



## Choosing Your Flow: Northwestern's Cytometry Cores

If a researcher needs to separate and characterize thousands of cells per second, then it's fairly evident that he or she needs to use flow cytometry for the job. But with two flow cytometry core facilities on the Chicago campus, the less obvious question is which one to choose.

Physically being able to sort and analyze cells based on certain characteristics allows researchers to isolate populations of interest. From there, they can see what makes a population die, proliferate, or change in any way. With the exception of sorting the cells — only the core associated with the Cancer Center performs this process — both facilities have similar equipment; however, they aid with this process in different ways.

"We train our users and set them free," says Rebecca Bultema, manager of the Interdepartmental Immunobiology Center Flow Cytometry Core Facility located in the Tarry Building. "We are happy to help with problems or questions. But we want our users to be independent."

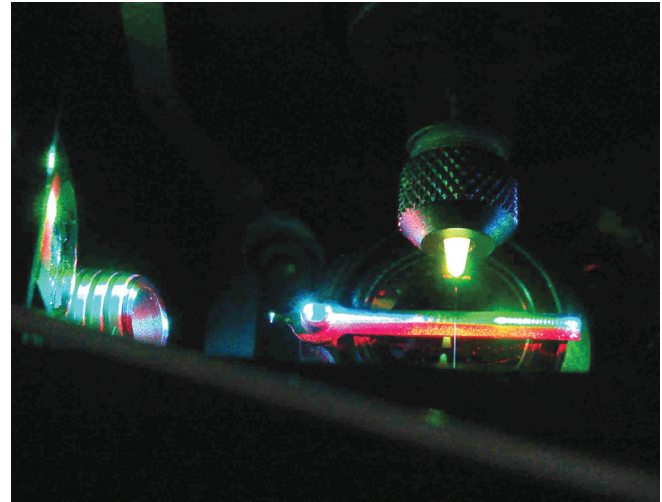
Directed by Stephen D. Miller, microbiology-immunology, the core that Bultema manages is described as "user run." Investigators who want to use this core can expect to run samples and complete data analysis by themselves after receiving training and initial recommendations for approaching the research.

For investigators who prefer to have less involvement with their samples or more supervision for their work, the core that is a part of the Robert H. Lurie Comprehensive Cancer Research Center, located in the Olson Building, is a better match. Under the direction of Charles Goolsby, pathology and editor-in-chief of the journal *Cytometry*, the staff offers everything from full-service sample preparation through data analysis.

If a researcher prefers to complete experiments independently, then the staff is prepared for that too. They offer training for specific instrumentation, and hands-on guidance is always available upon request. "Even when they are using the instruments by themselves, we are pretty much looking over their shoulders the whole time," says James Marvin, manager of the facility. "We have a lot of expertise here, so we can see if the data look strange."

Flow cytometry can be used for experiments in many disciplines, including immunology, cancer research, microbiology, and nanotechnology. Both Bultema and Marvin remark that what makes their respective core facilities exciting is the diversity of projects.

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Colorful lasers intersect with cells in the interrogation chamber of a flow cytometer in the Robert H. Lurie Comprehensive Cancer Research Center. *Image by James Marvin*

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"Every day I come to work unsure of what's going to happen," says Bultema who studies Epstein-Barr virus tumor progression in Burkitt's lymphoma by examining proteins with flow cytometry. "Either with my own work or through what other people bring in, I'm always learning something new."

Marvin, who works on Goolsby's investigation into the biology of cells in patients with leukemia, says a lot of the projects that come through the facility are exciting because

they have the possibility to translate directly to medicine.

"The University's link with Northwestern Memorial means that we see a lot of translational projects," he says. "It's one step closer to treating humans."

For more information about the Interdisciplinary Immunobiology Center Flow Cytometry Facility, please [click here](#).

And to learn more about the Robert H. Lurie Comprehensive Cancer Center Flow Cytometry Core facility, [follow this link](#).

## Science Chicago Social Media Aspects to Continue



Students work with pipettes to burst cells open and isolate DNA at the Center for Genetic Medicine during a Science Saturdays event. Photograph by Peter J. Schulz, courtesy of Science Chicago

Science Chicago — the city's yearlong celebration of science — concluded at the end of October. The initiative's social media efforts, however, will continue to publicize science-related events in and around Chicago. This includes the [web site](#), Twitter and Facebook pages, and e-newsletter.

For 12 months, Science Chicago offered more than 1,500 programs designed to engage community members in science. Northwestern organized several of these, including multiple Junior Science Cafes and Science Saturdays, which explored various topics such as genetics, nanotechnology, astronomy, and evolution.

"I would like to thank everyone at Northwestern who participated in Science Chicago. Your efforts contributed greatly toward making it a resounding success," says Meg McDonald, executive director of ORPFC and member of the Science Chicago advisory board. "It is my hope that, through the framework laid by Science Chicago and maintained by the Museum of Science and Industry, our faculty and students will continue to share their knowledge and love of science with the broader community."

A web-based final report on the initiative is available for those who would like to learn more about the organizations and people who made the project a success. [That report can be accessed here](#).

Inquiries about Science Chicago should be directed to Rabiah Mayas, science director, Center for the Advancement of Science Education at the Museum of Science and Industry, at [rabiah.mayas@msichicago.org](mailto:rabiah.mayas@msichicago.org).

## Argonne's Connection to the 2009 Nobel Prize in Chemistry

The Nobel Prize in Chemistry was awarded to three scientists for determining the three-dimensional structure of the ribosome, which helps translate DNA code into life. This accomplishment was partly made possible by the Advanced Photon Source (APS) at Argonne.

Venkatraman Ramakrishnan, MRC Laboratory of Molecular Biology, Cambridge, England; Thomas A. Steitz, Yale University and Howard Hughes Medical Institute; and Ada E. Yonath, Weizmann Institute of Science, Rehovot, Israel, performed important research with Argonne's APS that led to their findings.

The APS, constructed in 1996, provides the brightest coherent x-ray beams in the Western Hemisphere. The beam allowed the three Nobel laureates to view the ribosome assembly's subunits in high-resolution.

As a result of research completed at Argonne, the three scientists wrote more than 60 papers explaining why ribosomes are an essential component of life. They also developed 3-D models of the structure that are now being used to develop new antibiotics to fight bacterial infections.

More information about Argonne's APS can be found at [www.aps.anl.gov](http://www.aps.anl.gov).



Aerial view of the Advanced Photon Source at Argonne National Laboratory. Image used courtesy of Argonne National Laboratory

## Kennedy Assumes New Position to Close the Gap in Science Literacy

Amid the thousands of layoffs in the journalism industry, science coverage has been one of the first things to go. About this time last year, CNN cut its entire science unit. A few months later, the *Boston Globe* followed the trend by eliminating its science staff. As it becomes more difficult to find reliable science news, research institutions are stepping up their game.

To help fill the gap that the decline in science reporting has left behind, the Office for Research established a new half-time position dedicated to promoting science literacy to the public. As of October 1, Michael Kennedy became the director of science outreach and public engagement.

"What a great research institution does is recognize an area of societal need and work to address those needs," says Jay Walsh, vice president for research. "The office will help faculty promote their research and bring important and exciting new discoveries to the community."

Formerly serving as the chief of staff at Feinberg School of Medicine, Kennedy was also the mastermind behind Northwestern's e-magazine, *Science in Society*, which launched in 2008. The magazine is one aspect of a new, broader plan to enhance existing outreach efforts on campus.

"Our motto is to link, amplify, and extend," Kennedy says. "Our faculty and students are conducting all kinds of exciting outreach programs, and we started *Science in Society* as a partnership to help promote these activities. We aim to share best practices while making it easier to engage the public in our work."



A Science Club student and her mentor show a dissected worm at the Science Fair. A fair takes place at the end of each 10-week session of Science Club to give members a place to demonstrate what they've learned. *Photograph by Michael Kennedy*



Michael Kennedy *Photograph by Matthew Gilson*

Kennedy's goals for the new position fall into three main areas: (1) Promote partner research, events, and other outreach initiatives through *Science in Society*; (2) Support existing and new opportunities for faculty, staff, and students to develop their science communication skills; (3) Invite and respond to community-generated needs and ideas for outreach programming.

Kennedy's passion and talent for science outreach were recently recognized by the National Institutes of Health in the form of a multi-year grant to establish Science Club. The after school mentorship program for middle school students was developed with Carolyn Jahn, cell and molecular biology. The year-long program takes place at the Robert R. McCormick Boys & Girls Club, engaging students in hands-on science activities overseen by Northwestern graduate student mentors. All activities take place in a 700-square-foot lab built over the summer at the Boys & Girls Club in Chicago's Uptown neighborhood.

Science literacy isn't just for children though. As research becomes more interdisciplinary, it's important for researchers to understand terminology and concepts outside of their fields of study.

"An engineer must work with a chemist or a biologist to solve a problem. We don't always speak each others' languages," says Kennedy, who has a background in biochemistry. "Translational research has as much to do with 'translating' expertise from one discipline to another as it does with 'translating' ideas from bench to bedside."

Walsh and Kennedy also take seriously the university's mission to educate the public. "The public has legitimate questions about technology and science," Kennedy says. "And it's our responsibility to answer those questions through honest, open dialogue."

Faculty and staff interested in learning more about *Science in Society* or other outreach initiatives on campus are invited to contact Kennedy at [m-kennedy@northwestern.edu](mailto:m-kennedy@northwestern.edu) or join the [listserv here](#).

## Center to Open New Directions for Cancer Research

Northwestern was awarded a \$13.6 million five-year grant from the National Cancer Institute (NCI) to establish an interdisciplinary research center for the study of genes and their role in cancer. A better understanding of the mechanisms could lead to better diagnostics and therapeutics and open up new directions for research.

Northwestern's Physical Sciences-Oncology Center (PS-OC), one of 12 established nationwide by the NCI, brings together physical scientists and cancer biologists to use non-traditional, physical-sciences based approaches to understand and control cancer.

"Our center will be studying the regulation and expression of genes in both normal health and development and in cancer," says principal investigator Jonathan Widom, biochemistry, molecular biology, and cell biology. "We need to understand healthy cells to understand and control cancer."

The center is the result of a joint effort between the Chemistry of Life Processes Institute (CLP) and the Robert H. Lurie Comprehensive Cancer Center. Its focus is on the molecular mechanisms by which genetic and epigenetic information is encoded and decoded in cancer cells. By combining diverse approaches from the physical sciences, including nano- and atomic-scale investigation, advanced optics, high-level computational power and mathematical modeling, the center's investigators hope to gain new insights into fundamental processes of the cell. [Full Story](#)



Jonathan Widom Photograph by Jill Carlson

## Silverman Hall Opens After Dedication Ceremony



Richard Silverman cuts the ribbon during the dedication ceremony. Pictured left to right: Thomas O'Halloran, Henry S. Bienen, Sarah Mangelsdorf, Barbara Silverman, Richard Silverman, Dan Linzer, Morton Schapiro, and Julio Ottino. Photograph by Stephen Anzaldi

The Richard and Barbara Silverman Hall for Molecular Therapeutics and Diagnostics, a new building that will encourage discoveries at the intersections of multiple scientific disciplines, was dedicated last Thursday.

Silverman Hall will be home to the Chemistry of Life Processes Institute (CLP) and approximately 245 researchers and staff in 17 research groups. The facility will bring together faculty, graduate students, postdoctoral fellows, staff and undergraduates from the physical sciences,

engineering and life sciences to address fundamental questions in biomedical research and develop new medicines and diagnostics.

"Acting as an umbrella for a variety of centers, the Chemistry of Life Processes Institute will facilitate collaborations among — and help bridge — different cultures," said Thomas V. O'Halloran, chemistry and director of CLP. "By lowering the barriers to scientific discovery, we hope, for example, to design new drugs for the treatment of cancer and neurodegenerative diseases as well as develop improved techniques for early-stage diagnosis of disease."

The \$100 million building is named for Richard B. Silverman, chemistry, and his wife, Barbara. Silverman donated to the University a portion of the royalties that he receives from sales of the drug Lyrica to help fund construction of the building. In 1989 Silverman and his Northwestern research group first synthesized an organic molecule, which ultimately was marketed as Lyrica. The drug, sold by Pfizer, Inc., is used to combat epilepsy, neuropathic pain and fibromyalgia.

"Silverman Hall will provide state-of-the-art facilities for the important research that is being done at Northwestern," said President Schapiro. "The interdisciplinary approach to research and teaching that is a hallmark of Northwestern will be greatly enhanced by this wonderful new building."

[Click here for the full story](#)

## Student Awarded National Scholarship for Outstanding Leadership in Health Care



Blayne Amir Sayed, an MD-PhD student at Feinberg, received one of five Association of American Medical Colleges (AAMC) Herbert W. Nickens Scholarships. The scholarships are presented annually to "outstanding students who have shown leadership in efforts to eliminate inequities in medical education and healthcare and demonstrated leadership efforts in addressing educational, societal and healthcare needs of minorities in the United States."

"Blayne is deeply committed to eliminating healthcare disparities and social, racial, ethnic and religious intolerance," wrote Raymond Curry,

Dean for Education, Feinberg School of Medicine, in nominating Sayed. "He has gently, but firmly challenged the administration, faculty and students alike to live up to the high ethical and intellectual expectations he holds for himself."

Sayed is enrolled in the school's Medical Scientist Training Program (MSTP). He successfully defended his post-doctorate thesis in microbiology-immunology this past summer and is now completing the clinical clerkships in the Doctor of Medicine curriculum. However, his contributions to the medical community extend well beyond the classroom or research lab. Beginning with his experience as a teenager working with Native American children at the Cheyenne River Youth Project in Eagle Butte, South Dakota, Sayed has committed himself to a life of service addressing the challenges faced by medically underserved communities.

As a medical student, Sayed is noted for his advocacy for and education about diversity in the medical community. He is heavily involved in the Islamic Medical Association and serves as a liaison for Muslim patient care for the chaplain's office of Northwestern Memorial Hospital. He also volunteers for the Inner City Muslim Action Network and is a member of the Coordinating Committee of the Arab Jewish Partnership for Peace and Justice in the Middle East. At Feinberg, Sayed has taught two first-year medical student courses about healthcare disparities and has served as a member of the Executive Diversity Committee, the Curriculum Review Committee, the Committees of Admission for the Doctor of Medicine and MSTP programs and is one of the leaders of the University's MLK-DREAM Committee. His laboratory research focuses on the role of central nervous system-associated mast cells in facilitating inflammatory cell entry into the brain in a model of multiple sclerosis.

-- Story used courtesy of the Feinberg School of Medicine

## Student Receives Boeing Engineering Award



Can Bayram, a fifth-year PhD candidate in electrical engineering and computer science, was selected as the Boeing Company's 2009 Engineering Student of the Year. Open to engineering students worldwide, the prestigious award is given to a student whose work has potential for impact on current or future aeronautical or space technology.

Bayram, who works in the Center for Quantum Devices under the direction of Manijeh Razeghi, specializes in the development of high-performance nitride optoelectric devices. Applications of his work include ultraviolet detectors offering compact and portable substitutes for photomultiplier- or silicon-based biological agent detectors, and light-emitting diodes which can be used instead of fluorescent lights. He has also helped develop environmentally friendly emitters that can detect and analyze illegal drugs and explosives at security checks in airports.

### Awards & Honors

**Juan Carlos Caicedo**, surgery, was named one of *Crain's Chicago Business's* "40 Under 40" for 2009.

**Sunjay Kaushal**, surgery, was awarded a **Thoracic Surgery Foundation for Research and Education award**.

**Kathryn N. Farrow**, pediatrics, will receive a **Young Investigator Award** during the American Heart Association Resuscitation Science Symposium.

**Peter C. Stair**, chemistry, received the **2010 American Chemical Society Award** in Hydrocarbon and Petroleum Chemistry.

**John B. Matson** and **Ariella Shikanov**, chemical and biological engineering, received **2009 IBNAM-Baxter Career Development Awards**.

**Richard Van Duyne**, chemistry, received the **2010 American Chemical Society Award** in Analytical Chemistry.

## Proposals for New Core Facilities Now Being Accepted

The Office for Research (OR) is soliciting ideas for new core facilities or for significant enhancements to existing cores.

Linda Hicke, associate vice president for research, says she has heard several ideas for new cores — including one for the study of recombinant protein production and purification and another to develop a small molecule library for drug discovery — but she assumes there are other ideas that have not yet come to her attention.

Alternatively, she adds, there may be ideas for personnel resources or new technology that would provide a significant sub-core within an existing facility.

Hicke invites the submission of one-page proposals by faculty members who would direct a new core or who would drive the establishment of a sub-core. Compelling ideas that serve a number of faculty members and provide a substantial leap forward in research infrastructure will be considered for further development.

The one-page summary proposal must be e-mailed to Hicke by December 18 at [l-hicke@northwestern.edu](mailto:l-hicke@northwestern.edu). In addition to the proposal, a rough budget also must be included. Please [click here](#) for information on expectations and funding of core facilities.

## NUCATS Accepting Pilot Grant Applications

NUCATS is accepting proposals for its Fall 2009 Pilot Grant competition until December 6. Proposals should address significant unmet needs that have direct bearing on clinical problems. Those selected will receive seed funding for novel, high-risk ideas that foster new interdisciplinary collaborations.

For investigators who need help finding a collaborator, the NUCATS staff will help play matchmaker.

All full-time faculty at Northwestern and full-time investigators based at Children's Memorial and the Rehabilitation Institute of Chicago are eligible to apply. Emerging investigators and proposals with co-investigators especially are encouraged, as are proposals from multiple institutions or schools, and those with new collaborators.

Award recipients will be notified in January 2010. The total number of awardees will depend on the number, cost, and quality of applications. A minimum of four or five awards over two funding cycles is anticipated.

For more information or help finding a collaborator, e-mail Jim Bray at [j-bray@northwestern.edu](mailto:j-bray@northwestern.edu). To apply, please visit [www.nucats.northwestern.edu/pilots/index.html](http://www.nucats.northwestern.edu/pilots/index.html). A valid Northwestern NetID and password are required to log into the site.

## Northwestern Research in the News, Oct. 21 – Nov. 17

**Joan Chiao**, psychology, and her study finding that collectivist cultures create buffers for depression were mentioned in *USA Today*, *Agence France Press* and *Discovery Channel News*.

**Alice Dreger**, medical humanities and bioethics, wrote an article about determining the gender of athletes. It appeared in the *New York Times*.

**Adam Galinsky**, management and organizations, and his research about cleanliness influencing moral behavior were featured on *LiveScience* and *Financial Times*.

**William Gradishar**, oncology, discussed mammograms for women in their 40s in the *Chicago Tribune* and *Los Angeles Times*.

**Kathryn Heinze**, management and organizations, and her presentation about grass-fed beef and dairy products were discussed in the *Chicago Tribune*.

**Kemi Jona**, education and social policy, and the iLab Network were the subjects on an article by *United Press International*.

**Nina Kraus**, communication sciences and disorders, discussed her work with dyslexia and noise in *U.S. News and World Report* and *BBC News*.

**Donald Lloyd-Jones**, cardiology, commented on sudden cardiac death in the *Wall Street Journal* and *U.S. News and World Report*.

**Chad Mirkin**, chemistry, and his research into bio-barcode assay using gold nanoparticles were the subject of an article in *Chemistry World*.

**Chad Mirkin**, chemistry, commented on his research detecting a prostate-specific antigen in *U.S. News and World Report*, and *Bloomberg News*.

**Mark Molitch**, endocrinology, commented on how minimal weight loss can prevent diabetes in the *Chicago Tribune*.

**Thomas Schnitzer**, physical medicine and rehabilitation, commented on the placebo effect in the *Chicago Tribune*.

**Seth Stein**, Earth and planetary science, and his work concluding that tremors in the Midwest are aftershocks from 19th century earthquakes were the subject for an article in *U.S. News and World Report*, *USA Today*, *MSNBC*, *BBC News*, *New Scientist*, and *Nature*.

## New Lecture Series Encourages Interdisciplinary Research

Research at the boundaries between disciplines is critical to addressing the problems facing today's society. By aligning teams of researchers and practitioners from the fields of medicine and engineering, Feinberg Dean J. Larry Jameson and McCormick Dean Julio M. Ottino say new areas can be found that have greater impact than either group working alone.

With that concept in mind, the deans are kicking off a series of six lectures designed to bring together medical and engineering faculty members to spark interdisciplinary collaboration.

The 2009-10 "Deans' Grand Challenge Lecture Series in Medicine and Engineering" will span topics ranging from neurobiology and nanomechanics, to cell-based therapies for heart disease, to oncofertility, and more.

The first lectures of the series will take place on both campuses:

On the Chicago campus, Mitra Hartmann, biomedical engineering and mechanical engineering, will speak about "Tactile Sensing with Whiskers" at 4 p.m. Thursday, November 19 in the Hughes Auditorium of the Lurie Medical Research Center.

The Evanston Campus will host Douglas W. Losordo, medicine, presenting "Cell-Based Therapies for Heart and Vascular Disease" at 4:30 p.m. Wednesday, December 2 in the ITW Classroom of the Ford Design Center.

Free and open to the public, the lectures will followed by question-and-answer sessions and post-event receptions hosted by NUCATS intended to further collaborative discussions.

To view a complete schedule for the series, please visit [www.mccormick.northwestern.edu/grandchallenges](http://www.mccormick.northwestern.edu/grandchallenges).

## Training Calendar, November 18 – December 15

### Evanston

Hazardous Waste Management  
Tuesday, December 1, 2 p.m.  
Technological Institute

Radiological Surveys by Laboratory Personnel  
Wednesday, December 2, 1 p.m.  
Technological Institute

Radiological Emergency Management in Radiation Laboratories  
Thursday, December 3, 1 p.m.  
Technological Institute

Biological Pathogens Training  
Tuesday, December 8, 10 a.m.  
Technological Institute

Managing Sponsored Projects  
Tuesday, December 8, 1 p.m.  
Main Library

Safe Shipping of Biological Materials  
Tuesday, December 8, 2 p.m.  
Technological Institute

Radiological Surveys by Laboratory Personnel  
Wednesday, December 9, 1 p.m.  
Technological Institute

Advanced Laser Safety Awareness Training  
Thursday, December 10, 1 p.m.  
Technological Institute

Laboratory Safety and PPE Training  
Thursday, December 10, 2 p.m.  
Technological Institute

### Chicago

Comprehensive Radiation Safety Training  
Wednesday, November 18, 10 a.m.  
Ward Building

eIRB Conversion Process  
Wednesday, November 18, noon  
Rubloff

Biological Pathogens Training  
Tuesday, November 24, 10 a.m.  
Ward Building

Laboratory Safety and PPE Training  
Thursday, December 3, 10 a.m.  
Ward Building

Hazardous Waste Management  
Thursday, December 3, 2 p.m.  
Ward Building

Radiological Emergency Management in Radiation Laboratories  
Wednesday, December 4, 1 p.m.  
Ward Building

Biological Pathogens Training  
Tuesday, December 8, 10 a.m.  
Ward Building

Advanced Laser Safety Awareness Training  
Friday, December 11, 1 p.m.  
Ward Building

Safe Shipping of Biological Materials  
Tuesday, December 15, 2 p.m.  
Ward Building

For a complete schedule of events and details, please visit [www.research.northwestern.edu/training](http://www.research.northwestern.edu/training)

## Faculty Notes

A new study led by **Joan Chiao**, psychology, found that a genetic tendency to depression is much less likely to be realized in a culture centered on collectivistic rather than individualistic values. [Full Story](#)

**David Dranove**, management and strategy, conducted a study finding that people who are near retirement but lack insurance put up to 50 percent of their household assets at risk. [Full Story](#)

New research by **Adam Galinsky**, management and organizations, found that people are unconsciously fairer and more generous when they are in clean-smelling environments. [Full Story](#)

Research by **Nina Kraus**, communication sciences and disorders, indicates that children with developmental dyslexia have difficulty separating relevant auditory information from competing noise. Kraus' student, Bharath Chandrasekaran, led the study. [Full Story](#)

**Chad Mirkin**, chemistry and biomedical engineering, led a team that detected previously undetectable levels of prostate-specific antigen in patients who have undergone radical prostatectomy. [Full Story](#)

**Mark Molitch**, endocrinology, was principle investigator of a study finding that modest weight loss reduces the rate of developing type-2 diabetes by

34 percent in people at high risk for the disease. [Full Story](#)

A study led by **Eva Redei**, psychiatry and behavioral sciences, found evidence that disproves the long-held dogma that stress is a major cause of depression and that an imbalance in neurotransmitters in the brain triggers depressive symptoms. [Full Story](#)

**Seth Stein**, Earth and planetary sciences, was lead author of a study finding that most of the earthquakes in the Midwest are aftershocks of big earthquakes that struck the Midwest almost 200 years ago. [Full Story](#)

## Next Issue...

Due to the holiday season and closing of the academic year, the Northwestern Research Newsletter will not be published during the month of December.

The next issue of the Newsletter will be published Wednesday, January 20, 2010.

Enjoy the holidays!

## Proposal and Award Reports for September 2009

The total amount of award funding received this fiscal year through September 2009 is \$46.2 million, an increase of 66 percent (\$18.3 million) over September 2008. This includes 63 awards totaling \$15.5 million in funding from the American Recovery and Reinvestment Act.

The dollar volume of awards to Feinberg by 60 percent (\$13.0 million), while those to McCormick grew by 219 percent (\$2.9 million). Weinberg awards also rose by 275 percent (\$2.7 million).

In September 2009, the dollar volume of awards from federal agencies increased by 101 percent (\$21.6 million), while those from industrial sponsors decreased by 50 percent (\$1.9 million).

The dollar volume of proposals submitted in September 2009 is \$117.2 million, an increase of 5 percent (\$5.3 million) over the total reported in September 2008. Research Centers and Institute activity increased by 1126 percent (\$9.7 million), while proposals from Research Operations were up by 2894 percent (\$9.7 million). Proposals from SESP also grew significantly (\$5.3 million). The dollar volume of Weinberg proposals decreased by 37 percent (\$8.5 million), while those from Feinberg were down by 9 percent (\$5.8 million). McCormick submissions also declined by 13 percent (\$3.0 million).

In September 2009, the dollar volume of proposals submitted to federal agencies increased by 4 percent (\$4.4 million), while submissions to voluntary health organizations grew by 122 percent (\$4.4 million). Foreign government proposal activity also rose considerably (\$3.2 million). Proposals to foundations reflected a decrease of 79 percent (\$5.3 million), while those to associations also decreased by 92 percent (\$1.1 million).

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