Breakthroughs

Feinberg School of Medicine Research Office

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An Impactful Partnership Between the American Heart Association and Northwestern

By Will Doss

Cardiovascular health isn't just about the heart, or about the thousands of veins, arteries and capillaries that provide oxygen and other nutrients to every corner of the body. According to Clyde Yancy, MD, MSc, the Magerstadt Professor and chief of Cardiology in the Department of Medicine, cardiovascular health involves an extraordinarily complex set of inputs that modern medicine has just begun to unravel.

"It's not just an inciting stimulus and then a disease, but it's the aggregate," said Yancy, who is also vice dean of Diversity and Inclusion and a professor of <u>Medical Social Sciences</u>. "It's the environmental exposures, risk factors that impact biology and anatomy, and genetic predisposition to vulnerability. All of these things come together in an intricate manner that is redefining cardiovascular disease."

Discovering those variables and the subsequent contribution to disease is challenging, but translating those discoveries into concrete medical practices that can improve patients' lives is is exciting, maybe even transformational, which is why the American Heart Association (AHA) Strategically Focused Research Networks (SFRN) are an important vehicle for benchto-bedside-to-bench discoveries at Feinberg.

"It's not the traditional granting mechanism to the sole investigator, but rather a process iteration and development



that is intended to align a group of investigators toward one research focus," Yancy said. "The successfully funded research networks generate an intense spirit of discovery, combined with the tool of collaboration — that makes these networks and the consequent discoveries very important."

The AHA recently awarded Northwestern a sixth SFRN, the most at any institution in the country. The SFRN centers have investigated a range of topics, such as the arc of cardiovascular risk from childhood to adults and the dense explanations of health disparities, and new centers are utilizing cutting-edge technology to ask fundamental questions about conditions such as atrial fibrillation and sudden cardiac death.

Mercedes Carnethon, PhD, the Mary Harris Thompson Professor and vice chair of <u>Preventive Medicine</u> in the Department of Medicine, is a veteran of three centers: one aimed at preventing cardiovascular disease, the other focused on cataloguing the impact of health disparities and another on the debilitating impact of vascular disease in the lower extremities.

In the prevention network, scientists including Carnethon and <u>Norrina Allen, PhD</u>, associate professor of Preventive Medicine in the Division of <u>Epidemiology</u> and of <u>Pediatrics</u>, showed that periods of poor cardiovascular behavior are followed by poor cardiovascular health, across populations and in younger patients than ever before.

The disparities network made similar discoveries, showing how markers of poor diet influence kidney function and cardiovascular health far into the future.

AHA and Northwestern (continued from cover page)

"Unfortunately, many of these poor behaviors and exposures are more common among lower-income populations and nonwhites," said Carnethon, who is also chief of Epidemiology in the Department of Preventive Medicine.

The multidisciplinary nature of these centers was a boon for team science, according to Carnethon.

"It is a useful mechanism because it supports approaching a problem from multiple perspectives — basic, clinical and population science," Carnethon said. "There are few mechanisms that would allow for such a comprehensive approach to investigate a single problem."

While several current centers continue to make progress in cardiovascular disease prevention, newly awarded centers are exploring other, less-studied conditions.

Atrial fibrillation, an erratic or quivering heartbeat that results in abnormal blood flow in the heart, is the most common abnormal heart rhythm in adults. According to <u>Rod Passman</u>, <u>MD</u>, the Jules J. Reingold Professor of Electrophysiology and principal investigator of the SFRN studying the condition, atrial fibrillation is a major contributor to stroke, dementia and heart failure, but questions remain about its origin and optimal treatment.

To develop new treatments or diagnostic methods, the group is taking on a foundational, chicken-or-egg-type problem.

"We are trying to understand whether it's the rhythm of the heart that causes these problems, or is it that people who have abnormal rhythms also have other structural abnormalities that may predispose them to the consequences of atrial fibrillation," said Passman, who is also a professor of Medicine in the Division of Cardiology and of Preventive Medicine.

Passman is leading a project to normalize the rhythm of patients' hearts using ablation, following up several months later with 4D flow MRI to see if correcting the rhythm has favorably impacted the structure of the heart and blood flow in the upper chambers.

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"If we can take patients with abnormal flow and turn that flow normal by normalizing the rhythm, it would show you that the rhythm abnormality is the cause," Passman said. "If we don't change it, it suggests the abnormal rhythm is just some sort of epiphenomenon, and we should be looking at other sources of stroke beyond atrial fibrillation and not wait for the abnormal rhythm to occur before instituting treatment."

The goal of this project, and others in the SFRN, is to help develop technologies that can identify patients at risk for atrial fibrillation, so clinicians can intervene before serious illness strikes. This is particularly important for atrial fibrillation, as many patients' disease lies in wait, largely undetectable until a major stroke or other illness, according to Passman.

"In many patients, stroke is the first manifestation of the disease — we didn't know that anything was wrong before," Passman said. "This is the beginning of trying to find an earlier pathologic mechanism, and advances like this don't happen in a vacuum. If you want to make a significant change, you have to take something from the bench to the bedside."

Another disease with a largely unknown etiology is sudden cardiac death and <u>Elizabeth McNally, MD, PhD</u>, the Elizabeth J. Ward Professor of Genetic Medicine, is leading a newly awarded SFRN that will examine how it intertwines with more pedestrian heart arrhythmia.

"Even with all the rapid advances in the genetics of arrhythmias, there are still many patients for whom we do not find clear-cut mutations," said McNally, who is also director of the Center for Genetic Medicine, a professor of Medicine in the Division of Cardiology and of <u>Biochemistry and Molecular</u> <u>Genetics</u>. "This is because we don't yet know all the genes and, in some cases, the risk is correlating with having combinations of gene variants."

Feinberg scientists will use genetic data from patients who have experienced sudden cardiac death and arrhythmias, running large-scale analyses to tease out how these conditions are related, before moving to test the impact of variants in stem cell models of heart tissue.

"These cell models of heart disease are very powerful, and we have the capacity to measure arrhythmias in the models," McNally said. "They will not only help us better define the genetic risk, but ultimately these models will become important platforms in which we can test new therapies."

Further, while genetic testing is becoming more commonplace, the application of that information is uneven because many clinicians don't have the proper training and there's a relatively thin databank of genetic information from historically understudied populations, according to McNally.

"An especially pressing need is to get better at interpreting variants of uncertain significance in diverse populations, where there are more variants of uncertain significance and inadequacy," McNally said. "We also hope to address the provider-side knowledge gap in genetics with provider education." Feinberg School of Medicine Research Office \setminus Breakthroughs

Christine Rini Appointed Director of the Cancer Survivorship Institute at the Lurie Cancer Center

Christine Rini, PhD, a social/health psychologist and highly respected expert in cancer survivorship, has joined the Robert H. Lurie Comprehensive Cancer Center of Northwestern University as director of its Cancer Survivorship Institute (CSI).

Rini is also a professor of <u>Medical Social Sciences</u>. Prior to joining Northwestern, she was director of the Cancer Prevention and Control Program at the John Theurer Cancer Center and a professor of oncology at Georgetown University/ Lombardi Comprehensive Cancer Center. Her NIH-funded research focuses on psychosocial factors that facilitate or hinder adjustment to health-related challenges, including making decisions about managing high risk for cancer, reducing physical symptoms such as pain and recovering physical and emotional health after cancer treatment.

As director of the <u>Cancer Survivorship Institute</u>, Rini will provide skilled leadership and a deep understanding of the unique medical, physical and psychosocial challenges many patients face after cancer and its treatment. Rini will also serve as leader of the Lurie Cancer Center's <u>Cancer Control and Survivorship</u> <u>Program</u>. In collaboration with program co-leader <u>Melissa</u> <u>Simon, MD</u>, she will facilitate efforts to reduce the burden of cancer and cancer-related disparities from diagnosis and treatment through survivorship.

Established in 2013, the CSI integrates state-of-the-art clinical care and translational research, bringing clinicians and scientists together to develop evidence-based programs and highimpact tools designed to promote long-term wellness and quality of life for cancer survivors. "We are excited to have Christine join Northwestern Medicine as director of the Lurie Cancer Center Survivorship Institute and our Cancer Control Program," said <u>Leonidas Platanias</u>, <u>MD</u>, <u>PhD</u>, director of the Lurie Cancer Center. "She is a strong leader, and her presence will strengthen our programs and profoundly benefit our patients."

Rini will work closely with the CSI's medical co-director <u>Sheetal</u> <u>Kircher, MD</u>, to offer patients individualized survivorship care and education, including treatment summaries and survivorship care plans. The CSI offers disease-specific survivorship clinics, including the Lynn Sage Breast Cancer Survivorship Program, as well as Lurie Cancer Center's Adolescent and Young Adult Cancer Program and the STAR Program (Survivors Taking Action and Responsibility) for adult survivors of childhood cancer.

"Dr. Rini brings a wealth of experience to our cancer control and survivorship programming. We are very excited for her to engage with our faculty to create better health and well-being for our patients," said <u>David Cella, PhD</u>, chair of Medical Social Sciences at Feinberg and associate director for Prevention and Control Research at the Lurie Cancer Center.

She will also collaborate with <u>Sofia Garcia, PhD</u>, director of clinical research, <u>Judith Moskowitz</u>, PhD, director of integrative oncology, and <u>Timothy Pearman</u>, PhD, director of supportive oncology in the CSI. "We extend special thanks to Sofia and to <u>David Victorson</u>, PhD, for their dedication and service as interim co-directors during this transition," Platanias said.



Welcome New Faculty

Kai Lee Yap, PhD, joins as assistant professor of <u>Pathology</u>. She is also the director of Molecular Diagnostics at Ann & Robert H. Lurie Children's Hospital of Chicago. Her work focuses on the genetic diagnosis of pediatric constitutional disorders and malignancies using next-generation sequencing technologies. Kai Lee earned her PhD in pathobiology from the Johns Hopkins University School of Medicine and completed her postdoctoral research and clinical fellowship at the University of Chicago in the areas of cancer genomics, clinical cytogenetics and clinical molecular genetics. She has published more than 20 peer-reviewed papers and is recipient of numerous awards and honors for her research. One of her future goals includes establishing more clinical research collaborations in the area of genetics within the Feinberg community.



Christine Rini, PhD

Uncovering the Poorly Understood Functions of the Human Olfactory System

Christina Zelano, assistant professor of Neurology in the Division of Epilepsy/Clinical Neurophysiology



Christina Zelano, PhD, assistant professor of <u>Neurology</u> in the Division of <u>Epilepsy/Clinical</u> <u>Neurophysiology</u>, was senior author of a recent study (<u>published</u> in Nature Communications) showing the brain may sometimes know what it's smelling before scents reach the nostrils.



What are your research interests?

Broadly, my lab studies the human olfactory system, which remains poorly understood compared to other sensory systems. We use functional neuroimaging, invasive electrophysiology and psychophysics techniques to better understand how smells are coded in the human brain and to better understand which brain areas are involved. We are interested in uncovering the specific functions that different olfactory brain areas perform and how they may impact cognition and emotional states.

We are also interested in the impact of breathing rhythms on neural activity in olfactory and limbic brain areas. We have shown that breathing induces oscillations in olfactory cortex, amygdala and hippocampus, and we are trying to understand the full impact of these respiratory oscillations on human cognition, behavioral states and emotional health.

What is the ultimate goal of your research?

Our ultimate goal is to produce a functional map of the human olfactory system that informs researchers of the specific function carried out by each part of the brain receiving olfactory sensory information. In doing so, we hope to gain an understanding of the unique anatomical organization of the human olfactory system. We hope to use this information to learn about olfactory deficits in neurological disease states, including Alzheimer's disease and Parkinson's disease.

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

We have clinical collaborations with the Departments of Neurosurgery at both Northwestern University and George Washington University to study epilepsy patients who are undergoing surgery and collaborations with the neurology clinics at both Northwestern and University of Chicago to study patients with probable Alzheimer's disease.

How is your research funded?

We currently have a R01 funded by the the National Institute on Deafness and Other Communication Disorders.

Where have you recently published papers?

In 2019, we have published papers in *Nature Communications*, *eLife*, *Journal of Neurosurgery* and *eNeuro*.

What do you enjoy about teaching/mentoring young scientists in the lab?

I enjoy helping young scientists achieve their goals, whatever they may be. This is one of the most rewarding parts of this job.

Leveraging Meaningful Information from Large and Complex Datasets

Julianne Murphy, second-year student in the Health Sciences Integrated PhD Program



Q&A

Where is your hometown? I grew up in a central New Jersey suburb called Oceanport.

What are your research interests? As a predoctoral student in the <u>Health and Biomedical Informatics</u> track in the Health Sciences Integrated PhD Program (<u>HSIP</u>), I am interested in leveraging

meaningful information from large and complex datasets for improved patient outcomes and reduced healthcare costs. I am particularly interested in creating novel methods for data representation, integration, analysis and application. My coursework and experiences at Northwestern have heightened my interests in uncovering the potential of high-performance computing and data analytics in structured and unstructured electronic health data.

What exciting projects are you working on?

I was recently chosen to participate in the Biomedical Data-Driven Discovery (BD3) Training Program, the perfect progression of my training to expand my knowledge in developing novel big data tools. I intend to use this training to harness predictive analytics in referring patients to transitional care.

Here at Northwestern, <u>Dr. Christine Schaeffer-Pettigrew</u> and the transitional care team focus on comprehensively addressing patients' medical and psychosocial needs. I'm working with <u>Dr. Nicholas Soulakis</u> to develop a risk and complexity score to quantify and predict how beneficial a transitional care encounter would be for any given patient. I am committed to using data to improve patient care and patient outcomes.

What attracted you to the PhD program?

The interdisciplinary nature and small size of the Health Sciences Integrated PhD Program attracted me to Northwestern. My master's degree from Clark University focused on using computational techniques to quantify the population genomics of gene copy number variation. I knew I wanted to expand my computational skillset and learn how to apply these techniques to promote healthcare quality improvement. After studying RNAs on the micro level, I wanted to take a broader look at healthcare systems. Doctoral training in the science of public health gives me the tools to directly promote health beyond individuals or scientific theories. It combines my personal interests regarding access to care and quality of care improvement with applied biomedical informatics. Additionally, I was really drawn to the small size of the program and the faculty and staff's intimate dedication to my program's students.

What has been your best experience at Feinberg?

The best part about my experience so far has been the people — both fellow students and faculty mentors. I feel fortunate to learn with students across the HSIP, <u>Driskill Graduate</u> <u>Program in Life Sciences</u> and multiple masters' programs. Our conversations are made richer by contributions from a variety of perspectives. Additionally, the faculty mentors in my program and for my research have been exceptional. I love the program's flexibility in forging my own path with the support and guidance from faculty mentors.

How would you describe the faculty at Feinberg?

The faculty at Feinberg are at the top of their game and a huge reason why I chose Northwestern. It is an incredible experience to learn from experts in the field, and I have found that the faculty are more than willing to make time for educating students and trainees.

What do you do in your free time?

I have really enjoyed getting to know Chicago this past year. I love supporting the arts, and in my free time I try to go to as many local shows and museums as I can. I also take great pleasure in staying active, and I always seem to be checking out a new yoga studio. Chicago's neighborhoods are very unique, and I'm excited to continue discovering different corners of the city.

What are your plans for after graduation?

After graduate school, I hope to apply my big data training in computational analysis, modeling and stimulation to promote population health and optimize healthcare systems.

Advocating for Investigators' Needs

Garett Griffith, MPH, clinical research manager in the Ken and Ruth Davee Department of Neurology



Q&A

Where are you originally from?

I was born and raised in the western suburbs of Chicago, about 15 miles outside of the city. After having lived in Indiana for six years for school, I moved back to the area in 2014.

What is your educational background?

I received a Bachelor of Science in physical education from Butler University (go Bulldogs!), a Master of Science in clinical exercise physiology from Ball State University and a Master of Public Health in health policy and administration from the University of Illinois at Chicago. Since one of the best parts of working at a university is taking advantage of the education benefits, I'm pursuing a doctorate degree in health sciences from Rush University.

Please tell us about your professional background.

I've been working as the clinical research manager for the Ken and Ruth Davee Department of <u>Neurology</u> since April 2018. Prior to that, I worked in the Integrative Physiology Laboratory at the University of Illinois at Chicago as a laboratory manager and senior research specialist. Additionally, I served as the data and evaluation manager for the Health and Aging Department of Rush University.

Why do you enjoy working at Northwestern?

I take a lot of pride in working for Northwestern and am happy to be able to contribute to an internationally renowned university. It's been great to get to know peers in various departments across campus and continue to develop my professional network, and I've benefitted tremendously from the mentorship of others on administrative and clinical research committees. The collaborative environment has been very welcoming and I've enjoyed the supportive interactions with individuals, both within and outside of the Department of Neurology.

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

I organize the Department of Neurology's Clinical Research Steering Committee, which includes a representative from each research division and provides a venue for open communication between investigators and departmental administration. By managing the feasibility assessment process for upcoming clinical research studies, I advocate for investigators' needs and work to support them by ensuring resources are available to ensure the success of their projects. I am lucky to be on several clinical research and administrative committees and help problem-solve when unique circumstances arise for new or ongoing trials. Further, I act as a liaison between our research students and staff and the various research entities on campus, helping them navigate the research process at Northwestern. Additionally, I oversee the onboarding process for clinical research staff within the department and am the access program liaison for the Department of Neurology.

What is your favorite part of the job?

My job involves facilitating clinical research projects across all of Neurology's divisions, which puts me in a unique position to appreciate the breadth and diversity of ongoing and upcoming studies within the department. I enjoy supporting investigators as they pursue their clinical research interests and knowing that the longer-term impact of our work will be improved medical care for the patient cohorts with whom we work.

What do you like to do in your spare time?

I feel like the physical education major in me never left, and so most of my spare time is taken up playing in various recreational sports leagues around the city and in the suburbs. An average week for me involves three to four softball games, one to two ultimate Frisbee games and a few volleyball games (depending on the season). I have always enjoyed running, and having moved closer to campus about a year ago means that I get to run along the lakefront, which I do several times each week. I have been lucky enough to visit some national parks in recent years, and I like hiking and backpacking with my friends. This past summer, we spent a week near Mount Rainier and in the Cascade Mountain range in Washington.

Anything else we should know about you?

I'm a published author, with one poem and two manuscripts in print and a few additional articles under review and in preparation — I've always enjoyed writing and hope to continue to get involved in more opportunities to do so.

Connect with Griffith on LinkedIn.

Research in the News

New York Times, October 2

<u>Donate Your Healthcare Data Today</u> The research of Mozziyar Etemadi, MD, PhD, was referenced.

U.S. News & World Report, September 30

<u>Gene-Based Therapy Helps Fight Advanced Prostate Cancer</u> Maha Hussein, MBChB, was quoted.

► This research was also featured in *HealthDay, Chicago Tribune* and CNN

Washington Post, September 23

For some with chronic pain, the problem is not in their backs or knees but their brains A. Vania Apkarian, PhD, was quoted.

Chicago Tribune, September 20

A new drug may help kids' peanut allergies soon, but for now parents afraid of fatal reactions turn to a rare therapy from a few Chicago-area doctors Ruchi Gupta, MD, MPH, was quoted.

ABC 7, September 15

<u>Newsviews: health concerns connected to vaping</u> Ravi Kalhan, MD, was featured.

This research was also featured in Crain's Chicago Business, on CBS News and by other outlets.

Washington Post, September 12

<u>A trailblazing professor turns 100 next month. He's still doing</u> <u>'incredibly complex' research funded by the NIH</u> Jeremiah Stamler, MD, was featured.

The New York Times, September 11

This Treatment Can Cure Cancer. Can It Mend the Heart? Elizabeth McNally, MD, PhD, was quoted.

WTTW, September 9

Northwestern Engineering Team Pioneers New Medical Technologies John Rogers, PhD, was featured.

More media coverage available online.



NUCATS Corner

NUCATS Grants Repository

NUCATS offers a robust selection of resources and services to support and enhance your grant submissions with the goal of accelerating your clinical and translational research discoveries. The latest addition to our menu of resources and services is the NUCATS Grants Repository. The repository is composed of previously funded proposals (NIH R, K, and T awards, as well as a variety of non-NIH awards) from Feinberg School of Medicine clinical and translational investigators who have donated their grant for education and mentoring purposes. The proposals in the repository include: exemplar research plans, budget justifications, NIH-style biosketches, and resources and environment sections.

To access the NUCATS Grants Repository, simply fill out the quick access form <u>here</u> and bookmark the link provided to you by NUCATS.

If you are willing to share your funded grants in the repository, please contact Emily Traw, Assistant Director of the NUCATS Center for Education and Career Development, at <u>emily.traw@northwestern.edu</u>. NUCATS will work with you to redact sensitive information prior to making your proposal available to the FSM community.

AHA and Northwestern (continued from cover page)

Feinberg's institutional focus on collaboration makes these SFRN's a natural fit — both for the scientists and clinicians working to solve cardiovascular medicine's most pressing problems, and for the patients who will receive new cures and better care, according to Yancy.

"What drives me in medicine is being able to make a difference in the lives of patients, and the opportunity we have through these six networks may truly change practice," Yancy said. "If that's the case, then the reason I've been in this business for more than 30 years becomes actualized. That would be beyond gratifying."

Sponsored Research



PI: Alexander Misharin, MD, professor of Medicine in the Division of Pulmonary and Critical Care

Sponsor: Chan Zuckerberg Foundation

Title: Human Cell Atlas Project

Lung function relies on a complex anatomical, histological and cellular organization. Understanding this organization requires knowledge of the cell types, states, differentiation events and cellular interactions within an anatomic context. Investigators will combine single cell and spatial genomics, microscopy and anatomic methods to assemble a working atlas of the lung that reflects normal variation across individuals. Their seed network spans pulmonary physicians, lung biologists and computational biologists, including specialists in machine learning.

Investigators will leverage unique sources of normal human lung tissue, including biopsies from healthy volunteers and entire lungs from organ donors to ultimately analyze 25 healthy adult subjects that reflect geographic, gender, age and ethnic diversity. They will systematically sample the entire lung along its proximodistal length in the context of a Common Coordinate Framework.

Investigators will employ computational methodology to integrate data across modalities, infer cell types, associate cell states to various environmental contexts and assemble canonical histological neighborhoods within an anatomy-level lung atlas. Their healthy atlas of the developing, adult and aging lung will serve as a roadmap for future studies focused on lung disease. Understanding how the normal crosstalk of spatially defined cell types is perturbed in pathologic states will ultimately provide tools for understanding the basis of the pathology associated with lung disease.

Coupling a new understanding of cells, their spatial location and assigning the loci of action of disease genes to particular cells and regions of the lung will form the requisite compendium of knowledge needed by the global research community.

Read more about this project here.



PI: Talia Newcombe Lerner, PhD, assistant professor of Physiology

Sponsor: National Institutes of Health, Office of Director's New Innovator Award Program

Title: How Early-Life Experiences Create Individual Variation in Dopamine Circuit Architecture: Understanding Risk for Psychiatric Disease

Adverse childhood experiences (ACEs), such as abuse and neglect, have been strongly and consistently linked to increased risk for a variety of psychiatric diseases, including anxiety disorders, mood disorders and substance abuse disorders. These diseases extract a massive emotional and economic toll on society and their combination can be devastating and even deadly in cases of suicide and overdose.

The increased risk for psychiatric disease following ACEs can persist for decades, well into adulthood, and combine with adult stressors to provoke the onset of symptoms. Despite the huge burden of psychiatric disease on our nation, and the clear impact of ACEs in producing that burden, we still have little understanding of the underlying neural circuits mediating increased psychiatric risk following adverse childhood experience. Why does stress during a window of early life confer elevated psychiatric disease risk? And why are some individuals nevertheless resilient? I hypothesize that stress during an earlylife period of ongoing development in the midbrain dopamine system may alter the structure, and therefore function, of neuromodulation in the adult brain, dysregulating adult stress responses. Furthermore, I propose that individual variation in the dopamine circuit alterations produced by early life stress may explain individual variation in the later development of disease symptoms.

This project will elucidate the neural circuit basis of susceptibility to psychiatric disease using mice as a model system. Mice of both sexes will be exposed to varying positive and negative early life conditions, and then tested for susceptibility or resilience to stress in adulthood using a panel of behavioral tests measuring effective function and motivation. Using cutting-edge neural circuit imaging techniques, including CLARITY, optogenetics and fiber photometry, I will ask whether the strength of specific brain connections in each individual subject is predictive of that subject's susceptibility or resilience to stress.

Read more here.

Funding

Single-Cell Analysis of Inflammation

More information

Sponsor: Chan Zuckerberg Initiative Submission Deadline: November 19 at 5:00 p.m. PST Amount: \$175,000 per PI, up to \$525,000 total

Synopsis: Applications aimed toward identifying unifying principles that underlie tissue homeostasis and inflammation at the single-cell level. The goal is to stimulate collaborations across disciplines that will help define a new field. Teams should consist of two or three principal investigators with different areas of expertise. Successful applications will bring together investigators in different experimental, computational or medical domains. They will address local cell properties and interactions in inflamed tissues and compare them to the properties and interactions of similar cells in healthy tissues. They will increase our understanding of the cell types that mediate inflammation, and their interactions in space and time. The two-year pilot grant period is intended to develop proof-of-concept for the experimental team and the approach, setting up future programs for detailed mechanistic investigations.

Targeting Inflammasomes in Substance Abuse and HIV (R01 Clinical Trial Not Allowed)

More information

Sponsor: National Institute on Drug Abuse (NIDA) Letter of Intent Due: December 15 Submission Deadline: January 15, 2020 Upper amount: \$500,000

Synopsis: NIDA invites applications to investigate the

underlying mechanisms and central nervous system consequences of the interactions of drugs of abuse and HIV-1 infections on inflammasome assembly and activation. Substances of abuse that are of interest include: opioids, nicotine, cocaine, methamphetamine, stimulants, prescription drugs, cannabinoids, alcohol or combinations of these drugs.

Integrative Strategies for Understanding Neural and Cognitive Systems (NCS)

More information

Sponsor: National Science Foundation (NSF) Letter of Intent Due: January 8, 2020 Submission Deadline: February 26, 2020 Upper Amount: \$1M

Synopsis: This NCS program calls for innovative, integrative, boundary-crossing proposals, and multi-perspective and multi-approach research efforts. The program focuses on four aspects of neural and cognitive systems that are current targets of converging interdisciplinary interests. NCS projects must advance the foundations of one or more of these focus areas: (1) Neuroengineering and Brain-Inspired Concepts and Designs, (2) Individuality and Variation; (3) Cognitive and Neural Processes in Realistic, Complex Environments; (4) Data-Intensive Neuroscience and Cognitive Science. Proposals must address both risk and reward — high-risk, high-payoff approaches are expected — and also be consistent with the missions of the participating directorates, while going beyond the scope of any NSF core program.

View more funding opportunities

Earn CME credits for Listening to the Breakthroughs Podcast

Did you know that you can claim Continuing Medical Education (CME) credit for listening to the *Breakthroughs* <u>podcast</u>?

At Feinberg, we are driven by our mission to impact human health beyond the individual patient. We believe better answers come from discovery. *Breakthroughs* aims to broadcast these discoveries to contribute to the larger conversation surrounding human health.

Each episode includes an interview with a Feinberg faculty member about their work and its impact. Featured experts and topics intersect all our medical disciplines at Feinberg – <u>dermatology</u>, <u>ophthalmology</u>, <u>nephrology</u> or wherever else your area of interest lies.

After listening to an episode, you will be able to identify the research interests and initiatives of Feinberg faculty and discuss updates in clinical and translational research. If you would like to claim CME credit for listening to *Breakthroughs*, visit the <u>Continuing Medical Education website</u>.



The Northwestern University Feinberg School of Medicine is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The Northwestern University Feinberg School of Medicine designates this Enduring Material for a maximum of 0.5 AMA PRA Category 1 Credit(s)[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

If you have additional questions about processing CME credits, please <u>contact</u> the Office of Continuing Medical Education.

Feinberg School of Medicine Research Office Breakthroughs

Ensuring Style Consistency in Your Manuscripts' References



By Ramune Kubilius, Collection Management & Special Projects Librarian

While writing for publication and preparing funding submissions or reports require focus on the content of the message being conveyed, the style in which reference lists are included is also important. Different publications and funding agencies may have specific instructions, and familiarity with styles and requirements at the outset can alleviate delays later in the submission cycle.

Reference Management Software

One of the easiest ways to ensure style consistency is to use a reference management software like <u>EndNote</u>, which can help create bibliographies based on a number of available journal or <u>output styles</u>. These include AMA (listed as JAMA in EndNote), APA (American Psychological Association), the Chicago Manual of Style and others. Northwestern University has a site license for EndNote, and Galter librarians are available to teach and support it to researchers. However, EndNote isn't always completely accurate, so it's worth checking the bibliographies it produces against the style guidelines provided by the journal itself.

Instructions to Authors

While many biomedical journals follow some form of the AMA Manual of Style: A Guide for Authors and Editors, many have their own additional requirements and preferences. Instructions to Authors in the Health Sciences is a site maintained by the Mulford Health Science Library (the University of Toledo) and includes links to websites providing instructions to authors for over 6,000 journals in the health and life sciences.

International Committee of Medical Journal Editors Further information on the use of references in manuscripts is available in the International Committee of Medical Journal Editors (ICMJE)'s <u>Recommendations for the Conduct,</u> <u>Reporting, Editing, and Publication of Scholarly Work</u> in <u>Medical Journals</u> (Formerly Uniform Requirements/ Vancouver Style). Look here for guidance on citing primary vs. review articles, conference abstracts, datasets and personal communications, as well as recommendations for verifying references or learning about retracted publications.

Samples of Formatted References for Authors of Journal Articles on the ICMJE site can be found with more detail in Citing Medicine: The NLM Style Guide for Authors, Editors, and Publishers. This National Library of Medicine source provides assistance to authors, editors, publishers and librarians in compiling lists of references for publication.

Data Files and Datasets

Citing data files and datasets can provide referencing challenges. Data archives and organizations may provide guidance. The International Association for Social Science Information Services & Technology (IASSIST), an organization of data professionals, recommends consulting the <u>Quick</u> <u>Guide to Data Citation</u> for suggestions on the best way to cite data in APA, MLA and Chicago styles. You could also consult the <u>Citing Data</u> section of Galter Library's <u>Data</u> <u>Organization and Documentation</u> guide. In reference management software like EndNote, look for the "item type" for data files or datasets. If that is not available, the listing should follow standard reference conventions to identify not only the format and data file, but also the author/s, the title of the file, the year and retrieval source.

DigitalHub Deposits and Grants

Those who wish to cite deposits stored in <u>DigitalHub</u>, the institutional repository for Northwestern Medicine, can use the "Action > Citations" feature to generate a citation in a limited number of styles. (Further development of this feature is in the works.)

Granting agencies such as NIH can be helpful not only for font sizes, density and margins, but also citation format. See <u>Format attachments</u> for more details.

Need Help?

Links to more useful tips and sites highlighted above can be found in various <u>GalterGuides</u>, including <u>Writing</u>, <u>Citing &</u> <u>Publishing</u>. You can also take an <u>EndNote class</u> or request a consultation with liaison librarians who are available to provide guidance on citation style questions.

High-Impact Factor Research

Bartlett NL, Wilson WH, Jung SH, Hsi ED, Maurer MJ, Pederson LD, Polley MC, Pitcher BN, Cheson BD, Kahl BS, Friedberg JW, Staudt LM, Wagner-Johnston ND, Blum KA, Abramson JS, Reddy NM, **Winter JN**, Chang JE, Gopal AK, Chadburn A, Mathew S, Fisher RI, Richards KL, Schoder H, Zelenetz AD, Leonard JP. <u>Dose-Adjusted EPOCH-R Compared With R-CHOP as Frontline Therapy for Diffuse</u> <u>Large B-Cell Lymphoma: Clinical Outcomes of the Phase III Integroup Trial</u> <u>Alliance/CALGB 50303</u>. *Journal of Clinical Oncology*. 2019 Jul 20;37(21):1790-1799.

Bornstein NM, Saver JL, Diener HC, **Gorelick PB**, Shuaib A, Solberg Y, Thackeray L, Savic M, Janelidze T, Zarqua N, Yarnitsky D, Molina CA, Imp ACTBI. <u>An</u> injectable implant to stimulate the sphenopalatine ganglion for treatment of acute ischaemic stroke up to 24 h from onset (ImpACT-24B): an international, randomised, double-blind, sham-controlled, pivotal trial. *Lancet*. 2019 Jul;394(10194):219-229.

Choi J, Troyanovsky RB, Indra I, Mitchell BJ, Troyanovsky SM. <u>Scribble</u>, Erbin, and Lano redundantly regulate epithelial polarity and apical adhesion <u>complex</u>. Journal of Cell Biology. 2019 Jul;218(7):2277-2293.

Donnelly DP, Rawlins CM, DeHart CJ, Fornelli L, Schachner LF, Lin Z, Lippens JL, Aluri KC, Sarin R, Chen B, Lantz C, Jung W, Johnson KR, Koller A, Wolff JJ, Campuzano IDG, Auclair JR, Ivanov AR, Whitelegge JP, Pasa-Tolic L, Chamot-Rooke J, Danis PO, Smith LM, Tsybin YO, Loo JA, Ge Y, **Kelleher NL**, Agar JN. Best practices and benchmarks for intact protein analysis for top-down mass spectrometry. *Nature Methods.* 2019 Jul;16(7):587-594.

Feinstein MJ, Hsue PY, Benjamin LA, Bloomfield GS, Currier JS, Freiberg MS, Grinspoon SK, Levin J, Longenecker CT, Post WS, Council Epidemiology P, Council C, Stroke, Council Clin C, Stroke. <u>Characteristics, Prevention</u>, and Management of Cardiovascular Disease in People Living With HIV: A <u>Scientific Statement From the American Heart Association</u>. *Circulation*. 2019 Jul;140(2):E98-E124.

Galvan DL, Long JY, Green N, Chang BH, Lin JS, **Schumacker P**, Truong LD, Overbeek P, Danesh FR. <u>Drp1S600 phosphorylation regulates mitochondrial</u> <u>fission and progression of nephropathy in diabetic mice</u>. *Journal of Clinical Investigation*. 2019 Jul;129(7):2807-2823.

January CT, Wann LS, Calkins H, et al (including **Yancy CW**). <u>2019 AHA/ACC/HRS</u> Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society in Collaboration With the Society of Thoracic Surgeons. *Circulation*. 2019 Jul;140(2):E125-E151.

Liu Y, Wang XJ, Xu YM, Xue ZG, Zhang Y, Ning X, Chen X, Xue YG, Lu D, Zhang QH, Zhang F, Liu JX, Guo XG, Hwang KC, Huang YG, **Rogers JA**, Zhang YH. Harnessing the interface mechanics of hard films and soft substrates for 3D assembly by controlled buckling. *Proceedings of the National Academy of Sciences of the United States of America*. 2019 Jul;116(31):15368-15377.

Ng LCT, Vien TN, Yarov-Yarovoy V, DeCaen PG. <u>Opening TRPP2 (PKD2L1)</u> requires the transfer of gating charges. Proceedings of the National Academy of Sciences of the United States of America. 2019 Jul;116(31):15540-15549.

Owens DK, Davidson KW, Krist AH, Barry MJ, Cabana M, Caughey AB, Doubeni CA, Epling JW, Jr., Kemper AR, Kubik M, Landefeld CS, Mangione CM, Pbert L, Silverstein M, **Simon MA**, Tseng CW, Wong JB. <u>Screening for Hepatitis B Virus</u> Infection in Pregnant Women: US Preventive Services Task Force Reaffirmation <u>Recommendation Statement</u>. *JAMA-Journal of the American Medical Association*. 2019 Jul 23;322(4):349-354.

Ponds FA, Fockens P, Lei A, Neuhaus H, Beyna T, Kandler J, Frieling T, Chiu PY, Wu JCY, Wong VWY, Costamagna G, Familiari P, **Kahrilas PJ, Pandolfino JE**, Smout A, Bredenoord AJ. Effect of Peroral Endoscopic Myotomy vs Pneumatic Dilation on Symptom Severity and Treatment Outcomes Among Treatment-Naive Patients With Achalasia A Randomized Clinical Trial. JAMA-Journal of the American Medical Association. 2019 Jul;322(2):134-144. Roberts MY, Curtis PR, Sone BJ, Hampton LH. <u>Association of Parent Training</u> With Child Language Development: A Systematic Review and Meta-analysis. JAMA Pediatrics. 2019 Jul 1;173(7):671-680.

Salpietro V, Dixon CL, Guo H, et al. (including **Menacacci NE**) <u>AMPA receptor</u> <u>GluA2 subunit defects are a cause of neurodevelopmental disorders.</u> *Nature Communications.* 2019 Jul;10:16.

Schnitzer TJ, Easton R, Pang S, Levinson DJ, Pixton G, Viktrup L, Davignon I, Brown MT, West CR, Verburg KM. Effect of Tanezumab on Joint Pain, Physical Function, and Patient Global Assessment of Osteoarthritis Among Patients With Osteoarthritis of the Hip or Knee A Randomized Clinical Trial. JAMA-Journal of the American Medical Association. 2019 Jul;322(1):37-48.

Sin-Chan P, Mumal I, Suwal T, et al. (including Schnitzer TJ). <u>A C19MC-LIN28A-MYCN Oncogenic Circuit Driven by Hijacked Super-enhancers Is a Distinct</u> <u>Therapeutic Vulnerability in ETMRs: A Lethal Brain Tumor</u>. *Cancer Cell*. 2019 Jul;36(1):51.

Singer BD, Chandel NS. <u>Immunometabolism of pro-repair cells</u>. Journal of Clinical Investigation. 2019 Jul;129(7):2597-2607.

Song EM, Chiang CH, Li R, Jin X, Zhao JN, Hill M, Xia Y, Li LZ, Huang YM, Won SM, Yu KJ, Sheng X, Fang H, Alam MA, Huang YG, Viventi J, Chang JK, **Rogers JA.** Flexible electronic/optoelectronic microsystems with scalable designs for chronic biointegration. *Proceedings of the National Academy of Sciences of the United States of America*. 2019 Jul;116(31):15398-15406.

Torres C, Mancinelli G, Cordoba-Chacon J, Viswakarma N, Castellanos K, Grimaldo S, Kumar S, Principe D, Dorman MJ, McKinney R, Hirsch E, Dawson D, **Munshi HG**, Rana A, Grippo PJ. <u>p110 gamma deficiency protects against</u> <u>pancreatic carcinogenesis yet predisposes to diet-induced hepatotoxicity</u>. *Proceedings of the National Academy of Sciences of the United States of America*. 2019 Jul;116(29):14724-14733.

Zeitler B, Froelich S, Marlen K, Shivak DA, Yu Q, Li D, Pearl JR, Miller JC, Zhang L, Paschon DE, Hinkley SJ, Ankoudinova I, Lam S, Guschin D, Kopan L, Cherone JM, Nguyen HOB, Qiao GJ, Ataei Y, Mendel MC, Amora R, Surosky R, Laganiere J, Vu BJ, Narayanan A, Sedaghat Y, Tillack K, Thiede C, Gartner A, Kwak S, Bard J, Mrzljak L, Park L, Heikkinen T, Lehtimaki KK, Svedberg MM, Haggkvist J, Tari L, Toth M, Varrone A, Halldin C, Kudwa AE, Ramboz S, Day M, **Kondapalli J, Surmeier DJ**, Urnov FD, Gregory PD, Rebar EJ, Munoz-Sanjuan I, Zhang HS. Allele-selective transcriptional repression of mutant HTT for the treatment of Huntington's disease. *Nature Medicine*. 2019 Jul;25(7):1131.

Zhang F, Wei K, Slowikowski K, Fonseka CY, Rao DA, Kelly S, Goodman SM, Tabechian D, Hughes LB, Salomon-Escoto K, Watts GFM, Jonsson AH, Rangel-Moreno J, Meednu N, Rozo C, Apruzzese W, Eisenhaure TM, Lieb DJ, Boyle DL, Mandelin AM, 2nd, Boyce BF, DiCarlo E, Gravallese EM, Gregersen PK, Moreland L, Firestein GS, Hacohen N, Nusbaum C, Lederer JA, **Perlman H**, Pitzalis C, Filer A, Holers VM, Bykerk VP, Donlin LT, Anolik JH, Brenner MB, Raychaudhuri S. <u>Defining inflammatory cell states in rheumatoid arthritis joint</u> <u>synovial tissues by integrating single-cell transcriptomics and mass cytometry</u>. *Nature Immunology*. 2019 Jul;20(7):928-942.

Zhao H, Li K, Han M, Zhu F, Vazquez-Guardado A, Guo P, Xie Z, Park Y, Chen L, Wang X, Luan H, Yang Y, Wang H, Liang C, Xue Y, Schaller RD, Chanda D, Huang Y, Zhang Y, **Rogers JA**. <u>Buckling and twisting of advanced materials</u> into morphable 3D mesostructures. *Proceedings of the National Academy of Sciences of the United States of America*. 2019 Jul 2;116(27):13239-13248.

Zhou XP, Chen Y, Mok KY, et al. (including **Mesulam MM, Kerwin D, Lipowski** K, Wu CK, Johnson N, Grafman J). <u>Non-coding variability at the APOE locus</u> <u>contributes to the Alzheimer's risk</u>. *Nature Communications*. 2019 Jul;10:16.

Featured Core

Center for Translational Imaging

The Center for Translational Imaging provides customers access to translational imaging capabilities designed to promote pre-clinical and clinical research efforts of investigators at Northwestern and beyond. Additionally, the center serves as a catalyst for the development of innovative imaging technologies for the broad-scale interrogation of disease processes, the guidance of therapeutic interventions and the study of human physiology and function. The center offers a myriad of services and state-of-the-art equipment for customers to perform translational/preclinical cardiovascular imaging, neuroimaging and small animal imaging of laboratory animal species, while also providing educational opportunities, resources, advanced software and custom imaging experiments for aspiring clinicians, biomedical scientists and engineers.

The work of Center for Translational Imaging faculty and staff has been published in <u>Circulation</u>, the <u>Journal of</u> <u>Neuroscience</u> and <u>ACS Nano</u>, among others. The center is led by Daniel Kim, PhD, director of cardiovascular imaging, Todd Parrish, PhD, director of neuroimaging, and Daniel Procissi, PhD, director of small animal imaging.

Contact

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NIH News

NIH Funds \$945 Million in Research to Tackle the National Opioid Crisis

The National Institutes of Health awarded a total of \$945 million during the 2019 fiscal year to fund approximately 375 grants, contracts and cooperative agreements across 41 states through the <u>Helping to End Addiction Long-term Initiative</u> <u>or NIH HEAL Initiative</u>. The trans-NIH research effort aims to improve treatments for chronic pain, curb the rates of opioid use disorder and overdose and achieve long-term recovery from opioid addiction.

Two Feinberg faculty — Lauren Wakschlag, PhD, vice chair for Scientific & Faculty Development of Medical Social Sciences and professor of Medical Social Sciences, Pediatrics, Psychiatry and Behavioral Sciences, and Daniela Menichella, MD, PhD, assistant professor of Neurology (Neuromuscular Disease) and Pharmacology — are recipients of NIH awards that will lead research with the purpose of accelerating scientific solutions against the opioid crisis. Wakschlag's team will partner with neuroscience, substance use, perinatal mental health and child welfare scientists at Washington University School of Medicine to leverage punitive and non-punitive approaches to prenatal opioid use, providing a platform for examining the impact of jurisdictional variations on science. Menichella's research will aim to uncover novel non-addictive targets by exploring molecular mechanisms responsible for painful diabetic neuropathy while focusing on preclinical and translational approaches to pain management. Read more about this push to reverse the opioid crisis here.

Changes to the NIH Loan Repayment Programs

The <u>NIH Loan Repayment Program</u> (LRP), a program in effect for three decades, helps to recruit and retain highly qualified health professionals into biomedical or biobehavioral careers by repaying qualified educational debt in return for the recipient's commitment of engaging in NIH mission-relevant research. Effective September 1, 2019, changes to the NIH LRP maximum award amount increased from \$35,000 per year to \$50,000 per year. Participation within the <u>Health Disparities</u> <u>Research LRP</u> was also expanded to include all NIH institutes and centers for the 2020 fiscal year (FY) LRP application cycle. NIH will also establish a new Emerging and Gap Areas of Research LRP category in the next year's application cycle, with awards announced in FY 2021.

Letters of Support on All About Grants podcast

Letters of support are a valuable part of a grant application, providing an opportunity to applicants to document and showcase their commitment and support to their institution and collaborators. Tune into the episode *All About Grants* featuring guest, <u>Cathleen Cooper</u>, PhD, director in the Division of Receipt and Referral at the NIH Center for Scientific Review, who highlights what information should and should not be included in these letters, and how they differ from other letters submitted as part of an application. Click <u>here</u> to listen to the eight-minute episode or <u>here</u> to read the transcript.



Northwestern University Feinberg School of Medicine Institute for Global Health

Global Health Day 2019 Call for Abstracts

See globalhealth.northwestern.edu

Global Health Day will be held on Friday, December 6th from 9:00 am to 4:30 pm.

Global Health Day is an exciting opportunity to learn about emerging topics in global health at Northwestern, explore the breadth and depth of current research in Chicago and around the world, network with colleagues, and celebrate the launch of the new Institute for Global Health.

The full day of events includes a poster competition. All are welcome to submit abstracts, both internal and external to Northwestern.

Abstract Submission Deadline

Thursday, October 31, 11:59 pm

Those interested in participating in this event must submit an abstract online for consideration.

Please note:

- The current deadline reflects an extension.
- Abstracts should be no more than 500 words
- Presenters, or a
 representative must be
 available to present at
 Global Health Day between
 1:00 pm 2:00 pm

For more information, please contact the Institute for Global Health office, 312-503-9000 or globalhealthinstitute@northw estern.edu

