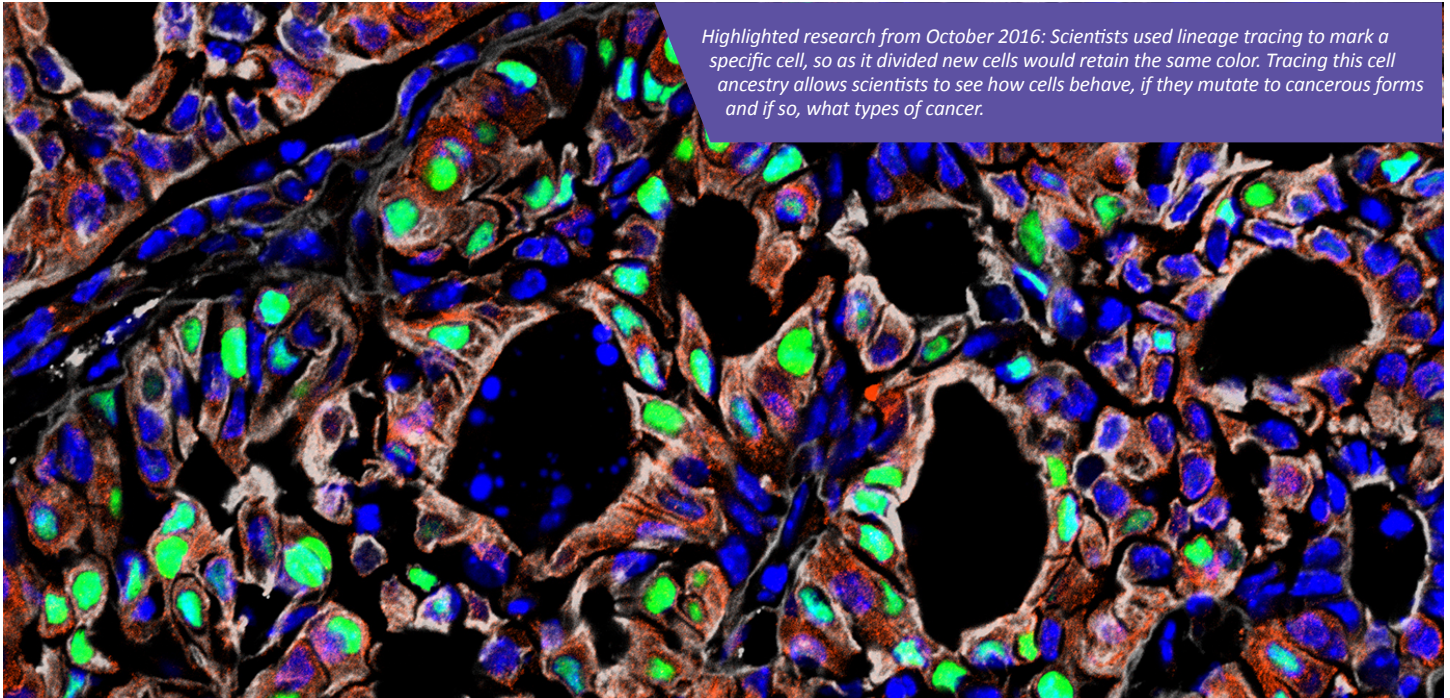


# Breakthroughs

Feinberg School of Medicine Research Office

December 2016



Highlighted research from October 2016: Scientists used lineage tracing to mark a specific cell, so as it divided new cells would retain the same color. Tracing this cell ancestry allows scientists to see how cells behave, if they mutate to cancerous forms and if so, what types of cancer.

## A Snapshot of 2016's Top Research Stories

Feinberg's notable research publications of 2016 represent discoveries from faculty members across departments, institutes and centers. This year's leading-edge discoveries delved into the mysteries of the genome, engineered novel biomedical devices, uncovered new targets for therapeutics and more.

"The roster of this year's scientific publications is impressive: our faculty members' dedication to pursuing new discoveries seems absolutely boundless," said [Rex Chisholm, PhD](#), vice dean of Scientific Affairs and Graduate Education. "Feinberg faculty members have advanced the state of scientific knowledge in their fields over and over. As we begin 2017, I foresee another year of innovative research and discovery."

Here we highlight some Feinberg's top research news stories throughout the past year:

### [January: HIV Is Still Growing, Even When Undetectable In The Blood](#)

[Steven Wolinsky, MD '82 GME](#), Samuel Jefferson Sackett Professor of [Infectious Diseases](#), led a team of international scientists in a study, published in *Nature*, providing a new understanding of how HIV can persist in the body despite antiretroviral therapies. The scientists found HIV replicates in lymphoid tissue, even when undetectable in the blood of patients.

### [February: Inherited Neandertal DNA Influences Human Disease Risk Today](#)

Modern humans contain a small fraction of their DNA as a result of interbreeding with Neandertals. A study in *Science* demonstrated how DNA from that past history continues to affect our risk for disease. Chisholm co-authored the paper and another in the *Journal of the American Medical Association* that used electronic health records to explore genetic data.

## 2016's Top Research Stories

(continued from cover page)

### March: [Examining New Breast Cancer Therapy](#)

[Massimo Cristofanilli, MD](#), professor of Medicine in the Division of [Hematology/Oncology](#), led a clinical trial that found combining the drugs palbociclib and fulvestrant may be an effective treatment for patients with advanced breast cancer. This study was the first time the combination of drugs had been tested in premenopausal women. The results were published in *Lancet Oncology*.

### April: [Nanoparticle Halts Asthma](#)

[Stephen Miller, PhD](#), Judy Gugenheim Research Professor of [Microbiology-Immunology](#), was senior author of a study published in *Proceedings of the National Academy of Sciences* that described a new approach to treating asthma and allergies: a biodegradable nanoparticle that houses an allergen to convince the immune system not to attack it.

### May: [Exploring the Role of Transcription Factors in Lymphatic Diseases](#)

The results of a study in the *Journal of Clinical Investigation*, led by [Tsutomu Kume, PhD](#), associate professor of [Medicine](#) in the Division of [Cardiology](#) and of [Pharmacology](#), suggest a new mechanism for diseases associated with lymphatic vessels. "The area of lymphatic research is expanding, with lymphatics having an important role in tumor growth and vascular disorders," Kume said.

### June: [New Gene Shown to Cause Parkinson's Disease](#)

[Teepu Siddique, MD](#), the Les Turner ALS Foundation/Herbert C. Wenske Foundation Professor of [Neurology](#) and of [Cell and Molecular Biology](#) and his team discovered a new genetic cause of Parkinson's disease – mutations in a gene called TMEM230. The study was published in *Nature Genetics*. "We show that mutations in this new gene lead to pathologically and clinically proven cases of the disease," Siddique said.

### July: [Nanoscientists Develop the 'Ultimate Discovery Tool'](#)

[Chad Mirkin, PhD](#), professor of Medicine in the Division of [Hematology/Oncology](#) and founding director of Northwestern's International Institute for Nanotechnology, developed a tool to rapidly test millions and perhaps billions of different nanoparticles at a time to zero in on the best particle for a specific use, findings [published](#) in *Science*.

### August: [Investigating Mechanisms Behind Immunological Mystery](#)

[Deyu Fang, PhD](#), professor of [Pathology](#), identified a new potential target for treating autoimmune diseases, in research published in *Nature Communications*. The scientists compared the gene expression profiles of anergic T-cells and showed that decreasing expression of the protein Hrd1 led to T-cell tolerance. "Based on the recent discoveries in our laboratory, we believe that Hrd1 is a potential therapeutic target for autoimmune diseases, as its suppression inhibits the functions of T-cells, B-cells and dendritic cells," Fang said.

### September: [Promising Biomaterial to Build Better Bones with 3-D Printing](#)

[Ramille Shah, PhD](#), assistant professor of [Surgery](#) in the Division of [Organ Transplantation](#), developed a 3-D printable ink that produces a synthetic bone implant that can rapidly induce bone regeneration and growth. The findings were published in *Science Translational Medicine*.

### October: [Pinpointing the Origins of Prostate Cancer](#)

In a study [published](#) in *Nature Communications*, [Sarki Abdulkadir, MD, PhD](#), the John T. Grayhack, MD, Professor of [Urological](#) Research and professor of [Pathology](#), identified the cell of origin for prostate cancer, which is very important in determining if it is an aggressive cancer or not and maybe even the treatment response.

### November: [New Drug Clears Atopic Dermatitis in Clinical Trials](#)

[Jonathan Silverberg, MD, PhD, MPH](#), assistant professor of [Dermatology](#), was a principal investigator on a clinical trial that found nearly 40 percent of patients with atopic dermatitis saw their disease completely or almost completely cleared with a new drug called dupilumab. The data from two phase III clinical trials were [published](#) in the *New England Journal of Medicine*. "We haven't seen data like this until now," said Silverberg. "It really is a first of its kind in atopic dermatitis."

### December: [Northwestern University Ranks Among Highly Cited Researchers in 2016](#)

Eleven Feinberg faculty made the 2016 [annual list](#) of highly cited researchers compiled by Clarivate Analytics (formerly a part of Thomson Reuters). Highly cited researchers are authors of papers that rank in the top one percent by citations for field and publication year.

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# Investigating Proteins Involved in Neurodegeneration

Jeffrey Savas, PhD, assistant professor of Neurology



[Jeffrey Savas, PhD](#), assistant professor of [Neurology](#), [Medicine](#), [Neurological Surgery](#) and [Pharmacology](#), aims to accelerate understanding of the proteins and proteomes that drive neurodevelopmental and neurodegenerative diseases, from autism to Alzheimer's.

Using biochemistry with discovery-based mass spectrometry, Savas and his team work to identify key proteins and proteomes that might serve as targets in the development of novel therapies.

## Q&A

### What are your research interests?

My research interests are focused on investigating the mammalian nervous system at the protein and proteome levels. We are currently investigating three related areas. First, we are working to develop new tools to anatomize distinct synaptic proteomes because, up to now, nearly all biochemical analyses of synapses have been limited by the composite measurements made from many different synapse types. We want to know which proteins are present at distinct synapses. How do they contribute to synapse-specific properties, and how do synaptic proteomes change during development and disease? These efforts are aimed to investigate the molecular perturbations that drive synaptopathologies, such as autism and schizophrenia.

Second, we are investigating synaptic excitotoxicity by using the rodent auditory sensory system in combination with noise exposure as our model system. Excess noise causes increased synaptic transmission and eventual loss of the cochlear hair cell/spiral ganglion neuron synapse, which represent the first synapse in the auditory circuit. We are using biochemistry and quantitative proteomic analysis to characterize these perturbed synapses after noise exposure to gain a detailed understanding of these key processes.

Finally, we are investigating protein degradation kinetics during neurodegeneration. Many neurodegenerative diseases — including Alzheimer's disease, Huntington's disease and Parkinson's disease — are characterized by impaired protein decay kinetics. We want to understand how altered protein degradation pathways contribute to each of these deadly diseases and impair synaptic function, neuron homeostasis and cognition. Our approach uses metabolic pulse-chase labeling of whole rodent models with stable isotopes and proteomic analysis to monitor protein decay dynamics for the lifetime of the animal.

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

The overarching goal is to develop and apply new chemical proteomic methods to elucidate the hidden and previously inaccessible proteins and proteomes responsible for neurodevelopment disorders, aging and neurological disease.

My research leverages discovery-based proteomic analysis to rapidly advance our understanding of the nervous system in healthy and diseased conditions. My research strategy is anchored to my belief that proteins do not function in isolation. Rather than investigate them individually, I analyze proteins on the proteomic scale.

Ultimately, we apply high throughput chemical neuroproteomic analyses to reveal new therapeutic targets, and hope to shorten the time needed to develop potent therapeutics for today's most devastating neurodevelopmental and neurodegenerative diseases.

### How does your research advance medical science and knowledge?

We utilize a research platform that can speed up the process of identifying therapeutic targets. We want to make breakthrough discoveries today, to help sick patients

*(continued on page 9)*

# Promoting Feinberg Research and News

The Feinberg Office of Communications offers several avenues to help you share your latest publication, promote an upcoming event or get the word out about a special project or program.

## Publications

The communications team produces a number of print and online communication vehicles to target its various audiences, such as this newsletter, [Breakthroughs](#), [My Northwestern Medicine](#), a weekly e-newsletter and, [Northwestern Medicine Magazine](#), a quarterly printed publication. If you have a news story to share, fill out this [online form](#).

## Digital Monitors

Feinberg has digital monitors throughout its Chicago campus to provide faculty, staff and students with timely and informative content, including news, weather and more. [Submit your event](#) for consideration; it may be showcased on the monitors.

## Mass Communications

Sending your announcements and events to the campus community through the Feinberg bulk e-mail system is another way to reach desired audiences. Check out [this service](#) and its guidelines.

## Social Media

The Office of Communications has established [guidelines](#) and best practices for faculty who wish to use their own social media accounts to promote their work.

## Media Relations

If you wish to contact journalists about your work or a journalist contacts you, the Northwestern University or Northwestern Medicine media relations teams may be able help. [More information](#).

## Printed Materials

If your project requires print support, such as a brochure, ad, poster, flyer, banner, certificate, invitation or T-shirt, the communications team can help you decide which options are appropriate based on your audience, goals and budget. Take the first step by completing the [project request form](#).

## Templates, Logos, Presentation Resources

[Login to the Office of Communications Northwestern Box](#) account to download useful templates for your projects.

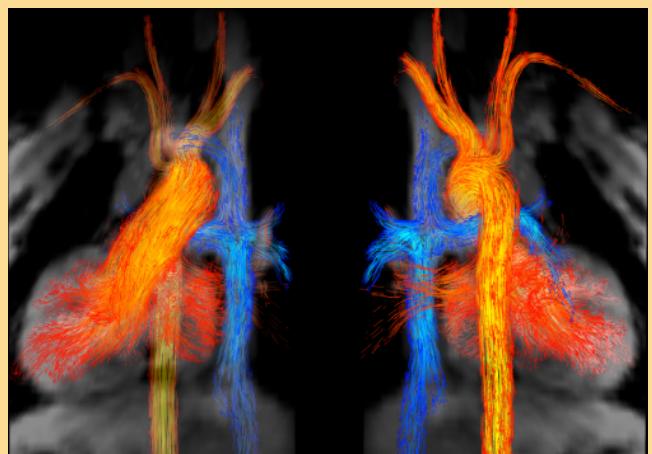
## Other Editorial, Design, Video and Audio Requests

If the communications team at Feinberg cannot fulfill your request in-house, they can connect you to trusted external resources that can be hired on a short-term basis by your department to produce special projects. Questions? [Contact Erin Spain](#), research communications director.

## Award-Winning Image

The image “Blood Flow Through the Heart,” created by Kelly Jarvis, a graduate student in the Department of [Radiology](#) at Feinberg, took first place in the annual Science in Society Scientific Images Contest, which is open to all Northwestern scientists. With a special imaging technique — 4D flow MRI — Jarvis’ image captures the heart’s blood flow at a single moment in time.

The blood colored red is full of oxygen, flowing out to the rest of the body, while the blood colored blue is returning to be re-oxygenated by the lungs. Jarvis works in the lab of Michael Markl, PhD the Lester B. and Frances T. Knight Professor of Cardiac Imaging in the Department of Radiology.



“I’ve always considered 4D flow MRI images to be beautiful and I’m proud to work in Dr. Markl’s lab on this cutting-edge research,” Jarvis said.

# Decoding the Complexity of the Central Nervous System

## Sam Cooler, Northwestern University Interdepartmental Neuroscience (NUIN) PhD Program



Sam Cooler, a third-year student in Northwestern University's Interdepartmental Neuroscience (NUIN) PhD Program, studies the mouse retina, specifically neurons that sense and process information in visual scenes. Cooler works in the laboratory of [Gregory Schwartz, PhD](#), assistant professor of [Ophthalmology](#) and [Physiology](#).

Cooler has undergraduate and masters degrees from The Ohio State University. Cooler was originally drawn to studying electrical and computer engineering but eventually found that studying the central nervous system was their true calling.

## Q&A

### Where is your hometown?

I grew up moving around the Midwest, but I've spent most of my time Columbus, Ohio. I lived in Worthington, a close suburb, and I attended a local Catholic high school.

### What are your research interests?

I'm fascinated by complex systems, and I'm driven to figure out how they work. In my research I study the mouse retina, focusing on the thin layer of neurons across the back of the eye that senses the visual scene around an animal. The retina is an information processing biological system: It receives light stimulus and transforms it to a form useful by the brain to understand the world around. In my experimental setup, I have the ability to show videos to a mouse retina and record the electrical signals of a single neuron. I'm interested in extracting the most knowledge I can from an electrical recording of a retinal output neuron. Each of these output neurons tells the brain a little bit of information about the visual image within its receptive field. I'm trying to understand what they are sending, and how they generate that signal.

Previously, I studied electrical and computer engineering, working on wireless communication protocols, signal conversion and transmission and information networks. Now, I work as a neuroscientist, applying nearly the same skillset to understanding naturally created systems. I love how deep and complicated the nervous system is and that I'll always have

more to discover.

### What exciting projects are you working on?

One of my projects is to understand a specific type of cell. The mouse retina is composed of a few layers of many repeating types of cells and circuits, which makes the whole system self-similar across the back of the eye. Each of these types has particular sets of inputs and outputs and creates a feature-selective filtering and transformation between the two. Using a combination of stimulus design for the input and signal analysis for the output, I can tease out the workings of the neuron network. In order to help me understand why the system reacts the way it does, I build a mathematical model of the retina, give it the same inputs as the real thing and interpret the similarities and differences in the two responses.

Some of these retinal output cells signal for the direction of movement of objects in the visual scene, a behavior called Direction Selectivity (DS). The Schwartz lab has identified a type of cell, which exhibits DS, but without connecting to the typical network of cells, which generates direction selectivity. We have insight into how it does this: a particular combination of the speed and strength of its multiple inputs and where, in 2-D space across the retina, those input cells are located. Unlike most cells, these have misaligned inputs. For this set of cells, that creates a strong response when activated in one direction, and a weak response when activated in the opposite direction. This generates direction selectivity! However, the signal is not very accurate or consistent, which makes us wonder if the cells are really signaling for direction or if that behavior is an artifact of something else for which it is actually optimized. Perhaps it is specifically optimized to signal for the light patterns of static objects while the mouse is running, which is biased strongly towards forward motion, behaviorally. I'm excited about the search for meaning here: Why does this cell type do what it does? What information about the visual scene is it actually trying to encode? And, why does the brain need this information?

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

My daily work life has been productive, healthy, mostly-only-moderately-stressful and happily entertaining. That's all I ask for!

### What are your plans for after graduation?

I'm excited to continue researching the nervous system. What form that takes will depend on how my research work evolves over time. I'd love to take a post-doctoral position with an academic research lab, but I'm happy to have a few more years before I've got to solidify those plans.

Connect with Sam at [SamCooler.com](http://SamCooler.com).

# Guiding MSTP Students through the Admissions Process and Beyond

Joyce Tamanio, Program Coordinator, Medical Scientist Training Program (MSTP)



## Q&A

### Where are you originally from?

I was born and raised on the Northwest side of Chicago in the Portage Park neighborhood.

### What is your educational background?

I received an associate degree in graphic design and multimedia technology.

### Please tell us about your professional background.

I started my career at Northwestern University at the Weinberg College of Arts and Sciences (WCAS) in the political science department as a temporary employee. I then became a permanent employee and moved on to the WCAS Dean's Office as a program assistant for four years. I then made my way to Feinberg and was a program assistant III for six years in the Department of Preventive Medicine. I am currently the program coordinator for MSTP.

### Why did you choose to work at Northwestern?

I've always wanted to work in an environment that is dedicated to training students to be excellent research scientists and physicians; it's amazing to be part of the process. Being one of the top universities in the nation, Northwestern offers this and so much more.

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

As the program manager of the MSTP program, I oversee registration and support the general administration of the program. I love that I get to interact with students during their time in the program.

### What is your favorite part of the job?

My favorite part of job is interacting not just with the students, but also with faculty and staff across the university. Not to mention, being surrounded by physician-scientists with different backgrounds and specialties, you are bound to learn something new everyday.

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

In my spare time, I coordinate a Filipino basketball league. I also love to bake. Who doesn't like sweets?



## Welcome New Faculty

Gemma Carvill, PhD, joins as an assistant professor of Neurology and Pharmacology. Her research focuses on identifying the genetic factors and biological mechanisms that cause epilepsy. Carvill earned her PhD in genetics from the University of Cape Town, South Africa. She comes from the University of Washington where, as a postdoctoral fellow in the Department of Pediatrics, she studied the genetic basis of the pediatric epilepsies. At Northwestern, Carvill will be interfacing with clinical teams to expand neurogenetics research and to facilitate better genetic diagnoses, identify new causes of epilepsy and study how seizures occur using stem cell models. She is the principal investigator on grants from the National Institutes of Health and the Citizens United for Research in Epilepsy and has published more than 22 peer-reviewed journal articles.

# Research in the News

## **Associated Press, November 3**

[Some Immune-boosting cancer drugs may pose rare heart risks](#)  
Jeffrey Sosman was quoted.

- ▶ This research was also featured in *The Washington Post*, *ABC News*, *CNBC* and *Business Insider*

## **TIME Magazine, November 9**

[You Asked: Why Does MY Skin Still Break Out?](#)  
Andrea Dunaif was quoted.

## **U.S. News & World Report, November 10**

[High-Dose Statins Boost Survival: Study](#)

Robert Bonow and Clyde Yancy were quoted.

- ▶ This research was also featured in *HealthDay*.

## **U.S. News & World Report, November 10**

[When Are Children's Nightmares Symptoms?](#)  
Marc Weissbluth was quoted.

## **Huffington Post, November 22**

[When 'Super Agers' Get Alzheimer's, They Don't Exhibit Any Symptoms](#)  
Changiz Geula was quoted.

## **Becker's Hospital Review, November 22**

[Northwestern Medicine boasts nation's only PhD in healthcare quality and patient safety](#)  
Donna Woods was quoted.

## **U.S. News & World Report, November 22**

[Hi-Tech Skin Patch Might Someday Track Your Health](#)  
John Rogers was quoted.

- ▶ This research was also featured in *HealthDay* and *Yahoo!*.

[More media coverage available online.](#)

Northwestern University

**NUCATS**  
Clinical and Translational Sciences Institute

## NUCATS Corner

### KL2 Award Applications are Now Being Accepted

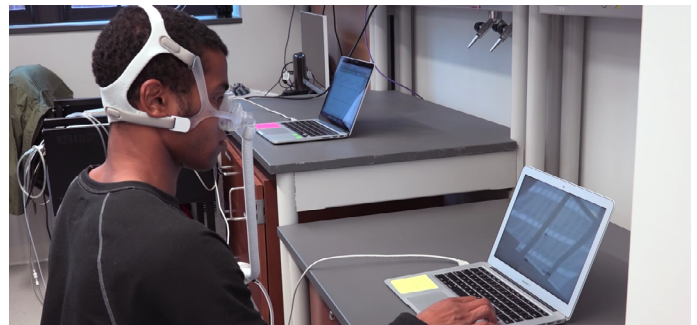
The Multidisciplinary Career Development Program (KL2) provides junior faculty with the skills and resources to develop as independent investigators.

The KL2 Program includes access to a community of scholars who provide support and peer mentoring to each other. Scholars can also tap into the expertise of 11 seasoned investigators who serve as the KL2 executive leadership committee.

The core components of the KL2 award are: mentorship, personalized career development opportunities, including coursework, peer mentoring, career guidance and workshops on various areas of research and salary support, including 75 percent protected time for mentored research, tuition, travel, mentor materials and supply support.

Letters of intent are due January 13. Applications are due March 20. Appointment begins September 1.

Click [here](#) to learn more about the KL2 award and find application instruction.



### Video: How You Breathe Affects Memory and Fear

Scientists in the lab of [Jay Gottfried, MD/PhD](#), professor of [Neurology](#), have discovered for the first time that the rhythm of breathing creates electrical activity in the human brain that enhances emotional judgments and memory recall. The study was published in the *Journal of Neuroscience*. [Watch the video.](#)

# Sponsored Research



**PI: Karla Satchell, PhD, professor of Microbiology-Immunology**

**Sponsor: National Institute of Allergy and Infectious Diseases**

**Title: “Molecular mechanism of *V. vulnificus* MARTX toxin in pathogenesis and food safety”**

*Vibrio vulnificus* (*V. vulnificus*) causes highly lethal infections from eating shellfish, particularly raw oysters, or from swimming in warm seawater. Death can occur 24 to 48 hours after eating contaminated food or swimming. This project will define the biochemical process of how the major toxin produced by this bacterium destroys cells and how changes to the toxin can affect severity of foodborne disease.

A significant virulence factor of *V. vulnificus* is the large Multifunctional- Autoprocessing RTX toxin (MARTXVv). Bioinformatics studies reveal that different clinical isolates of *V. vulnificus* express distinct forms of the toxin, with five different variants assembled from eight different MARTX effector domains. To date, the mechanism of action of five of these domains has been determined. Satchell’s team will investigate the mechanism of action of the remaining effector domains found in clinical isolates. Further, they’ll study the relative toxicity of different variants of MARTXVv toxin in pathogenesis by the foodborne route of infection.

[Read more about the project.](#)



**Co-PIs: Richard Gershon, PhD, professor of Medical Social Sciences and Preventive Medicine in the Division of Health and Biomedical Informatics, and David Cella, PhD, chair of Medical Social Sciences**

**Sponsor: Office of the Director, National Institutes of Health**

**Title: “ECHO PRO Research Resource: A Developmentally-based Measurement Science Framework for Assessing Environmental Exposure and Child Health”**

Understanding the effects of environmental exposures on child health and development is a priority for the National Institutes of Health. To advance knowledge in this area, NIH has launched a new seven-year initiative called the Environmental Influences on Child Health Outcomes (ECHO) program. The Northwestern team is part of a new NIH ECHO consortium exploring how environmental exposures during early development can have long-lasting effects on the health of children. Northwestern investigators are in charge of the consortium’s patient-reported outcomes core, which will capture the voices and experiences of more than 50,000 children and family members participating in research at more than two dozen study sites. Patient-reported outcomes involve data obtained directly from a patient — rather than from physical tests or blood work — such as their answers to questions about symptoms like pain, fatigue and anxiety. [Read more about the project.](#)



## Medical Students Showcase Scientific Research Projects

Feinberg medical students conduct research projects in areas of investigation ranging from clinical research and translational medicine to community and family health and medical social sciences during their education at Feinberg.

On December 2, second-year students presented their work at a poster session. These students will continue to work on their projects and will submit a written thesis at the end of their fourth year. [Read more.](#)



# Neurodegeneration

(continued from page 3)

tomorrow.

I aim to rapidly advance our understanding of the nervous system in healthy and diseased states by measuring many proteins with high accuracy in each analysis. Typically, scientists investigate candidate proteins or pathways to identify pathological mechanisms. We use discovery-based results obtained from mass spectrometry-based proteomic analyses to kickstart our in-depth mechanistic characterizations.

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

Ever since my undergraduate biochemistry classes, I've been amazed by the structural and functional diversity of proteins. How can nearly all cellular processes be governed by molecular micro-machines built from only 20 amino acid building blocks? An astonishing feat!

During my graduate school training, I used biochemistry and a bit of proteomic mass spectrometry to investigate Huntington's disease and was immediately moved by the power of this analytical technique to measure many proteins confidently in a single analysis. My interest in mass spectrometry-based proteomics grew to new heights during my postdoctoral training and culminated here in Chicago where I am fortunate to have a leading-edge mass spectrometer in my lab at Feinberg.

## Who makes up your research team and what role does each individual play in your research?

My research team is composed of three excellent post-doctoral fellows, two super Northwestern University Interdepartmental Neuroscience PhD students, three amazing research technicians, and an off-the-charts undergraduate.

Yi-Zhi Wang leads our efforts to investigate distinct synaptic proteomes, Nopporn Jongkamonwivat is the auditory expert and Ewa Bomba-Warczak will bring her expertise in molecular neuroscience to the lab in February. Graduate students Tim Hark and Miguel Ramirez investigate neurodegeneration and auditory synapses, respectively. But none of the research would be possible without our essential lab manager Laith Ali, the impressive dedication of Samuel Smukowski, or the timely and reliable research of Kira Cazzolino. Finally, but far from least, Lap-Heng Keung, an enormously promising undergraduate, completes our team.

## Follow Feinberg Social Media



# Funding

## Translational Research Program

[More information](#)

**Sponsor:** Leukemia & Lymphoma Society

Submission deadline: January 13, 2017

Upper Amount: \$2,000,000

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

## Clinical Trials for Frontotemporal Degeneration RFP

[More information](#)

**Sponsor:** Alzheimer's Drug Discovery Foundation

**Submission deadline:** February 17, 2017 (letter of intent)

**Upper Amount:** \$200,000,000 for one to three years

**Synopsis:** Running clinical trials in frontotemporal degeneration patients will help investigators learn how best to target this unique patient population and will employ advances in biomarkers as they develop. This RFP is agnostic to drug target, open to both symptomatic and disease modifying approaches and includes both novel and repurposed therapies. Behavioral and social interventions as well as lifestyle modifications will not be considered.

## Innovative Molecular and Cellular Analysis Technologies for Basic and Clinical Cancer Research (R21)

[More information](#)

**Sponsor:** United States Department of Health and Human Services, National Institutes of Health, National Cancer Institute

**Submission deadline:** February 28, 2017

**Upper Amount:** \$400,000 over a 3-year period

**Synopsis:** This funding opportunity announcement solicits grant applications proposing exploratory research projects focused on the early-stage development of highly innovative technologies offering novel molecular or cellular analysis capabilities for basic or clinical cancer research.

[View more funding opportunities](#)

# A New Metric from the NIH Office of Portfolio Analysis



In 2015, the NIH Office of Portfolio Analysis introduced the **Relative Citation Ratio (RCR)**, in order to better capture the citation impact of published research. This ratio determines the impact and influence of an article when benchmarked against publications from NIH-funded R01 awards.

## How is the RCR calculated?

The RCR is calculated by dividing the article citation rate, which is the average number of citations an article receives each year, by the expected citation rate, which represents the citation rate of NIH-funded publications in the same year and disciplinary field.

$$\text{RCR} = \frac{\text{Article Citation Rate}}{\text{Expected Citation Rate}}$$

Any RCR score equal to 1.0 means that the article is doing as expected within the context of its field and when compared against the NIH benchmark. Scores less than 1.0 indicate less than expected influence, while scores greater than 1.0 indicate greater than expected influence. The citation data used to calculate the RCR comes from various sources, including PubMed Central, European PubMed Central, CrossRef and Web of Science.

The RCR can quickly be determined using the freely available [iCite dashboard](#). This easy-to-use dashboard asks for the PubMed IDs of the article(s) of interest or allows for a search of PubMed for those articles. The dashboard will display citation metrics for each article, including cites per year, relative citation ratio, NIH percentile ranking and more.

## How does the RCR differ from similar metrics?

Unlike similar ratios (such as Scopus’s Field Weighted Citation Impact), the RCR does not determine an article’s disciplinary field at the journal-level; instead it creates a field based on articles that are cited alongside it in reference lists (also known as a co-citation network). Additionally, the expected citation rate is calculated, not from a global average of all field-related publications regardless of their funding or origin, but instead focuses on publications from NIH-funded R01 awards.

## How do we talk about the RCR?

The data from the iCite tool is easily accessible and can be downloaded as a customized report. However, it can be difficult to determine how best to incorporate metrics into a narrative or to visualize the metrics for a group of articles. Below are some ideas that you may find helpful:

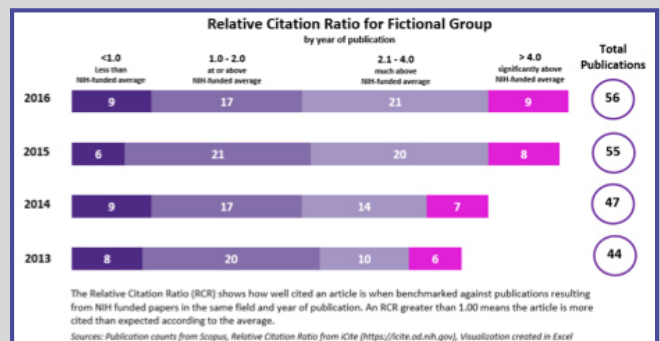
### Example of the RCR for an individual researcher’s publications:

“Eight of my peer-reviewed works have higher citation impact than the average NIH-funded article published in the same field and year (i.e. their RCR is >1.0; iCite tool).”

### Example of the RCR for a group of researchers’ publications:

“Our group’s publications are more impactful when compared against similar NIH-funded articles from the same field and year (i.e. their Weighted RCR > Total Pubs; iCite tool).”

### Example of visualizing the RCR metric for a group of researchers’ publications:



## A deeper look

For more information on the RCR or the iCite tool, see the [iCite Help documentation](#). Need some help understanding citation-based metrics? Contact Galter Library’s [Metrics and Impact Core](#).

# High Impact Factor Research

Almassalha LM, Bauer GM, Chandler JE, Gladstein S, Cherkezyan L, Stypula-Cyrus Y, **Weinberg S**, Zhang D, Thusgaard Ruhoff P, Roy HK, Subramanian H, Chandel NS, Szleifer I, Backman V. [Label-free imaging of the native, living cellular nanoarchitecture using partial-wave spectroscopic microscopy](#). *Proceedings of the National Academy of Sciences of the United States of America*. 2016 Oct 18;113(42):E6372-e6381.

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## 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

Thursday, December 15

## Small RNAs and Small Kidneys

**Presentation by Jacqueline Ho, MD, assistant professor of Pediatrics, Division of Pediatric Nephrology, Children's**

**Hospital of Pittsburgh of UPMC and University of Pittsburgh**

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

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

**Contact:** [helene.wright@nm.org](mailto:helene.wright@nm.org)

[More information](#)

Friday, January 13

## Toward Restoring Dopamine Regulation of Striatal Projection Neurons in Parkinson's Disease

**Stella M. Papa, associate professor of Neurology at Emory University School of Medicine, will give a lecture on her research, pathogenic mechanisms leading to movement abnormalities.**

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

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

**Contact:** [d-daviston@northwestern.edu](mailto:d-daviston@northwestern.edu)

[More information](#)

Wednesday, January 25

## Sex Inclusion in Biomedical Research Workshop and Symposium

**Discover best practices in sex-inclusive research from national experts who are leading the way in sex-inclusive research.**

**Time:** Noon to 6:00 p.m.

**Location:** Prentice Women's Hospital  
250 E. Superior

**Contact:** [nicole.woitowich@northwestern.edu](mailto:nicole.woitowich@northwestern.edu)

[More information](#)

# NIH News

## NIH Mentor Program/Social Platform

The NIH is helping biomedical researchers and students connect professionally through a new, free, web-based social networking platform called [MyNRMN](#). It's part of the NIH's National Research Mentoring Network and is designed to build mentor/mentee connections.

Faculty in more senior roles and established scientists can sign up as mentors. Early career faculty can serve as mentors or be mentees, depending on their needs. Undergraduates, graduate students and postdocs can elect to be peer mentors or sign up to be mentored. The connections you form through MyNRMN might be as simple as asking a question to scheduling formal mentoring sessions.

Some of MyNRMN's features include:

- Browsing other registrants' profiles to connect with people who have similar interests (as on social media sites).
- Sharing documents and sending direct messages to your connections.
- Creating a personalized calendar to schedule mentee/mentor meetings and electing whether you would like to receive text message reminders.
- Revising and improving your resume with the CV Builder tool (for mentees).

Read more about this [new tool](#).

## Diversity in NIH-Funded Research

The NIH has a [new website](#) dedicated to supporting a diverse scientific research workforce. It is designed to highlight NIH initiatives that support diversity, offer resources to help leaders further and develop their diversity programs and highlights personal stories of diverse scientists working on NIH research. The NIH welcomes [your feedback](#) on the website.

## Important Phone Number Change

The Office of Extramural Research Grants Information service desk answers thousands of general inquiries a year related to grants policies, processes and funding opportunities on behalf of NIH. Due to a scamming issue this phone number recently changed. The new number is **301-945-7573**. A notice has been posted in the NIH Guide for Grants and Contracts and websites have been updated with this new number. If you reference the grants information number on any of your resources, please note the change.