disruptions to the myelin sheath play in neurological disorders. Popko earned his PhD in Microbiology and Immunology from the University of Miami School of Medicine, completed a postdoctoral fellowship at Caltech and started his own laboratory in the Neuroscience Center at the University of North Carolina at Chapel Hill before moving to the Department of Neurology at the University of Chicago, where he was the Jack Miller Professor in Neurological Disorders prior to his appointment at Feinberg.

## Press Pause

*Bi-weekly: Monday, February 22 and March 8*

*Time: Noon to 1:00 p.m.*

Press Pause is a new bi-weekly Monday virtual lunch series designed to help you slow down and connect with others on different topics specifically related to graduate and professional students. Northwestern Counseling and Psychological Services (CAPS) staff – Rachael Collins, PhD, LCP, staff therapist and liaison to Feinberg students, and Plamena Daskalova, PhD, a postdoctoral fellow – will facilitate the sessions.

**February 22 - Mental Health and Well-Being:** During this session, common experiences of stress, anxiety and depression will be discussed, and CAPS will help you identify what you need to help yourself and others.

**March 8 - Self-Care Wrap-up:** You'll learn how to "zoom in" and "zoom out" of your self-care routine, discover new strategies for building wellness and brainstorm solutions to common barriers to creating a sustainable well-being plan.

[Register here using your Northwestern email account](#)

**Contact:** CAPS, 847-491-2151

[More information](#)

## Women's History Month Annual Symposium: Mutual Aid and Community Engagement

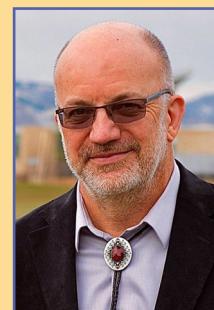
*Tuesday, March 9*

*Time: 1:00 p.m. to 4:30 p.m.*

Join the [Women's Center](#) for a day dedicated to mutual aid and community engagement. Sekile Nzinga, PhD, MSW, will offer opening remarks on the history of mutual aid in Black communities. There will be a plenary conversation between crisis clinician Kelly Hayes and Dean Spade, JD, as well as a panel of Northwestern students, staff and faculty currently doing the work of advancing mutual aid and engaging our communities.

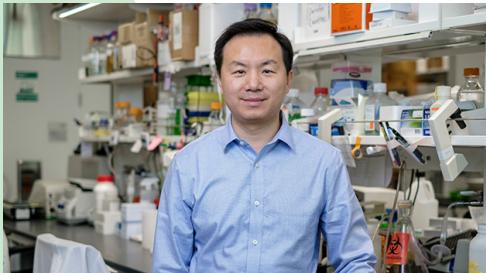
**Contact:** Melisa Stephen, [womenscenter@northwestern.edu](mailto:womenscenter@northwestern.edu)

[More information](#)



# Collaboration at the Core of Cutting-Edge Epigenomics Research

Feng Yue, PhD, the Duane and Susan Burnham Professor of Molecular Medicine and director of the Center for Advanced Molecular Analysis at the Institute for Augmented Intelligence in Medicine



[Feng Yue, PhD](#), is the Duane and Susan Burnham Professor of Molecular Medicine and director of the [Center for Advanced Molecular Analysis](#) at the [Institute for Augmented Intelligence in Medicine](#). He is also an associate professor of [Biochemistry and Molecular Genetics](#), of [Pathology](#) and is the founding director of the Center for Cancer Genomics at the [Robert H. Lurie Comprehensive Cancer Center](#) of Northwestern University.

Yue's [laboratory](#) studies epigenomics and 3D genome organization in human diseases. Most recent work from his laboratory includes identifying tissue-specific [epigenetic regulators in zebrafish](#) that may guide the greater scientific community in unraveling the source of pathogenetic dysregulation in many human diseases, such as cancer. He also led a team of investigators to develop a [machine-learning program](#) that can reveal unknown chromatin loops, structures that are essential for gene regulation.

Yue is currently an associate editor of the peer-reviewed scientific journal *Science Advances*, and serves on the editorial board for *Genome Research*. He is the co-chair for the Integrative Analysis Workgroup in the National Institutes of Health [4D Nucleome Program](#). He is also a member of the [Simpson Querrey Institute for Epigenetics](#) and the [Center for Genetic Medicine](#).

## Q&A

### What are your research interests?

We are interested in identifying disease-causing genetic mutations in the human genome, using a combination of cutting-edge genomic technologies and algorithms. In particular, our focus is to determine functional mutations in the non-protein-coding region, which covers roughly 98 percent of the genome. We study how such mutations can disrupt the expression of critical genes and the proper folding of DNA inside cell nucleus in 3D space, and eventually lead to disease pathogenesis.

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

Our ultimate goal is to determine biomarkers for cancer prognosis and stratification. Through collaborations with clinical colleagues, our passion is to identify drugs and drug combinations for better treatment of different cancers, such as leukemia, bladder cancer and brain tumors.

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

I was initially trained as a computer scientist, specializing in algorithm design for efficient computing. During the later stage of my PhD study, next-generation sequencing became really popular. It is relatively easy to generate terabytes of genomic data, but hard to extract useful information from them. As I have always been fascinated in human biology and diseases, I took this opportunity and pursued my postdoctoral training in functional genomics from Dr. Bing Ren's group at the UC San Diego School of Medicine. This experience opened a door to a new world for me and I found almost endless opportunities there to make exciting and impactful discoveries in this research area.

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

Since I joined Northwestern University about one and half years ago, I have been actively collaborating with investigators from both campuses. Collaborative investigation has always been an important part of my research program. For example, I have been working with clinicians at the Chicago campus, such as Drs. [Amanda Saratsis](#), [Joshua Meeks](#) and [Leonidas Platanias](#), to dissect the underlying regulatory mechanisms for different types of cancers. I have also been collaborating with Dr. [Ali Shilatifard](#) on biochemistry and epigenetic regulation. At the Evanston campus, I am collaborating with Drs. Yue Yang and Tomoko Yamada on 3D imaging to study how mis-wiring of genes and their regulatory elements can lead to altered expression in cancer.

### How is your research funded?

We are currently supported by multiple grants from the National Institutes of Health. Our research is also supported by the [Department of Biochemistry and Molecular Genetics](#), the Simpson Querrey Institute for Epigenetics, the Center for Genetic Medicine and the Lurie Cancer Center.

### Where has your work been published?

In the past three years, we have published multiple papers in several journals, including [Nature](#), [Nature Genetics](#), and [Nature Communications](#).

# Advancing Wellbeing With Digital Tools

Geneva Jonathan, Clinical Psychology PhD student



Geneva Jonathan, student in the Clinical Psychology PhD Program, is interested in using mobile health technology to better understand and treat psychiatric disorders such as bipolar disorder. Under the mentorship of [Evan Goulding, MD, MPH, '11 GME](#), assistant professor of [Psychiatry and Behavioral Sciences](#), Jonathan is working on a study that evaluates the ability of one such mobile app to increase access to psychosocial interventions.

## Q&A

### Where is your hometown?

I was born in Honolulu but relocated to the contiguous states before pre-school. I spent the majority of my childhood growing up in Williamstown, MA as the child of a college professor and pastor. I think growing up in a college town and being the child of a professor influenced my choice to pursue a graduate degree.

### What are your research interests?

I am passionate about applying and integrating mobile health technologies into real-world mental healthcare settings — specifically, porting evidence-based psychotherapies for serious mental illnesses to smartphones. Digital mental health interventions have the ability to bring the same therapies available in clinic-based treatment into the hands of the people who need it most. I am also interested in learning how passively collected data from our smartphones can monitor, predict and help us better understand illness trajectories and clinical outcomes.

### What exciting projects are you working on?

Right now, I am working on a study, under the mentorship of Dr. Evan Goulding, that evaluates the use of a smartphone intervention, LiveWell, to better understand and improve the treatment of bipolar disorder. The study aims to increase access to psychosocial interventions as well as improve their effectiveness in reducing symptoms and mood episodes.

While the study primarily focuses on a user-facing smartphone intervention, the application also passively collects behavioral data in an effort to explore whether there are unique behavioral patterns among individuals with bipolar disorder that can help us better understand illness features and trajectory. The data collection period ended in April 2020, so it has been very exciting to start examining some of the data and preliminary findings.

### What attracted you to your program?

Northwestern Feinberg School of Medicine's clinical psychology doctoral program is one of the only of its kind based in an academic healthcare system. Before Northwestern, I was a research assistant at Geisel School of Medicine at Dartmouth College, another academic healthcare system. Because I am familiar with the environment, culture and unique access to clinical settings for research that an academic healthcare system can provide, Northwestern seemed like a natural choice and good fit.

I felt that Northwestern's location meant that I truly would get an opportunity to balance my research interests with access to clinical training steps away from where we take classes each day. I was also eager to come to Northwestern because, at the time I applied, mobile health for mental health was a very nascent field. Though many programs wanted to recruit students to do this type of research, there were only a few programs, including Northwestern, that I felt I could attend and receive strong support and mentorship.

### What has been your best experience at Feinberg?

I think my best experience at Feinberg was getting support from my mentor, Dr. Goulding, very early on to apply for funding support from the National Institute of Mental Health (NIMH). As a first-year graduate student, I was eager to apply for funding as I knew it was an important skill for a student interested in a research career. I applied for and was awarded a diversity supplement from NIMH which allowed me to develop independent research aims that were aligned with my mentor's current research project.

The independence and mentoring experiences that the supplement outlines, in many ways, have encouraged and fostered significant self-growth as a researcher and student. The funding support has also allowed me to travel and present work from the LiveWell research study at NIMH and the International Society of Bipolar Disorders annual conferences, both domestically and internationally.

### What are your plans for after graduation?

I would really love to stay in research. The COVID-19 pandemic has emphasized the need for mobile, accessible mental health care more than ever, and I cannot think of a better field or position to make an impact. I hope to continue conducting research either in an academic setting or in an industry that works to make it easier to monitor and self-manage mental health difficulties without frequent visits to the clinic. I believe the future of healthcare is already in our hands, pockets and staple of our everyday lives — our phones! I hope to someday be in a position where I can help implement evidence-based smartphone interventions into clinical practice.

# Data Analysis From Head to Toe

Quan Mai, research analyst, Northwestern Medicine Enterprise Data Warehouse



Quan Mai, research analyst at Northwestern Medicine Enterprise Data Warehouse (NMEDW), helps scientists and students at Feinberg with nearly every aspect of research data: assessing feasibility, extracting data, building reports and visualizing results.

## Where are you originally from?

I was born and grew up in Long Xuyen, the capital city of the An Giang province in Vietnam. An Giang is known as the “Land of the Seven Mountains” because of the sudden appearance of the seven mountains in the middle of the flat Mekong Delta area. It is also famous for growing and exporting the second-most rice out of any province in the country.

## What is your educational background?

I received my Bachelor of Science in nutritional science from the University of Minnesota-Twin Cities and then earned my Master of Science in epidemiology and biostatistics from Northwestern University.

## Please tell us about your professional background.

I went to Northwestern University for graduate school right after receiving my bachelor’s degree in 2014. In summer of 2015, I graduated from my master’s program and started working as an associate research analyst for the NMEDW in November 2015. I have been with NMEDW since then and now am a research analyst.

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

I am a part of the EDW research team and I work directly with scientists, clinicians and medical students on their clinical research grants and studies. The scientists and students come to the NMEDW for various reasons; from assessing feasibility, to extracting data, building reports and analyzing or visualizing data for their studies.

For scientists who are still in the planning phase of their studies, I help determine which data is available or can be retrieved from the electronic medical records, so scientists can adjust their questions and hypotheses appropriately. For investigators who already have research protocols approved by the Institutional Review Board, I write SQL queries to extract the data for them, discuss the format of the data that is best suited for their research hypotheses, build dashboards to visualize the data and participate in analysis and manuscript drafting in preparation for publication.

## What is your favorite part of the job?

My most favorite part of my job is that it always puts me in a problem-solving mode. With the continuously evolving of medical data and studies, there are always new challenges and questions arising and that excites me every day going to work. Additionally, my job gives me the opportunity to walk the fine line between the technical and clinical world.

In order to write SQL queries to extract medical data, I am required to understand coding, databases and electronic medical records. In order to help researchers with their clinical studies, I need to understand study designs and characters of medical data as well as different analysis methods. Seeing studies I contributed to publish in prestigious journals that contribute to the medical community is a rewarding feeling.

Finally, the ability to continuously learn new skills and knowledge from my colleagues, which greatly benefits my career development, makes every working day enjoyable and exciting.

## What exciting projects are you working on?

2020 was such an unprecedent year and my most exciting projects focused on COVID-19. Recently, I have been involved with the ongoing Northwestern Medicine Healthcare Worker SARS-CoV-2 Serology Study, which examines the linkage between serologic status, SAS-CoV-2 exposure and COVID outcomes among Northwestern Medicine employees.

Last June, I co-authored “Prevalence and Characterization of Asthma in Patients with COVID-19”, which was [published](#) in the *Journal of Allergy and Clinical Immunology*. The study found the use of inhaled corticosteroid was not associated with increased rates of COVID-19 hospitalizations.

Besides studies related to COVID-19, I am also involved in various studies using patient’s reported outcomes to assess the quality of their cancer or surgery care.

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

Before the pandemic, I liked to go to fitness dancing classes, explore different rooftop restaurants and enjoyed concerts at Millennium Park. During the summer, you can find me out and about; biking, exploring hidden charming streets or along the lakefront trail. During the winter months, I love curling up, reading books from my Kindle while enjoying a cup of hot tea.

# NIH News

## NIH Launches New COVID-19 Research Website

The new NIH [COVID-19 Research](#) website provides a central location for trusted, up-to-date, accurate information about research and the strategic role of the NIH in COVID-19 research. The site complements information available on the [COVID-19: Information for NIH Applicants and Recipients of NIH Funding](#) webpage and includes information about key programs, such as the [Accelerating COVID-19 Therapeutic Interventions and Vaccines public-private partnership](#) and the [Rapid Acceleration of Diagnostics initiative](#) to develop state-of-the-science diagnostic tests for COVID-19. Users are also able to search information on funded research by state, institution, congressional district and more.

To support ongoing efforts to direct the public to critical information on COVID-19, the website also includes links to information on vaccines, treatments and testing, clinical trials and how to participate, and guidance on plasma donation.

## Enhancing Diversity at NIH-Funded Conferences

NIH recently released a [notice](#) that updates guidance for [NIH R13/U13 Conference Grant](#) applicants and recipients, requiring conference organizers to maintain inclusive, safe spaces and respectful environments. The policy encourages conference organizers to increase the participation of underrepresented groups – individuals from nationally underrepresented racial and ethnic groups, individuals with disabilities, individuals from disadvantaged backgrounds and women – in the planning, implementation and participation in the proposed conference. It is also expected that NIH conference and scientific meeting organizers take steps toward the development of strategies that maintain a safe and respectful environment for all attendees by providing an environment free from discrimination and harassment, sexual or otherwise. The NIH recommends strategies such as establishing codes of conduct, providing resources in support of individuals who report incidents of harassment and conducting conference climate surveys, for example.

These requirements are part of a wider series of initiatives at NIH aimed at [diversifying the biomedical workforce](#). Read more about this enhancement in a [blog post](#) by NIH Deputy director Michael Lauer, MD.

## Writing an Effective “K” Application

Originally presented at the [Fall 2020 NIH Virtual Seminar on Program Funding and Grants Administration](#), Kay Lund, PhD, Director of Division of Biomedical Research Workforce at NIH, gives tips in a [25-minute YouTube video](#) on how to write an effective “K” application.

The video, designed for junior investigators and those who assist in the preparation of the scientific portions of an application, include the following talk points:

- Where to find currently active K award funding opportunity announcements
- A breakdown of the different K awards
- Planning tips
- Application requirements
- Review criteria

Lund also touches on how to avoid the most common mistakes in writing K applications, as well as some typical misconceptions about the review process. View the YouTube video guide [here](#).



## Remember to Cite the NUCATS Grant

NUCATS is funded in part by a Clinical and Translational Science Award (CTSA) grant from the National Institutes of Health (NIH). Publications are the key metric that Congress, the NIH and Northwestern University use to demonstrate efficient use of grant funding and allows us to effectively compete for CTSA renewal. The CTSA grant allows the Institute to support scientists at Northwestern by providing essential infrastructure, resources and services. Below is some of the approved common language that can be used to [cite](#) the grant in your work.

### For all NUCATS resources and services, including vouchers and pilots (UL1):

Research reported in this publication was supported, in part, by the National Institutes of Health's National Center for Advancing Translational Sciences, Grant Number UL1TR001422. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

### For KL2 scholars:

Research reported in this publication was supported, in part, by the National Institutes of Health's National Center for Advancing Translational Sciences, Grant Number KL2TR001424. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

### Deadline Alert

The Multidisciplinary Career Development Program ([KL2](#)) is a NUCATS-sponsored career development award supporting early-career faculty at Northwestern. Key dates are listed below:

March 1 — [Letter of Intent](#) due

April 12 — [Application](#) due

September 1 — Funds available

# Sponsored Research

**PI:** [Deyu Fang, PhD, Hosmer Allen Johnson Professor of Pathology](#)

**Sponsor:** National Cancer Institute

**Title:** Deubiquitination Module Controls Treg Adaptation to Tumor Microenvironment



One of the recent advances in cancer treatment is the development of immunotherapy, largely through targeting the checkpoint receptors. However, attempts at immunotherapy to increase antitumor immune responses have achieved very limited success. A major hurdle in tumor immunotherapy is mediated by regulatory T (Treg) cells, which suppress the function of antitumor effector T cells. The lineage transcription factor Forkhead Box P3 (FoxP3) is known as a programmer for Treg adaptation in the harsh tumor microenvironment such as metabolic changes and hypoxia. However, the factors that control FoxP3-mediated Treg fitness to orchestrate the survival and functions of intratumoral Treg cells have not been identified.

Our recent publications and preliminary discoveries in the current application suggest that tumor microenvironment factors possibly induce Treg fitness/adaptation through selectively upregulating a deubiquitinase module, including USP21 and USP22, but not USP7, of FoxP3 to control Treg adaptation. The current proposed studies will identify the tumor microenvironment factors that induce USP21 and USP22 expression in Tregs (Aim 1), and will test whether Tregs with simultaneous USP21 and USP22 deletion fail to adapt in the harsh tumor microenvironment, which consequently potentiates the antitumor immune therapy (Aim 2). Results from our proposed study will define a novel molecular cue in control Treg fitness to the tumor microenvironment and provide a rationale for the combined USP21 and USP22 suppression in antitumor immune therapy.

[Read more](#)

*The Feinberg Research Office regularly tracks research published by Feinberg investigators. The citations are used on web pages, in newsletters and social media, for internal reporting and more.*

*To more accurately track these journals, the Research Office asks that Feinberg investigators use the following institution name in the address field when publishing in peer-reviewed journals: "Northwestern University Feinberg School of Medicine."*

**PIs:** [Todd Parrish, PhD, professor of Radiology and of Physical Therapy and Human Movement Sciences and a professor at the McCormick School of Engineering](#)

[Matthew Tate, MD, PhD, associate professor of Neurological Surgery and of Neurology in The Ken & Ruth Davee Department of Neurology](#)



**Sponsor:** National Institute of Neurological Disorders and Stroke (preliminary data made possible by a Dixon Translational Research Grant)

**Title:** High-Resolution Infrared Thermal Imaging for Simultaneous Functional Mapping of the Entire Craniotomy in Awake Patients



Functional activation of the cerebral cortex creates a robust increase in local temperature by increasing blood flow and metabolism because of neurovascular coupling. Changes in surface brain temperature while an awake patient performs a motor, sensory or language task can be used to infer spatial patterns of activity to create functional maps. Awake neurosurgery is used in the management of drug-resistant epilepsy, glioma and neurovascular malformation, in order to localize seizure and/or physiologic activity.

Protection of key functional areas is imperative to avoiding postoperative neurologic deficits. Currently, direct electrical stimulation (DES) is the most commonly used method of intraoperative surgical mapping, which identifies functionally critical brain regions so they are not resected. However, DES has low spatial resolution (~1 cm), may provoke seizures, and can only test one area at a time.

This project investigates a new method of intraoperative functional mapping based on infrared thermography, which has high resolution (~100 micron) and simultaneously monitors the entire exposed brain surface without risk for seizures. The Intraoperative Mapping System will be developed and tested on glioma patients, as tumors have relatively static impact on brain temperature compared to epileptogenic foci and vascular malformations.

Fourth-year [Medical Scientist Training Program \(MSTP\)](#) student Michael Iorga has been spearheading this work.

[Read more](#)

# Funding

## Translational Research Program

[More information](#)

**Sponsor:** Leukemia & Lymphoma Society

**Letter of Intent Due:** March 1

**Application Deadline:** April 19

**Amount:** \$600K

**Synopsis:** The Translational Research Program puts recipients on the bench-to-bedside fast track when it comes to finding better treatment and cures for leukemia, lymphoma and myeloma. The Leukemia & Lymphoma Society funds new and innovative research that shows high promise for translating basic biomedical knowledge to clinical application.

## The Cellular Scale Connectome in Aging and Alzheimer's Disease (U01 Clinical Trial Not Allowed)

[More information](#)

**Sponsor:** National Institute of Aging

**Letter of Intent Due:** May 15

**Application Deadline:** June 15

**Amount:** \$1,000,000 per year for FY2022-2026 to fund up to three awards

**Synopsis:** The National Institute of Aging seeks applications that: (1) promote the development of a comprehensive characterization of brain circuits susceptible to Alzheimer's disease type pathology and/or neurodegeneration in mouse models of Alzheimer's disease (AD), (2) share data on the

cell connectome in the aging and AD brain in a common reference brain cell atlas that integrates both molecular and anatomical annotations; and (3) complement and extend research on vulnerable cell types to include the mapping of connectivity changes between cells in aging and AD and provide a greater understanding of the mechanisms underlying resilience and vulnerability in AD.

## Multi-Disciplinary Machine-Assisted, Genomic Analysis and Clinical Approaches to Shortening the Rare Diseases Diagnostic Odyssey (UG3/UH3 Clinical Trial Optional)

[More information](#)

**Sponsor:** National Center for Advancing Translational Sciences (NCATS)

**Letter of Intent Deadline:** March 19

**Application Due:** April 19

**Upper Amount:** \$1.3M

**Synopsis:** NCATS intends to fund applications that propose multi-disciplinary diagnostic strategies for rare diseases that combine machine-assistance, genomic analysis and clinical consultation. Of particular importance, these strategies must be able to be adopted and performed at the primary or secondary care levels by front-line healthcare providers and be readily integrated into their clinical care workflow.

[View COVID-19 funding opportunities](#)

[View more funding opportunities](#)

## Research in the News

### *Chicago Tribune, January 6*

['We're getting attacked.' Even before COVID-19, doctors faced online harassment, including death threats. The pandemic makes it worse.](#)

The news article features a study co-authored by Seth Trueger, MD, MPH, Nicole Woitowich, PhD, and second-year medical student Tricia Pendergrast.

### *MSN, January 11*

[Study aims to enhance prevention of peanut allergy in youth](#)

Ruchi Gupta, MD, was featured.

### *HealthDay, January 12*

[Research Reveals Why COVID Pneumonia Is More Deadly](#)

Scott Budinger, MD, and Richard Wunderink, MD, were featured. This research was also featured in *U.S. News & World Report* and *WebMD*.

### *U.S. News & World Report, January 13*

[Aphasia Affects Brain Similar to Alzheimer's, But Without Memory Loss](#)

M. Marsel Mesulam, MD, was featured. This research was also featured in *HealthDay* and *WebMD*.

### *Crain's Chicago Business, January 15*

[New COVID variant detected in Chicago](#)

Egon Ozer, MD, PhD, was featured. This research was also featured in *Chicago Tribune*.

### *Yahoo! News, January 21*

[Science Says a Good Night's Sleep Can Clear Toxins from the Brain](#)

Ravi Allada, MD, was featured.

### *U.S. News & World Report, January 27*

[AHA News: Statistics Report Puts Spotlight on Pregnancy and Heart Health](#)

Sadiya Khan, MD, MSc, was featured.

### *Chicago Tribune, January 29*

[Is the COVID-19 pandemic growing or shrinking in Illinois?](#)

New website tracks a key metric

Jaline Gerardin, PhD, was featured.

[More media coverage >>](#)

# Feinberg's Highly Cited Investigators of 2020



By Karen Gutzman, Head, Research Assessment and Communications

## Highly Cited Researchers for 2020

Each year, Clarivate Analytics releases a list of highly cited researchers, selected for their “exceptional research performance, demonstrated by production of multiple highly cited papers” that were published from 2009 to 2019 and at the end of 2019 ranked in the top 1 percent by citations for field and year in Web of Science. The threshold number of highly cited papers for selection differs by field, with Clinical Medicine requiring the most citations. There were 6,389 researchers named in the 2020 report.

Below is a list of Feinberg faculty who made the list in 2020

[Robert Bonow, MD](#), Medicine (Cardiology) in Clinical Medicine

[David Cella, PhD](#), Medical Social Sciences in Social Sciences

[Navdeep Chandel, PhD](#), Medicine (Pulmonary and Critical Care) in Cross-Field

[Mark Hersam, PhD](#), Medicine (Pulmonary and Critical Care) in Cross-Field

Mihai Gheorghiade, MD, (died Aug. 2017) Medicine and Surgery in Clinical Medicine

[Donald M. Lloyd-Jones, MD](#), Preventive Medicine, in Clinical Medicine

[Chad A. Mirkin, PhD](#), Medicine (Hematology and Oncology) in Chemistry

[John A. Rogers, PhD](#), Neurological Surgery in Materials Science

[Jeffrey A. Sosman, MD](#), Medicine (Hematology and Oncology) in Clinical Medicine

[Clyde W. Yancy, MD](#), Medicine (Cardiology) in Clinical Medicine

[Read the full report](#) on Highly Cited Researchers for 2020.

## Altmetric Top 100 List for 2020

While bibliometrics such as number of citations highlight academic interest in a paper, it can take two to three years after a paper has been published for citations to begin accruing. Altmetrics track the attention, activity and engagement with your research on the web in real time through mass media coverage, citations in policy documents, social media mentions, reviews on F1000 and many other outlets.

Each year, [Altmetric.com](#) produces The Altmetric Top 100, a list of the research that has most captured the public's imagination. The following paper from Feinberg made the list in 2020.

#27 of 100



Title: Unequal effects of the COVID-19 pandemic on scientists

Published in: Nature Human Behavior

Feinberg Authors: Yian Yin and Dashun Wang

The paper was published in July 2020 and has generated 24 news stories, 6,094 tweets, seven blog posts and one Reddit post. The paper ranks in the top 5 percent of research outputs ever tracked by Altmetric.com.

[View the entire list](#) of the Altmetric Top 100 for 2020.

## Learn More

The Metrics and Impact Core housed in Galter Health Sciences Library can help you track your work and learn more about metrics.

Please contact [Karen Gutzman](#), [Annette Mendoza](#) or [Mao Soulakis](#) to learn more about using metrics to tell your science story.

# High-Impact Factor Research

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# Recent Episodes of the *Breakthroughs* Podcast



## COVID-19 and Vulnerable Communities with Mercedes Carnethon, PhD

Mercedes Carnethon, PhD, Northwestern Medicine epidemiologist and a population science expert, talks about how COVID-19 is affecting Black, Indigenous, Latinx and other people of color the most as the pandemic continues and vaccine rollout lags behind.

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## Year in Review: How Feinberg Scientists Persevered in 2020 with Erin Spain, MS

In this episode, host Erin Spain takes a look and listen back on some of the top Feinberg research published in 2020. Hear how Northwestern scientists responded to COVID-19 while publishing high-impact papers unrelated to the pandemic and making vital discoveries across the research enterprise during a difficult time.

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## How Lung Transplants Are Saving COVID-19 Patients with Ankit Bharat, MBBS

Ankit Bharat, MBBS, chief of Thoracic Surgery at Northwestern Medicine and director of the Lung Transplant program, shares findings that support why lung transplantation should be considered for patients who have developed irreversible lung disease due to COVID-19.

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## Featured Core

### Research Computing Services

[Research Computing Services](#), part of Northwestern Information Technology (IT), provides Northwestern investigators from all disciplines support for computing resources, data science and visualization, and data management. Located on Northwestern's Evanston campus, Research Computing Services team members support the computational and data needs of the entire university community by providing [consultations and support](#), as well as [training opportunities](#) for Northwestern investigators to develop data and computing skills, and more.

#### Service highlights include:

- Access to high-performance and analytics computing and [research software](#);
- [Data science support](#) including consultations for longer-term projects and workshops;
- [Data storage services](#) including [cloud storage](#) for storing critical data in a secure, reliable and collaborative environment;
- Recommendations for [security practices](#) and university services for file sharing, research data storage and desktop management;
- And [COVID-19 research support](#).

To contact a computing consultant, email [consultant@northwestern.edu](mailto:consultant@northwestern.edu) and include "Research Computing Consultation Request" in the subject. General inquiries can also be sent to this address.

Investigators are also encouraged to subscribe to the [NUIT-RESEARCH listserv](#) for information about research and training opportunities happening on and off campus.

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