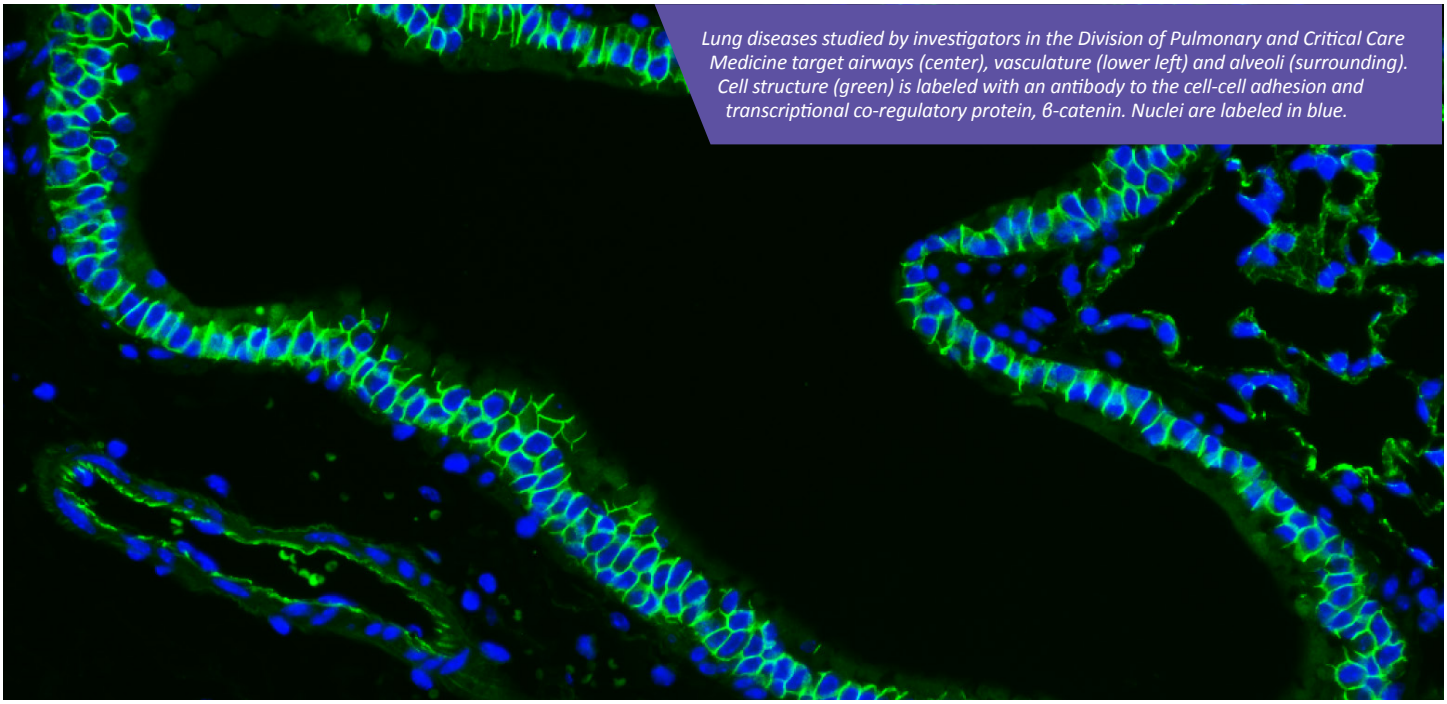
Breakthroughs

Feinberg School of Medicine Research Office

November 2016



Lung diseases studied by investigators in the Division of Pulmonary and Critical Care Medicine target airways (center), vasculature (lower left) and alveoli (surrounding). Cell structure (green) is labeled with an antibody to the cell-cell adhesion and transcriptional co-regulatory protein, β-catenin. Nuclei are labeled in blue.

Investigating the Molecular Roots of Lung Disease

Scientists in the Division of Pulmonary and Critical Care Medicine have a huge responsibility on their shoulders: Diseases of the lungs represent some of the most common — and fatal — medical conditions in the world. Indeed, chronic obstructive pulmonary disease (COPD) is the third leading cause of death in the United States, and asthma affects more than 7 percent of adults and nearly 9 percent of children in the country.

"The nearly 40 faculty in our division are tackling these problems head-on by combining exceptional clinical care for patients with cutting edge laboratory and clinical research," said Scott Budinger, MD, the Ernest S. Bazley Professor of Airway Diseases, who was named chief of the division last spring after 16 years at Feinberg.

In his own research, Budinger studies the lung on a molecular level to understand why age is the strongest risk factor for developing chronic lung disease. He's principal investigator of a new project examining whether dysfunction in the lung's proteostasis network causes age-related susceptibility to influenza A infection in mice. His lab will examine 25 different tissues every six months of the mouse lifespan to assess the protein-folding network's functioning. They hope to extrapolate the findings to human physiology.

Funded by the National Institute on Aging, the study is part of a multi-investigator program project focused on lung aging that includes faculty in Budinger's division and beyond. Exploring areas spanning from muscle dysfunction to mitochondrial metabolism, the team includes Jacob Sznajder, MD, Navdeep Chandel, PhD, and Karen Ridge, PhD, all in Pulmonary and Critical Care Medicine; Harris Perlman, PhD, in Rheumatology; Richard Morimoto, PhD, at the Weinberg College of Arts and Sciences; and William Balch, PhD, at the Scripps Institute.

Jing Liu, PhD, associate professor of Medicine in Pulmonary and Critical Care Medicine, is aiming to understand the molecular mechanisms underlying the regulation of inflammation. Her findings could provide therapeutic approaches for inflammatory diseases such as emphysema, chronic bronchitis and other types of COPD.

(continued on page 2)

Northwestern Medicine®

Molecular Roots of Lung Disease

(continued from cover page)

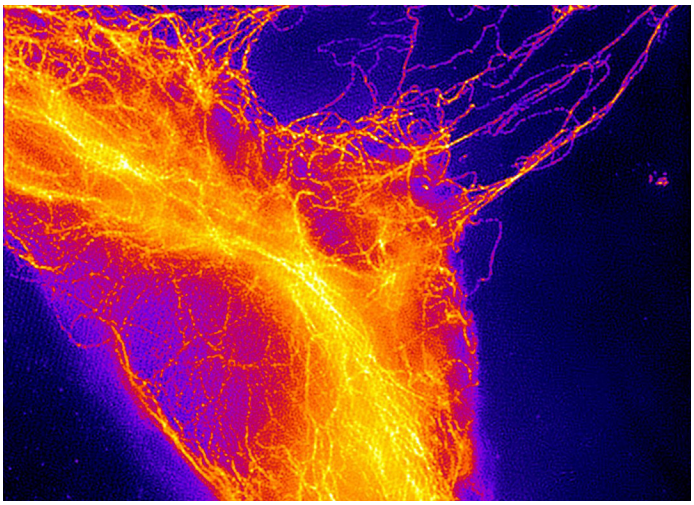
"Uncontrolled inflammation leads to many diseases," said Liu, who is also part of the aging program project. "We are currently conducting a study on the role of the transcription factor Miz1 in the regulation of inflammation, with particular relevance to COPD."

Last year, Liu published research demonstrating that the protein kinase Jnk2 promotes mitophagy, a physiological process that removes damaged or excessive mitochondria from cells. By extension, Jnk2 helps maintain immune homeostasis and could protect organs from sepsis, the most common risk factor for acute lung injury.

Karen Ridge, PhD, professor of Medicine in Pulmonary and Critical Care Medicine and of Cell and Molecular Biology, is also interested in the inflammatory response that leads to acute lung injury. She focuses on a protein called vimentin, which may activate that response. In 2015, she published a paper showing that vimentin deficiency consistently reduced the inflammatory response that leads to lung injury and pulmonary fibrosis in three different mouse models.

"We are now examining the role of vimentin intermediate filaments in epithelial-to-mesenchymal transition, invasion and metastasis using a model of non-small cell lung carcinoma," Ridge said, who recently received the H Foundation Multi-PI Basic Science Synergy Grant with Vladmir Gelfand, PhD, Leslie B. Arey Professor of Cell, Molecular, and Anatomical Sciences, and Robert Goldman, PhD, chair of Cell and Molecular Biology, to conduct this work.

Broadly speaking, scientists know lung diseases can be caused by a myriad of circumstances: chronic lung disease from aging; COPD from smoking, air pollution and genetics; acute lung injury from inflammation triggered by pneumonia, sepsis and other pathologies; and asthma likely from a combination of genetic and environmental factors. But the molecular roots of these conditions are less clear and, often, more surprising.



Vimentin intermediate filaments, cytoskeletal proteins studied in the lab of Karen Ridge, PhD, are visualized using a technique called structured illumination microscopy, which uses a shifting pattern of laser light to resolve features too small to be seen with an ordinary microscope.

Cara Gottardi, PhD, associate professor of Medicine in Pulmonary and Critical Care Medicine, explores how perturbations in cell-to-cell adhesion contribute to diseases including asthma.

"Cell sticking is fundamental to organizing tissues — without it, you'd have an amorphous blob of cells," said Gottardi, who also has an appointment in Cell and Molecular Biology. "For years, we've known that cancer cells inactivate the adhesive Velcro we study, for the purpose of competitive advantage, but my group only recently became interested in cell-cell adhesive defects that are more subtle."

A few years ago, her lab noticed that one component of the cell-cell "Velcro" they study, αT-catenin, appeared in multiple independent genome-wide association studies linked to asthma. Interestingly, the variant, αTcat, is only expressed in a few cell types: myoid cells of testis, cardiomyocytes of the heart and a subset of brain cells.

"Using an αTcat knockout mouse, we've been able to show that this protein promotes the development of asthma," Gottardi explained. "Using standard molecular genetic tools, we are in a position to identify the cell type through which αTcat drives asthma."

Like so much of the research coming out of this division, Gottardi's study has the potential to transform basic science discoveries into meaningful therapeutic options for patients.

"This project has been fun because it's poised to implicate an atypical, surprising cell type in asthma," she said. "This might be particularly relevant to the various genetic associations between aTcat and steroid resistant asthma — the most difficult to treat."

CONTENTS

Bringing the Promise of Precision Medicine to All Americans

Minoli Perera, PharmD, PhD

Through her research, Minoli Perera, PharmD, PhD, associate professor of Pharmacology, works to bring pharmacogenomics to African-American populations. Pharmacogenomics, part of the precision medicine movement, involves using a patient's genetic information to predict drug response, such as whether the medication will be effective or if it might lead to adverse effects.

Her lab specifically focuses on anticoagulants, the genomics of drug metabolism and the pharmacogenomics of inflammatory bowel disease.

Perera, who joined the Feinberg faculty earlier this year, is the principal investigator on a $7.5-million grant from the National Institute on Minority Health and Health Disparities to study genetic variation and drug response within African-American patients.

Q&A

What are your research interests?
My lab focuses on the discovery and translation of pharmacogenomics findings in African-Americans. The field of pharmacogenomics, which is relatively young, looks to predict drug response in patients by using their genome (i.e. genomics biomarkers). Discovery and translation in this field has accelerated with President Obama's Precision Medicine Initiative. However, African-Americans remain under-represented in these studies.

Our lab has focused on medications used in thrombotic conditions because 1) these drugs are dangerous and must be used within a tight therapeutic window and 2) African-Americans suffer from thrombotic diseases at a higher rate than other populations.

What is the ultimate goal of your research?
The rapid progress in pharmacogenomics has meant that many academic hospitals around the country have begun incorporating genetic biomarkers into the medical record and using this information to guide therapy. However, most of these studies have been conducted in populations of European descent, meaning that many times these predictive genomics biomarkers are uninformative to other populations, such as African-Americans. Our ultimate goal is to bring the promise of precision medicine to all Americans.

How does your research advance medical science and knowledge?
Right now, there is an open question of what genotypes we should be using to translate findings from pharmacogenomics into clinical care. Our lab is dedicated to finding and translating those biomarkers that are relevant to patients of African descent. This is of paramount importance as we find that some of the now-incorporated genetic biomarkers lack predictive power in African-Americans. Practically, this means we are using the wrong genetic information in African-Americans to guide their therapy.

African-Americans carry many population-specific genetic mutations, which may predispose this population to both disease and altered drug response. However, these unique genetic mutations can only be discovered in studies that target African-Americans. By conducting these types of studies, our lab has discovered several unique and previously unknown genetic biomarkers of drug response that specifically influence African-Americans.

How is your research funded?
We have received funding and genotyping support from several federal and non-federal agencies. The ACCOuNT (African-American Cardiovascular Pharmacogenetic CONsorTium), as well as work we are doing to discover regulators of drug metabolism in African-Americans, have been funded by the NIH's National Institute on Minority Health and Heath Disparities.

I have previously received funding from the American Heart Association, and I have a postdoctoral fellow funded by the NIH's National Heart, Lung and Blood Institute. In collaboration with the NIH Pharmacogenomics Research Network and the RIKEN Center for Integrative Medical Sciences in Japan, I have received genotyping services that help to generate needed data in pharmacogenomics.

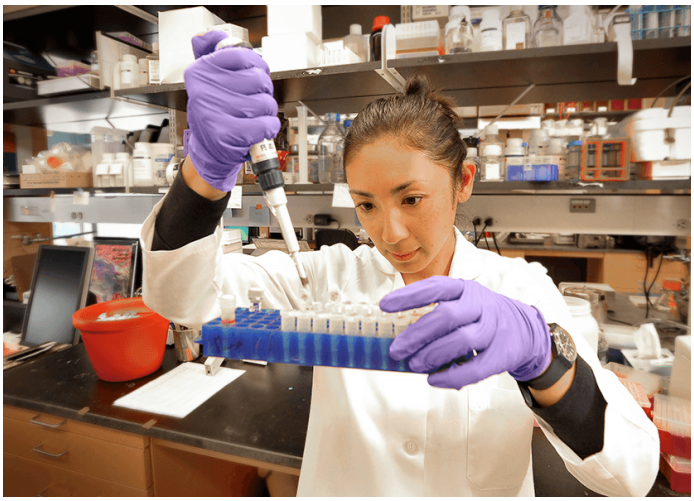
(continued on page 9)

Feinberg Research Dollars on the Rise

Northwestern University's sponsored research awards grew to a record-breaking $649.7 million during the 2015-2016 fiscal year with Feinberg School of Medicine generating much of this growth. Here are some facts about Feinberg's research dollars this past year:

- Feinberg scientists received 1,870 awards, totaling $443.1 million.
- Feinberg research award dollars are up nine percent from last year.
- Feinberg generated 68 percent of the university's total research dollars.

"Research funding is one important indicator of the strength of Northwestern's overall research enterprise," said Jay Walsh, vice president for research. "This annual support is instrumental in the University's high-impact contributions across many disciplines. Not only does Northwestern have world-class faculty who make breakthrough discoveries, but the University also has talented administrators whose dedication helps enable those discoveries to advance — including by managing funding grants and proposals."



University research funding from the Department of Health and Human Services — which includes the National Institutes of Health — rose to a record $362 million. This is the seventh consecutive year that annual research grants and contracts at Northwestern exceeded a half-billion dollars.

New Northwestern Medicine Advertising Campaign

The new Northwestern Medicine advertising campaign launched during game one of the World Series. The campaign, titled "Better," amplifies the unique breadth and depth of the research and medical expertise at Northwestern Medicine. The campaign adds dimension to Northwestern Medicine's commitment to the continuous quest for excellence — expressing the distinct DNA of the brand and highlighting what makes Northwestern Medicine better. Watch the first television ad.

Vanquishing Brain Diseases

Eileen McIver, Northwestern University's Interdepartmental Neuroscience (NUIN) PhD program

Eileen McIver, a sixth-year student in Northwestern University's Interdepartmental Neuroscience (NUIN) PhD Program, studies changes in neurons of the subthalamic nucleus, a structure within the basal ganglia that is the primary target of deep brain stimulation to treat patients with Parkinson's Disease, in the laboratory of Mark Bevan, PhD, professor of Physiology.

McIver earned her undergraduate degree from Cornell University. She was originally drawn to studying communication in animals, but after being diagnosed with multiple sclerosis (MS) just before graduating, she decided to shift her focus to brain disease studies.

Q&A

Where is your hometown?
I grew up in a rural area outside Buffalo, New York. Having spent undergrad in Ithaca, New York, Chicago is my first foray into big city living, but your winters don't scare me.

What are your research interests?
I spent my undergraduate years studying communication in songbirds and teleost fish, which allowed me to do science and enjoy the great outdoors at the same time. But since being diagnosed with MS following my junior year of college, I just want to vanquish brain diseases. Thus, my graduate thesis is driven by my desire to understand neurological disease processes and develop targeted therapeutics to improve the quality of life for patients and their families. Unfortunately, that means I now work in a lab with no windows.

What exciting projects are you working on?
My current research aims to expand our understanding of Parkinson's disease (PD) pathology. PD is a disease of the basal ganglia resulting from the degeneration of dopaminergic neurons and is hallmarked by motor symptoms of akinesia and tremor. I use a mouse model of PD to study changes in neurons of the subthalamic nucleus (STN), a structure within the basal ganglia that is the primary target of deep brain stimulation to treat PD in humans. In the absence of synaptic input, healthy mouse STN neurons fire autonomously at a regular rate between 5 and 20 Hz. I have found that in PD mice, these neurons experience an NMDA receptor-mediated increase in the activity of a potassium channel that leads to the disruption or cessation of their normal autonomous activity. I hypothesize that this loss of autonomous firing makes the STN and its downstream targets more susceptible to entrainment by synchronous activity patterns that are associated with motor deficits in patients. Therefore, I predicted that the restoration of their activity would be behaviorally therapeutic. I employed virally-expressed Designer Receptors Exclusively Activated by Designer Drugs — or DREADDs, for short—to successfully rescue intrinsic firing in STN neurons, and indeed saw a normalization of motor behavior in PD mice within ten minutes of DREADD activation. I certainly find this result exciting, and hope to see this line of research help human patients in the future.

What attracted you to the PhD program?
My family is enthusiastically and incurably academic, so earning a PhD has always been the default path for me, though I am the first to go the biology route. The NUIN program attracted me with its abundance of faculty in a wide range of fields and the opportunity to do translational research in the context of a prestigious medical campus. Another significant attractant was Chicago's food scene.

What has been your best experience at Feinberg?
One hears a lot of horror stories about thesis advisors or lab mates that can make graduate school a nightmare. But the lab I joined has provided both an attentive mentor who has shared his expertise in a vast array of techniques and skills and a group of coworkers who are not only conscientious lab mates, but some of my closest friends as well. I count myself very lucky to be a part of such a lab.

How would you describe the faculty at Feinberg?
All my mentors among the basic science faculty here have been tremendously supportive and instructive. They strive to do the highest quality science on the cutting edge of this rapidly developing field. It's an exciting place to be.

What do you do in your free time?
I occasionally go on skiing or backpacking trips and play bluegrass music with friends when I can, but I spend most of my free time honing skills for my back-up career in the circus at the Trapeze School New York in Chicago.

What are your plans for after graduation?
I will likely pursue post-doctoral training to learn additional advanced techniques in order to better equip me to explore pathophysiology in the brain. Otherwise: circus.

Connect with Eileen on LinkedIn.

Early Career Development for Research Faculty

Tara Spears, Senior Program Coordinator, Northwestern University Clinical and Translational Science (NUCATS)

Q&A

Where are you originally from?
I was born in Brooklyn, but I was raised in Michigan. I have lived in Chicago the longest.

What is your educational background?
I received a bachelor of science in psychology from Loyola University Chicago and a post-baccalaureate certificate in advanced biology for the health professions from Northwestern University. I am seeking candidacy in master's program within the next year.

Tell us about your professional background.
I have worked in higher education for the past eight years; half of that time has been here at Northwestern University. Prior to the start of my position at the medical school, I worked at the School of Professional Studies (SPS) as an advisor. I currently work at the Northwestern University Clinical and Translational Science (NUCATS) Institute, specifically in the center for education and career development. I have the unique opportunity to work some of the people I used to advise at SPS.

How do you help scientists and/or research students at the medical school?
I coordinate the majority of the early career development programs within NUCATS. My programs include Mentor Development Workshops for medical school faculty. Please join us if you have yet to attend. We will be hosting a workshop December 8 from 1 to 5 p.m. in Prentice Pavilion. Register here. For new investigators and postdoctoral fellows, I also manage Taking Responsibility for Responsible Conduct of Research and Navigating the Research Enterprise the first Monday of every month. Register here. Lastly, I assist with the Physician Scientist Training Program (PSTP), and I co-manage the summer seminar series with the Area of Scholarly Concentration for the first-year medical students.

What is your favorite part of the job?
Working with the faculty. I'm truly inspired by what they all have accomplished and how they have used their experiences as a way to enrich and support new faculty and postdocs working at the university. I hope that I can someday do the same for others!

What exciting projects are you working on?
I recently started working with Keith Herzog, assistant director of evaluations, to analyze and restructure the assessments for our center's programs. It's allowed me to learn more about programs that my colleagues manage and has also given me the chance to apply my data and analytical skills to my position.

What do you like to do in your spare time?
I love spending time with my two kids and husband, cooking, reading and volunteering.

Anything else we should know about you?
Most people are curious about my ethnicity so I will throw it out there. I am Guyanese (my mom is from Guyana in South America), Costa Rican and black (my father is from Costa Rica).

Connect with Tara on Linkedin.

Welcome New Faculty

Heather Risser, PhD, joins as assistant professor of Psychiatry and Behavioral Sciences. Her areas of expertise are parent training, child abuse prevention, child welfare and mental health promotion for underserved families or children. She comes from the University of Illinois at Chicago where she was an assistant research professor in the Division of General Pediatrics. Risser earned her master's degree from the University of Connecticut and her PhD in clinical psychology from Northern Illinois University. She is the principal investigator on grants from the Department of Children and Family Services and co-investigator on grants from the Agency for Healthcare Research and Quality and the National Institutes of Justice. She has published more than 10 peer-reviewed journal articles.

Research in the News

***The New York Times*, October 3**
New Drug for Severe Eczema Is Successful in 2 New Trials
Jonathan Silverberg was quoted.

***Associated Press*, October 3**
Mystery at island resort: Why did 2 sisters die?
Patrick Lank was quoted.

► This research was also featured in ***The New York Times, ABC News, Fox News, Yahoo!*** and ***BBC News***.

***Today*, October 5**
Ben Stiller reveals he had prostate cancer at age 48
Edward Schaeffer was quoted.

***U.S. News & World Report*, October 5**
Are Biases Hurting Your Health?
Mark Reinecke was quoted.

***Chicago Tribune*, October 6**
3D-printed bones could be coming soon to a skeleton near you
Ramille Shah was quoted.

***Fox News*, October 12**
Many parents who think they have food allergies actually don't
Feinberg School of Medicine was mentioned.

HealthDay, October 19
Irregular Heart Rhythm Patients May Not Always Need Blood Thinners: Study
Steven Swiryn was quoted.

More media coverage available online.

Northwestern University
NUCATS
Clinical and Translational Sciences Institute

NUCATS Corner

Sex Inclusion in Biomedical Research Workshop and Symposium

The Women's Health Research Institute is hosting the Sex Inclusion in Biomedical Research Workshop and Symposium January 25. The event highlights the first anniversary of the landmark NIH policy requiring investigators to consider sex as a biological variable in medical research. The event will feature thoughtful discussion on best practices and how to conduct sex-inclusive science. In addition, attendees will have the chance to hear from nationally recognized experts in the field and present their own work at oral and poster sessions.

Whether you are experienced in conducting sex-inclusive research or would like to begin, here are the top five reasons to consider attending this event:

1. Showcase your research – Submit an abstract today for consideration for an oral or poster presentation.
2. Enhance your grants – Find out how to comply with the NIH sex-inclusion policy.
3. Meet the experts – Join nationally recognized experts in the field of sex-inclusion for engaging discussions.
4. Create collaborations – Network at the poster session and reception to find potential collaborators with expertise in sex-based research.
5. Sex Cells – Learn how to consider sex as a biological variable in your research design, analyses and reporting.

Learn more and register for the event here.

Sponsored Research

PI: Andrea Dunaif, MD, Charles F. Kettering Professor of Endocrinology

Sponsor: National Institute of Child Health and Human Development

Title: "Multiethnic Fine-Mapping of Polycystic Ovary Syndrome Susceptibility"

Polycystic ovary syndrome (PCOS) is one of the most common disorders of reproductive age women worldwide, a leading risk factor for type 2 diabetes mellitus and the leading cause of anovulatory infertility. Males, as well as female first-degree relatives, also have metabolic and reproductive phenotypes characteristics of the syndrome. In collaboration with investigators from Shandong University in China, Duke University and Pennington Biomedical Research Center, Dunaif's team is mapping chromosomal regions that have a high likelihood of containing genes causing PCOS. These findings could identify novel therapeutic targets and genetic variants conferring substantial risk that could be used for PCOS prediction and prevention. Dunaif and her collaborator from Shandong University, Zi-Jiang Chen, recently completed two genomewide association studies (GWAS) to identify genetic loci associated with PCOS and its quantitative traits in PCOS women of European and Han Chinese ancestry. This project will use findings from that study and will use targeted genomic capture and next generation sequencing to comprehensively identify low frequency and rare variants within six of the associated loci (c9orf3, DENND1A, THADA, FSHB, LHCGR, FSHR). This project will also include women of African-American ancestry. The goal is to identify novel therapeutic targets and genetic variants conferring substantial risk that could be used for disease prediction. Read more about this project.

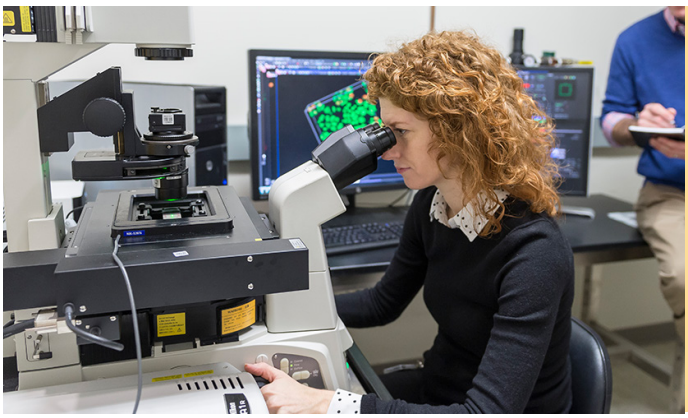
PI: Tamara Isakova, MD, Associate Professor of Medicine, Nephrology/Hypertension

Sponsor: National Institute of Diabetes, Digestive and Kidney Diseases

Title: "Novel Diagnostics and Therapeutic Targets for Calcification in CKD"

Chronic kidney disease (CKD) predisposes affected individuals to high rates of end stage renal disease (ESRD), cardiovascular disease (CVD) and premature death. Despite increasing utilization of interventions that target traditional risk factors, the frequency of adverse clinical events remains high. Novel strategies targeting non-traditional risk factors are urgently needed to improve outcomes. Vascular calcification is a non-traditional risk factor for CKD progression and CVD in CKD. Validation of novel screening tests to define high-risk individuals before they develop vascular calcification and insights into novel vascular calcification mechanisms in CKD would enhance risk stratification and CVD and CKD management and potentially prevent adverse clinical events. Backed by strong preliminary data, we will efficiently leverage the Chronic Renal Insufficiency Cohort (CRIC) Study to advance the vascular calcification field by evaluating the novel T50 assay as a candidate biomarker and elevated levels of deoxycholic acid as a possible modifiable disease mechanism. T50 is a novel serum assay that quantifies calcification propensity by measuring the net effect of calcification inhibitors and promoters.

Read more about this project.



Explore Our Cores
Center for Advanced Microscopy

Constadina (Dina) Arvanitis, PhD, Manager of the Nikon Imaging Center (pictured left) uses one of the many instruments available to Feinberg scientists through the Center for Advanced Microscopy (CAM). The center offers state-of-the art instrumentation and services for the study of biological processes at the whole animal, tissue, cellular and subcellular levels.

Precision Medicine

(continued from page 3)

Where have you recently published papers?
Earlier this year, we published a paper that identified novel genetic variants associated with venous thromboembolism (VTE) risk in African-Americans. This paper was really important to medicine, not only in the new biology that it uncovered, but also in the impact it made on African-American genomics discovery science.

African-Americans suffer disproportionately from VTE, with a 30 to 60 percent higher incidence than other populations. There are clinically actionable, genomic tests available to assess the increased risk of VTE. But the genetic variants used in these tests are not present in the African-American population. This means that clinicians could order this genetic test, and it would come back as negative in African-Americans, even though they have a higher risk of the disease. By looking specifically at African-American genomes, we discovered a new genetic variant in the gene thrombomodulin, which increases the risk of VTE by over twofold. This is a common genetic mutation, with 37 percent of African-Americans carrying at least one copy.

The take-home message of this paper is that by specifically studying African-Americans we were able to identify an important genetic biomarker that predisposes individuals to clots. Since this gene has not been implicated in VTE previously, this is also a potential therapeutic target for treatment of VTE.

What do you enjoy about teaching/mentoring young scientists in the lab?
The work that we do is scientifically interesting and important, but it also carries a social justice mission. This speaks to many young scientists. I am proud that many of the people who join my lab are inspired by the opportunity to work toward equality in precision medicine. This is especially true for minority students and trainees. I hope this work will become an avenue to bring more diversity into academia and science research in general.

Follow Feinberg Social Media

Funding

2017 NYSCF Robertson Stem Cell Investigator Award

More information

Sponsor: The New York Stem Cell Foundation

Submission deadline: Feb. 22, 2017

Upper Amount: $1.5M over five years

Synopsis: NYSCF is soliciting applications from early career investigators for Innovator Awards to be used for exploring the basic biology and translational potential of stem cells. The goal of this initiative is to foster bold and innovative scientists with the potential to transform the field of stem cell research and advance understanding and use of stem cells in the development of treatments for human disease. In addition to providing funding, NYSCF partners with investigators to advance and translate their research.

Military Medical Photonics Program

More information

Sponsor: United States Department of Defense, Department of the Air Force and Air Force Office of Scientific Research

Submission deadline: Dec. 31, 2016

Upper Amount: $1M

Synopsis: This project seeks unclassified proposals for broad-based research and development aimed at using lasers and other light source technology to develop applications in medicine, photobiology, surgery and closely related materials sciences, with applications to combat casualty care and other military medical problems. The efforts proposed may be basic or applied research, and must have direct relevance to combat casualty care or other military medical priorities.

Limited Submission: Precision Medicine Initiative Cohort Program Participant Technologies Center

More information

Sponsor: United States Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute

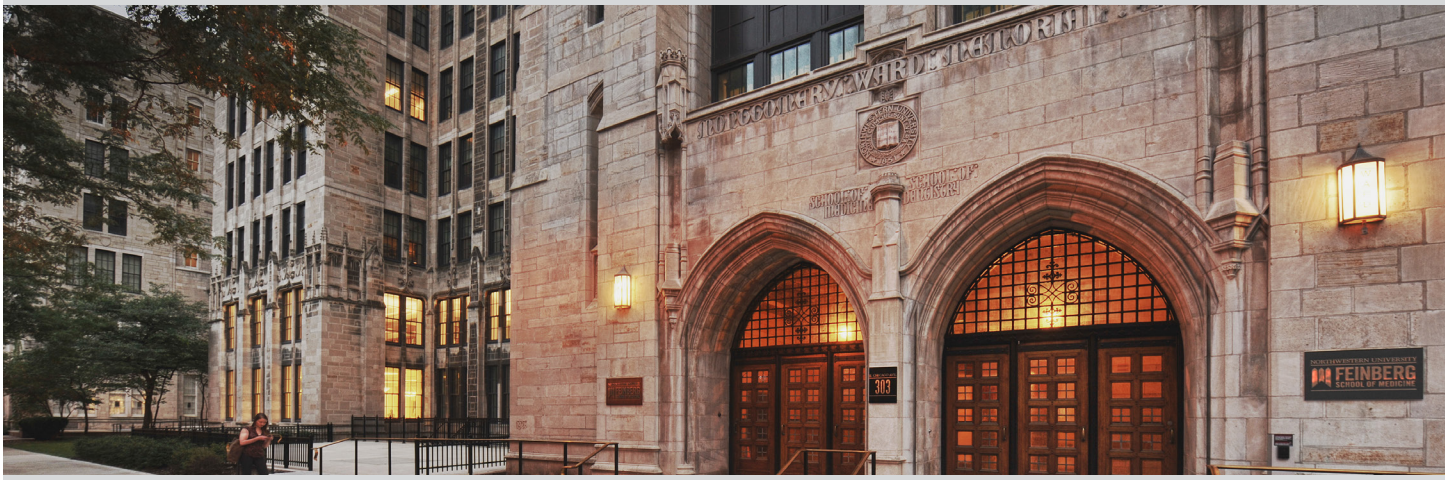
Submission deadline: Jan. 17, 2017 (letter of intent)

Upper Amount: $8M

Synopsis: The purpose of this funding announcement award is to provide support for a Participant Technologies Center for the Precision Medicine Initiative® Cohort Program. The goal of the program is to build a research cohort of one million or more U.S. volunteers who are engaged as partners in a longitudinal, long-term effort to transform the understanding of factors contributing to individual health and disease.

View more funding opportunities

Inside the NIH and FDA Mandate on Data Sharing



On September 16, the NIH and FDA announced the NIH policy and HHS regulation for sharing clinical trials information. These rules aim to ensure that results from NIH-funded clinical trials are reported in a timely fashion. In an NIH Director's Blog post, Francis Collins noted that not all trials registered at ClinicalTrials.gov provide summary results information, despite statutory requirements established by Congress.

This announcement prompted Galter Health Sciences Library to review federal mandates for data sharing. Here are highlights of our review:

Federal funder data sharing plans: background

In 2013, the White House Office of Science and Technology Policy issued a memorandum directing all federal agencies engaged in research funding to create plans for public access to publications and data produced by federally-funded research grants. Many federal funding bodies already have public access plans for publications (such as the NIH Public Access Policy) and some have well-established policies regarding data (such as the NSF Data Management Plan and the NIH Data Sharing Policy), but many more federal agencies are implementing plans that define data sharing requirements by researchers.

Journals also require data sharing

Some journals require their authors to provide public access to data that is used in the experiments described in their manuscripts. Journals such as *Nature*, *Science*, *PNAS* and *PLOS* require data sharing. Some of these journals include lists of appropriate public data repositories. Check the author instructions for the journal in which you're publishing to find its data sharing requirements.

Incentives for sharing data

Besides federal requirements, there are other reasons why sharing data is a good practice.

- Data shared in a public repository can be found and cited by other investigators, enhancing your research impact profile. To encourage the citability of data, Thomson Reuters is developing a Data Citation Index, and DataCite is used by a number of sources to generate DOIs for data.
- Data shared by you and other investigators can be reused, thus increasing the data's value, enhancing reproducibility and new experimentation from the datasets

Disincentives for sharing data

- It's difficult to "clean" data into a form that is shareable
- Data that include personal information must be protected or deidentified

Where to share data

There are many places where you can share data to meet requirements by your funder or journal publishers.

- Find a discipline-specific repository, such as NCBI's GEO or SRA, or the ICPSR for social science data
- If you don't know of a disciplinary repository, use the Registry of Research Data Repositories (re3data.org) to find a repository
- Use a general data repository, such as figshare or Dryad

Use Galter Library's DigitalHub repository!

If you cannot find a discipline-specific data repository, the Galter Health Sciences Library will accept datasets in DigitalHub. If you have questions about uploading data to DigitalHub, use our contact form to get assistance from our repository team. Also, check out the Galter web guide on federal data policies and look for more resources on data management coming to the Galter website in the future.

High Impact Factor Research

Alhasan AH, Scott AW, Wu JJ, Feng G, **Meeks JJ, Thaxton CS, Mirkin CA**. Circulating microRNA signature for the diagnosis of very high-risk prostate cancer. *Proceedings of the National Academy of Sciences of the United States of America.* 2016 Sep 20;113(38):10655-10660.

Brisson GE, Tyler PD. Medical Student Use of Electronic Health Records to Track Former Patients. *JAMA Intern Medicine.* 2016 Sep 1;176(9):1395-1397.

Gratias EJ, Dome JS, **Jennings LJ,** Chi YY, Tian J, Anderson J, Grundy P, Mullen EA, Geller JI, Fernandez CV, **Perlman EJ**. Association of Chromosome 1q Gain With Inferior Survival in Favorable-Histology Wilms Tumor: A Report From the Children's Oncology Group. *Journal of Clinical Oncology.* 2016 Sep;34(26):3189.

Higgins SJ, Purcell LA, Silver KL, Tran V, Crowley V, Hawkes M, Conroy AL, Opoka RO, Hay JG, **Quaggin SE**, Thurston G, Liles WC, Kain KC. Dysregulation of angiopoietin-1 plays a mechanistic role in the pathogenesis of cerebral malaria. *Science Translational Medicine.* 2016 Sep 28;8(358):358ra128.

Jakus AE, Rutz AL, **Jordan SW, Kannan A, Mitchell SM, Yun C**, Koube KD, Yoo SC, Whiteley HE, **Richter CP**, Galiano RD, **Hsu WK, Stock SR, Hsu EL, Shah RN**. Hyperelastic "bone": A highly versatile, growth factor-free, osteoregenerative, scalable, and surgically friendly biomaterial.*Science Translational Medicine*. 2016 Sep 28;8(358):358ra127.

Kong SY, Yang Y, Xu YM, Wang YJ**, Zhang YS, Melo-Cardenas J,** Xu XP, **Gao BX, Thorp EB**, Zhang DD, **Zhang B,** Song JX, Zhang KZ, Zhang JN, Zhang JP, Li HB, **Fang DY**. Endoplasmic reticulum-resident E3 ubiquitin ligase Hrd1 controls B-cell immunity through degradation of the death receptor CD95/Fas. *Proceedings of the National Academy of Sciences of the United States of America.* 2016 Sep;113(37):10394-10399.

Matsa E, **Burridge PW**, Yu KH, Ahrens JH, Termglinchan V, Wu H, Liu C, Shukla P, Sayed N, Churko JM, Shao N, Woo NA, Chao AS, Gold JD, Karakikes I, Snyder MP, Wu JC. Transcriptome Profiling of Patient-Specific Human iPSC-Cardiomyocytes Predicts Individual Drug Safety and Efficacy Responses In Vitro. *Cell Stem Cell.* 2016 Sep 1;19(3):311-325.

Muller WA. Transendothelial migration: unifying principles from the endothelial perspective. *Immunological Reviews.* 2016 Sep;273(1):61-75.

Ntziachristos P, Abdel-Wahab O, Aifantis I. Emerging concepts of epigenetic dysregulation in hematological malignancies. *Nature Immunology.* 2016 Sep;17(9):1016-1024.

O'Brien MN, Girard M, Lin HX, Millan JA, Olvera de la Cruz M, Lee B, **Mirkin CA**. Exploring the zone of anisotropy and broken symmetries in DNA-mediated nanoparticle crystallization. *Proceedings of the National Academy of Sciences of the United States of America.* 2016 Sep 20;113(38):10485-10490.

O'Connell PJ, Zhang WJ, Menon MC, Yi ZZ, Schroppel B, **Gallon L**, Luan Y, Rosales IA, Ge YC, Losic B, Xi CX, Woytovich C, Keung KL, Wei CG, Greene I, Overbey J, Bagiella E, Najafian N, Samaniego M, Djamali A, Alexander SI, Nankivell BJ, Chapman JR, Smith RN, Colvin R, Murphy B.Biopsy transcriptome expression profiling to identify kidney transplants at risk of chronic injury: a multicentre, prospective study. *Lancet.*2016 Sep;388(10048):983-993.

Paice JA, Portenoy R, Lacchetti C, Campbell T, Cheville A, Citron M, Constine LS, Cooper A, Glare P, Keefe F, Koyyalagunta L, Levy M, Miaskowski C, Otis-Green S, Sloan P, Bruera E. Management of Chronic Pain in Survivors of Adult Cancers: American Society of Clinical Oncology Clinical Practice Guideline. *Journal of Clinical Oncology.* 2016 Sep 20;34(27):3325-3345.

Piochon C, Kano M, Hansel C. LTD-like molecular pathways in developmental synaptic pruning. *Nature Neuroscience.* 2016 Sep 27;19(10):1299-1310.

Varvel NH, Neher JJ, Bosch A, Wang W, Ransohoff RM, **Miller RJ,** Dingledine R. Infiltrating monocytes promote brain inflammation and exacerbate neuronal damage after status epilepticus. *Proceedings of the National Academy of Sciences of the United States of America.* 2016 Sep 20;113(38):E5665-5674.

Yanik EL, **Achenbach CJ**, Gopal S, Coghill AE, Cole SR, Eron JJ, Moore RD, Mathews WC, Drozd DR, Hamdan A, Ballestas ME, Engels EA. Changes in Clinical Context for Kaposi's Sarcoma and Non-Hodgkin Lymphoma Among People With HIV Infection in the United States. *Journal of Clinical Oncology.* 2016 Sep 20;34(27):3276-3283.

Help Feinberg Track Journals

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."

Calendar

Tuesday, November 15

Can We Trap "The Clap" By Sugar Coating It?

Microbiology-Immunology Seminar Series featuring Sanjay Ram, MBBS, MD of the University of Massachusetts Medical Center.

Time: **12:00 p.m. to 1:00 p.m.**

Location: **Robert H Lurie Medical Research Center, Baldwin Auditorium, 303 E. Superior**

Contact: h-seifert@northwestern.edu

More information

Monday, November 28

Bioinspired Sponges: Metal-Organic Frameworks for Combating Nerve Agents and Toxic Gases

Omar K. Farha, research professor of Chemistry at Northwestern will present.

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

Location: **Ward 5-230, 303 E. Chicago Avenue**

Contact: alexa.nash@northwestern.edu

More information

Tuesday, December 6

The Subthalamic Nucleus: From Bench to Bedside in Parkinson's Disease

Speakers:

Mark Bevan, PhD, Northwestern University

Charles Wilson, PhD, University of Texas, San Antonio

Thomas Wichmann, MD, Emory University

Jerrold L. Vitek, MD, PhD, University of Minnesota

Jose A. Obeso, MD, PhD, Universidad CEU San Pablo Madrid

Daniel M. Corcos, PhD, Northwestern University

Time: **1:30 p.m. to 6:15pm, reception to follow**

Location: **Daniel Hale Williams Auditorium, McGaw Pavilion, 240 E. Huron Street**

Contact: d-daviston@northwestern.edu

More information

NIH News

Update Your Web Browser for eRA Modules

The Electronic Research Administration (eRA) of the NIH is working on strengthening the security of its modules, web services and websites to the federally mandated "https only" secure connection required for all federal agencies.

With the implementation of this security protocol, older Internet browsers may not work and you may need to update your browser to access any eRA module, including eRA Commons, ASSIST, IAR and iEdison by Nov. 30. These are the three browsers that will work properly after the security update:

- Google Chrome, version 4.0.211.0 and higher
- Firefox, version 4 and higher; with Firefox 17, Mozilla® integrates a list of websites supporting the new protocol
- Internet Explorer 11 on Windows 8.1 and Windows 7 when KB 3058515 or higher is installed (released on Windows Update in June 2015)

Read more information about the HTTPS-only standard

Improving Diversity in Small Business Research

The NIH's Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, also known as America's Seed Fund, are one of the largest sources of early-stage capital for technology commercialization in the United States. As part of the NIH's ongoing efforts to increase SBIR/STTR participation among women and minority applicants, NIH has issued a request for information (NOT-OD-17-008) to better understand the barriers that prevent SBIR/STTR awardees from participating in the existing diversity supplement program, and to inform its consideration of developing a new diversity supplement program specific to the SBIR/STTR programs. All responses are due by Dec. 16 and should be submitted as described in the announcement.

Federal Holidays and Deadlines

The holiday season is approaching and the NIH reminds applicants that if a grant application due date falls on a federal holiday, the application deadline is automatically extended to the next business day. Here are upcoming federal holidays:

- Thursday, November 24, 2016, Thanksgiving Day
- Monday, December 26 Christmas Day observed
- Monday, January 2, New Year's Day observed
- Monday, January 16, Birthday of Martin Luther King, Jr.

Check out the complete list of federal holidays.