

# FSM Research Newsletter

August 2008

Feinberg School of Medicine Office for Research  
Northwestern University

## SMALL ANIMAL MRI SCANNER WILL ENHANCE RESEARCH EFFORTS

Researchers at the Feinberg School of Medicine will have enhanced imaging capabilities thanks to a \$2 million grant from the National Institutes of Health High End Instrumentation (HEI) grant program. The funding will be used to purchase a 7T Bruker ClinScan MRI scanner, which provides high-resolution in vivo anatomic and functional MR scanning of small animals such as mice, rats, and rabbits.

Debiao Li, PhD, director of cardiovascular MRI research in the Department of Radiology, the principal investigator of the HEI proposal, also is a professor of radiology and biomedical engineering and collaborated extensively with faculty across Northwestern University in submitting the proposal. "This was a multidisciplinary effort," he says. "In particular, I want to extend great appreciation for the key roles played by Reed Omary, MD, vice chair of research for radiology and associate professor of radiology and biomedical engineering; Mark

Wainwright, MD, PhD, associate professor of pediatrics; John Disterhoft, PhD, Ernest J. and Hattie H. Magerstadt Memorial Research Professor of Physiology; David Johnson, PhD, associate dean for research operations; and Douglas Losordo, MD, Eileen M. Foell Professor of Heart Research and director of Feinberg Cardiovascular Research Institute. We would also like to acknowledge the support of Eric Russell, MD, Drs. Frederick John Bradd and William Kennedy Professor of Radiology and chair of the Department of Radiology; and Feinberg School Dean J. Larry Jameson, MD, PhD, for this application."

The new scanner will be the first MRI unit on the downtown campus dedicated to small animal imaging. It will be located in the Department of Radiology's Center for Advanced Magnetic Resonance Imaging (CAMRI) and will complement the already existing 1.5T and 3T clinical Siemens MRI scanners. The scanner will be operated through a combined effort of the Department of Radiology and the Feinberg School.

Dr. Li explains that the new 7T MRI scanner is expected to be used primarily in imaging animal models of cardiovascular, neurologic, and oncologic disease. While there are a number of expected major users with existing R01 funding, any researcher within or outside the Northwestern community will be able to sign up for scanner time. This time will be allotted for researchers who require the assistance of an MRI technologist, as well as for those who have the training to perform scanning themselves. "The scanner is expected to be 'turnkey,' thereby permitting large throughput imaging," Dr. Li says.

The new scanner will have a Siemens operating system. The clinical MRI scanners at Northwestern Memorial Hospital, as well as the research MRI scanners at CAMRI, are all Siemens scanners. Additionally Siemens has provided five basic scientists within the

Department of Radiology as part of a 10-year research agreement with Northwestern University. "This 7T scanner is the only dedicated small animal MRI that has the



Dr. Li (left), principal investigator of the HEI proposal, with Dr. Omary (right).

same operating system as existing clinical scanners," says Dr. Omary. "Thus, innovative imaging techniques developed in animal models on the 7T scanner can be readily translated to the clinical MRI scanners.

Northwestern is one of only a handful of institutions worldwide to have this opportunity to directly translate preclinical imaging studies in this way."

A number of ongoing research studies will benefit from this new technology. They include NIH-funded research projects led by Dr. Disterhoft that focus on the cellular and subcellular mechanisms of learning in the young and aging brain. His team is studying neurobiology of associative learning in the mammalian brain at cellular and systems levels using both in vivo and in vitro techniques. An important interest in this research program is examination of the cellular mechanisms for altered learning in aging. They are using a combination of behavioral, biophysical, and pharmacological approaches to address this question. Functional MRI is being used as an important systems-level tool to visualize the neural circuits that mediate eyeblink conditioning. Most of these experiments are done with animals and in collaboration with colleagues at distant locations because of the unavailability of the high-field magnet needed. While collaboration with colleagues outside of the Feinberg School is valuable in many ways, doing experiments in a distant place is not a formula for making rapid progress. "The presence of the new 7T scanner will be a huge benefit for many research programs in the medical school," Dr. Li says.

Dr. Li says the scanner is expected to arrive in late summer, 2009. For more information, contact Dr. Li at [d-li2@northwestern.edu](mailto:d-li2@northwestern.edu) or Dr. Omary at [reed@northwestern.edu](mailto:reed@northwestern.edu).

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## MEET JACOB IASHA SZNAJDER, MD



*Ernest S. Bazley Professor of Asthma and Related Disorders  
Chief, Division of Pulmonary and Critical Care Medicine*

### What are your research interests?

My research focuses on lung physiology. In particular, I am interested in exploring the mediators and mechanisms of acute lung injury, regulation of Na,K-ATPase in the alveolar epithelium, signal transduction pathways of gene

regulation, protein ubiquitination-degradation, and gene transfer to the alveolar epithelium.

### What are some of your current research projects?

One of my research goals is to improve care for patients with lung injury and acute hypoxemic respiratory failure (AHRF). In patients with AHRF, lung airspaces flood with edema from damaged pulmonary vessels and alveolar membranes interfering with oxygen transfer from the airspace into the blood resulting in hypoxemia, hypercapnia, and death if corrective measures are not taken. Our research focuses on the regulation of sodium potassium ATPase in the alveolar epithelium and its contribution to the resolution of lung edema. The sodium potassium ATPase maintains cellular ionic and electrochemical gradients through the hydrolysis of ATP coupled to the transport of Na<sup>+</sup> and K<sup>+</sup> across the plasma membrane. We utilize multiple approaches, including cell and molecular biology in cells and monolayers as well as physiological models. The work of our laboratory and others in this field has provided the scientific basis for the current NIH ARDSnet and other

clinical trials to evaluate whether lung edema clearance can be improved with medications and improve the outcomes of patients with respiratory failure.

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

The goal is to improve the survival and quality of life of patients with acute lung injury and AHRF, who have a mortality rate of 30-40 percent, even in top medical centers. If these patients survive their acute disease, they have a very good chance to have productive and fulfilling lives after AHRF.

### What brought you to the Feinberg School of Medicine?

It is a strong academic environment committed to academic excellence and critical thinking. The Feinberg School and Northwestern University have a large number of very talented faculty and students who are guided by visionary leadership, making this a very exciting place to be as a physician-scientist.

### What are some of the challenges you face?

Currently, the national and international political climate has not placed science as a top priority, resulting in less funding for research. This has been a barrier and a challenge for students and PhD and MD scientists to pursue research. Research requires passion, curiosity, vision, and enthusiasm, which need to be nurtured in the right environment. Generating new knowledge requires commitment, tenacity, and confidence that need to be fostered, particularly in challenging times. Some challenges stem from my own limitations of not being a more eloquent scientific advocate and more persuasive recruiter of our students and young physicians.

## WELCOME NEW FACULTY

**Jeffrey Allen, MD** joins as assistant professor of neurology. He received his MD from Wayne State University School of Medicine and obtained his graduate medical education in neuromuscular disease at Brigham & Women's Hospital/Massachusetts General Hospital Harvard Medical School.

**Amy Chadburn, MD** joins as professor of pathology. She received her MD from Stanford University Medical School and has held faculty appointments in Weill Medical College of Cornell University.

**Zong-Ming (Eric) Chen, MD, PhD** joins as assistant professor of pathology. He received his PhD in microbiology from University of Minnesota. Prior to joining FSM, he was a GI and liver pathology fellow at John Hopkins Medical Institutions.

**Hongxin Dong, MD, PhD** joins as assistant professor of psychiatry. She received her PhD in neurobiology from West China University of Medical Science and has held academic positions at Washington University School of Medicine.

**Darius Loghmane, MD** joins as assistant professor of pediatrics. After completing his MD from University of Buffalo, he obtained his graduate medical education from Rush University Medical Center.

**David Mahvi, MD** joins as professor of surgery-surgical oncology. He obtained his MD from the Medical University of South Carolina and served as the chief of surgical oncology at University of Wisconsin-Madison prior to joining FSM.

**Mary Pierce, MD** joins as associate professor of pediatrics. She has held faculty appointments at University of Louisville School of Medicine since completing her MD from Louisiana State University and postgraduate training from John Hopkins University and University of Pittsburgh.

**Lei Wang, PhD** joins as assistant professor of psychiatry. After completing his PhD in engineering science at Harvard University, he held academic positions at the Washington University of Medicine.

## CCM RATES, CAPITAL PLANS ANNOUNCED

The Center for Comparative Medicine (CCM) budget for fiscal year 2009 has been set at \$17.2 million. Despite per diem increases of three percent for barrier mice and five percent for large animals, operating revenues are expected to be \$7 million, leaving a deficit of \$10.2 million. This deficit is allocated between Northwestern University and the Feinberg School based on animal usage. The medical school's share of the deficit for next year will be \$7.1 million.

The operating budget includes close to \$1 million dollars in additional funding for new staff, salary adjustments, cage replacements, and scanners that should continue to improve the quality of service provided by CCM.

Plans are moving ahead for the renovation of the Ward and Searle facilities to accommodate large animals, with a five-year, three-phase approach to the project, expected to cost about \$50 million. This project should significantly relieve the space pressure in the Lurie vivarium. Meanwhile, the Feinberg School and the vice president for research are looking for ways to use surplus mouse capacity in Pancoe.

The magnitude of the deficit and the relatively low proportion of costs covered by charges to researchers (in spite of what appear to be relatively high per diems) has caused the Feinberg School and Northwestern University to try to benchmark cost and quality of animal services at select peer institutions. We will report on the results of these efforts in the months ahead. We hope this effort will lead to maximizing efficiency of CCM operation and to reduced costs.

### STAFF PROFILE: BRUCE ELLIOTT, PHD



Director, Office of Sponsored Research (OSR) - Chicago

Dr. Elliott grew up in Western Springs and Cleveland Heights and went to the Ohio State University and the University of Illinois Medical Campus (now UIC). He holds a doctorate in immunology and worked in research at MIT and Brandeis and in education at Boston University.

#### What is your role in OSR?

The Office for Sponsored Research is a large operation. We are responsible for all pre-award and non-financial post-award issues in research administration including clinical trials. OSR has offices on both the Evanston and Chicago campuses and I'm director of OSR-Chicago operation. We have a busy office supporting the Chicago campus, which consists of the medical and law schools, and has the majority of the University's sponsored funding.

#### How long have you been with OSR?

Five years. Prior to NU, I was director of grants and contracts at Beth Israel Deaconess Medical Center in Boston – one of Harvard affiliated hospitals.

#### What do you like most about your job?

I'm particularly interested in the Federal policies and regulations that provide the foundation for effective management of sponsored research operations and in the connectedness of these concepts as they apply to major compliance issues in grant and contract management, such as effort reporting, conflict of interest, and financial stewardship. I'm intrigued by how new topics emerge and are discussed and addressed by professional associations. I've enjoyed being involved in education and training in the core competencies of research administration and compliance. I relate to the culture of academic medical centers; and I'm interested in research-related operational issues that affect AMCs such as the relationship of the universities with practice plans and with affiliated institutions.

#### What professional activities do you participate in?

I'm very involved in the National Council of University Research Administrators (NCURA) and am a frequent committee member and speaker at NCURA conferences. I recently stepped down after 10 years as associate editor of the *Journal of Research Administration*. I'm also involved in activities at the Council on Governmental Relations and Federal Demonstration Partnership, two major organizations that are involved in the financial and administrative support of federally-funded research. I've also worked on several NIH Commons projects such as their Grants.gov website and the rollout of the new X-Train module for administration of training grants.

#### What do you like to do outside of work?

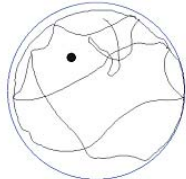
I've always had a strong affinity for Chicago; and I'm interested in the city's history and in exploring its neighborhoods, particularly those outside of the well known north-side neighborhoods. I'm very interested in understanding how Chicago's well-defined 80 neighborhoods evolve demographically over time and the role that migration, invasion, and succession of people play in neighborhood economic change. It fascinates me why some groups of people move as a whole out of certain neighborhoods and into other neighborhoods over a period of a decade yet other areas of the city remain stable. It's not easy to predict this change. Just like evolution, it's much easier to explain it in retrospect than prospectively.

## BEHAVIORAL PHENOTYPING CORE (NU BPC)

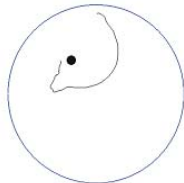
Are you working with a specific knockout or transgenic mouse, or a rat receiving experimental drugs, lesions or siRNA?

Would you like to know if the manipulations also affect other behaviors, including learning and memory abilities or sensorimotor functions?

The Northwestern University Behavioral Phenotyping Core (NU BPC), is here to help investigators examine their mice and rats for changes in behavior. The BPC is under the direction of John Disterhoft, PhD and Craig Weiss, PhD who both have extensive experience in behavioral neuroscience. Dr. Disterhoft and Dr. Weiss are available to help with experimental design and data analysis, and with test protocols to include in the PI's Animal Study Protocol.



Session 1



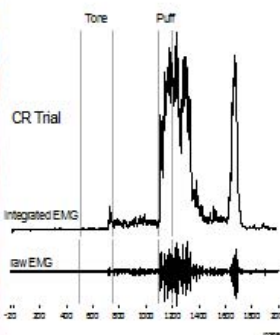
Session 4

Mice and rats are naturally good swimmers. The BPC provides mouse and rat sized water maze to investigate spatial navigation memory in rodents. The subject uses cues about the pool to find the location of an escape platform that is hidden below the surface of the water. The subject swims aimlessly during Session 1 and swims directly toward the platform by the fourth session.

conditioning is a well understood paradigm of associative memory from a neurobiological perspective. It is relatively quick and easy to do and has direct implications for those also interested in post-traumatic stress disorder. Eyeblink conditioning may be the best understood paradigm of associative memory from a neurobiological perspective and can dissociate forebrain from brainstem/cerebellar deficits and associative from non-associative effects.

Additional computerized, video-based memory tests that are new to the BPC include open field tests of activity, object recognition, and the Y maze to test for spontaneous alternation. There is also a computerized gait analysis system of interest particularly for those studying Parkinson's disease, ALS, and spinal cord damage.

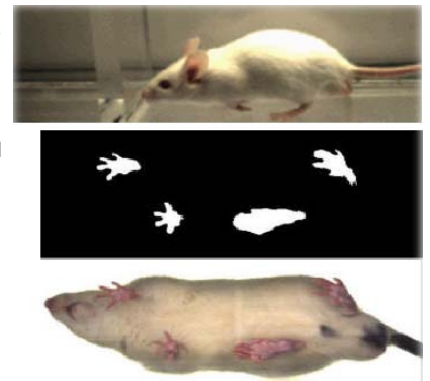
The BPC started with Dr. Disterhoft offering to make his equipment available to the BPC and has been able to expand our offerings with generous support from Dr. Rex Chisholm, dean for research, Dr. Jay Walsh, vice president for research, and shared facilities grants. This support allows each investigator to pay only a portion of the cost for the services and equipment that the BPC provides. The suite that



The BPC provides an isolation chamber to eyeblink condition up to four animals at a time. The picture to the right shows EMG activity (raw and integrated) from the upper eyelid of a rat. Notice the large unconditioned reflexive blink to a corneal airpuff and the conditioned response that begins before onset of the airpuff.

The mission of the BPC is to determine the behavioral effects of genetic manipulations, potential pharmaceuticals, aging, and other manipulations upon normal behavior, including the learning and memory capacities, of rodents used as model systems. The BPC is staffed by a full time technician, John Linardakis, MS, who is able to gather data from all of the available tests, and who can also train faculty, graduate students, and technicians to run the tests independently. The BPC also includes a surgical facility with stereotaxic for mice and rats with the option of using injected or inhaled anesthetics.

The BPC is located within the barrier facility of the Lurie Medical Research Building on the Chicago campus. At present we offer computerized systems for testing learning abilities of mice or rats with the water maze, fear conditioning, and eyeblink conditioning. These tests are useful for studying rodent models of Alzheimer's disease. The water maze is the most popular test for spatial memory. The animal has to find the location of a submerged, invisible escape platform based on its relative position with extramaze cues. Fear



The BPC provides the MouseSpecifics DigiGait system. A transparent treadmill and high-speed video camera are coupled with a computer for automated gait analysis. The device is useful for studying Parkinson's disease, ALS, and other issues of the motor system.

houses the BPC will soon include one of Dr. Vania Apkarian's laboratories and his tests for pain and temperature systems. The BPC has also voiced its support for the development of a metabolic core facility (under the direction of Dr. Franck Mauvais-Jarvis) that would reside within the suite containing the BPC. The combination of the three testing facilities will help to make the Feinberg School of Medicine a world leader in the behavioral characterization of rats and mice.

The NU BPC looks forward to expanding and serving the needs of the rodent users here at Northwestern University.

For more information contact Craig Weiss, PhD, [cweiss@northwestern.edu](mailto:cweiss@northwestern.edu), 312-503-0529, and watch for the upcoming debut of the BPC website at [www.feinberg.northwestern.edu/BPC](http://www.feinberg.northwestern.edu/BPC).

## SPONSORED AWARDS



**Gordon Shepherd, MD, PhD**  
Assistant Professor of Physiology

*Project Title:* Synaptic Circuit Organization of Motor Cortex  
*Sponsor:* National Institute of Neurological Disorders and Stroke

This project will fund high-resolution imaging studies of the synaptic circuit organization of the motor area of the cerebral cortex. By identifying and quantitatively characterizing the basic circuits in motor cortex, we hope to shed light not only on synaptic mechanisms underlying the cortical control of movement, but also provide a framework for identifying pathological mechanisms at the circuit level involved in movement disorders, paralysis, and other neurological diseases involving impairment of voluntary movement.



**Raj Awatramani, PhD**  
Assistant Professor of Neurology

*Project Title:* The Role of MicroRNAs in Peripheral Myelin Formation and Maintenance  
*Sponsor:* National Institute of Neurological Disorders and Stroke

The proposed studies will detail the role of microRNAs as critical regulators of genes expressed in the Schwann cell lineage, and thus will have important implications for understanding the pathomechanisms of various peripheral neuropathies including Charcot-Marie-Tooth disease.

[Click here for a list of recent FSM sponsored awards](#)

## ANIMAL RESEARCH CORNER



The use of animals in research and education has always been a controversial topic. No one wants to see an animal harmed, especially those of us who care for and use them on a daily basis. Unfortunately, at this point in time, there are no alternate methods in which to test products in a biological system. In the future that may change, but for now, that gives us the ultimate responsibility of ensuring the humane use of animals in research and responsibility for their care and welfare.

The use of animals in research and education is a privilege, not a right. At Northwestern University this is something that we take very seriously. The Institutional Animal Care and Use Committee (IACUC) and the Center for Comparative Medicine (CCM) hold the responsibility of assuring that the highest standards are met. To facilitate this, the IACUC is required to conduct semi-annual inspections of all the laboratories and facilities in which animals are used. The United States Department of Agriculture (USDA) also plays a role in assuring animal welfare by conducting unannounced visits each year. In addition, the University invites the Association for the Assessment and Accreditation of Laboratory Care International (AAALAC) every three years to review the animal care and use program. By achieving AAALAC accreditation, Northwestern University is announcing to the world that we meet the highest criteria for animal care and use.

Everyone at the University who cares for or uses animals in research plays a role in assuring the humane care and use of animals. The IACUC and CCM would like to thank all of you for your daily roles and hard work. If there is anything that we can do to support your efforts, please let us know. You may contact the IACUC through their website at <http://www.research.northwestern.edu/OPRS/acuc/> and CCM via <http://www.research.northwestern.edu/ccm/>.

STUDENT PROFILE:  
ERIN LESLIE

*Integrated Graduated Program (IGP)*

Erin entered the IGP program in 2002. She is originally from Rockford, Illinois but has lived in Chicago for 10 years. She received her BS from the University of Illinois at

Urbana, majoring in ecology, ethology and evolution, with a minor in Spanish. After working for several years in the environmental consulting field, she decided to pursue her interests in human evolution by entering an anthropology master's degree program at Northern Illinois University in DeKalb. While doing her master's coursework she became interested in primate evolution and chose to enter the IGP program in evolutionary morphology.

**What are your research interests?**

I'm currently studying the evolution of variation in ape skull morphology and am using radiography to examine internal cranial anatomy with Dr. Brian Shea. I've quantified key morphological features of the face and skull base that can be utilized by paleontologists to identify human and ape fossil ancestors.

Along with the other students in the evolutionary morphology program, I work as a teaching assistant in the first year Structure-Function gross anatomy course at the FSM. I've enjoyed this aspect of my training because it has given me valuable teaching experience and the opportunity to interact with the medical school community more directly.

**How would you describe the faculty at FSM?**

Dr. Brian Shea is an incredibly supportive and helpful advisor. Dr. Shea along with Dr. Marian Dagosto and Dr. Larry Cochard are excellent mentors and have provided valuable insights to my research and teaching experiences.

**How do you plan to use your degree?**

After graduation I hope to obtain an academic position that allows me to focus on my research in primate skull evolution and to teach anatomy or primate evolution.

**What do you like to do with your spare time?**

I spend my free time running, gardening or reading but occasionally I play a little World of Warcraft. I also have two huskies that I'm trying to train to skijor, which involves them pulling me while I'm on skis.

## IN THE NEWS

### ER patients often don't grasp discharge orders

Reuters – July 22nd

Original Article: <http://www.reuters.com/article/healthNews/idUSCOL25950620080722>

Patients often fail to fully comprehend the treatment they receive during an emergency department visit or recall instructions for their care after they leave, new research suggests.

More often than not, these patients aren't even aware that they have not understood what transpired or remembered what they were told, the investigators note in their study, published in the *Annals of Emergency Medicine*.

To shed more light on the communication process that occurs in this setting, Dr. Kirsten G. Engel at Northwestern University in Chicago and colleagues interviewed 140 adult English-speaking patients or their primary caregivers after discharge from emergency departments at two teaching hospitals.

## UPCOMING EVENTS

Clinical Research Educational Lecture Series:

*Lessons Learned at Rush and Compliant Clinical Trial Billing*

**Friday, August 15<sup>th</sup>**

**12pm – 1pm**

Lisa Pitler, JD, MS, RN

Senior Director, Research and Clinical Trials Administration Office,  
Rush University Medical Center

Feinberg Pavilion, Conference Rooms B & C, Northwestern Memorial  
Hospital

Conference Center, 251 E. Huron Street, Chicago

*Sponsored by the NMH Office for Research*

*Clinical Trial Budgets*

**Friday, September 19<sup>th</sup>**

**12pm – 1pm**

Peri Todd

Director of Clinical Research, DuPage Medical Group

Feinberg Pavilion, Conference Rooms B & C, Northwestern Memorial  
Hospital

Conference Center, 251 E. Huron Street, Chicago

*Sponsored by the NUgene Project*

*Presented by the Advisory Council for Clinical Research at  
Northwestern University*

<http://www.nucats.northwestern.edu/education/CRPT/ACCR/seminars.html>

IRB Brown Bag Seminars 2008:

*Prompt Report Form Update on new Prompt Reporting Policy*

**Wednesday, August 20<sup>th</sup>**

**12pm – 1pm**

750 N. Lake Shore Dr., 7th Floor, Room 750, Chicago

<http://www.research.northwestern.edu/oprs/irb/education/brownbag.html>

*Sponsored by the Office for the Protection of Research Subjects  
(OPRS)*

*Event organizers are encouraged to submit calendar items on*

*Plan-it Purple. For more events, visit*

[www.feinberg.northwestern.edu/research/calendar/](http://www.feinberg.northwestern.edu/research/calendar/)

## FUNDING OPPORTUNITIES

### 2009 Investigators in the Pathogenesis of Infectious Diseases - (Limited Submission)

Burroughs Wellcome Fund

[http://www.bwfund.org/brochures/2009\\_PATH\\_brochure.pdf](http://www.bwfund.org/brochures/2009_PATH_brochure.pdf)

NU Letter of Intent Deadline: 08/29/08

*Notable Eligibility Criteria:*

- Candidates will generally have an MD, DVM, or PhD degree.
- Candidates must hold a tenure-track position as an assistant professor or equivalent at the time of application.

Submission instructions on internal applications can be found on the Office for Research Development's web page at <http://www.research.northwestern.edu/ord/limited-submissions/current-opportunities.html>

### Sloan Research Fellowships

Alfred P. Sloan Foundation

[http://www.sloan.org/programs/fellowship\\_brochure.shtml](http://www.sloan.org/programs/fellowship_brochure.shtml)

Deadline: 9/15/08

*Notable Eligibility Criteria:*

- Applicants must have a PhD in chemistry, physics, mathematics, computer science, economics, neuroscience, relevant fields in the biological sciences, or in a related interdisciplinary field.
- Applicants must be members of the regular faculty (i.e., tenure track).
- Applicants may be no more than 6 years from completion of their most recent PhD (see website for special circumstances exception).

For more funding opportunities, visit:

[www.feinberg.northwestern.edu/research/funding-opportunities/](http://www.feinberg.northwestern.edu/research/funding-opportunities/)

Share your news with us!

Your feedback and suggestions are always welcomed!

Feinberg School of Medicine Office for Research

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[www.feinberg.northwestern.edu/research/](http://www.feinberg.northwestern.edu/research/)