

CHEMISTRY

August 2008

The Division of Chemistry

Number 13

In this issue:

NSF Town Hall at the American Chemical Society Meeting

Letter from the Division Director

Reminder of NSF-NIST Supplement Opportunity

Highlight Spotlight

Personnel Changes and Availability of Positions within the Division of Chemistry

Funding for Collaborative Research Projects

Reminder to Notify NSF of Publications or Announcements of a Significant Finding from NSF-Funded Research

NSF Division of Chemistry Strategic Directions 2008-2012

List of Recent and Upcoming NSF Sponsored Workshops

Request for Qualified Reviewers

NSF Custom News Service



4201 Wilson Blvd.
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Arlington, VA 22230

<http://www.nsf.gov/chem>

NSF Town Hall at the American Chemical Society Meeting

National Meeting of the American Chemical Society in Philadelphia, Pennsylvania

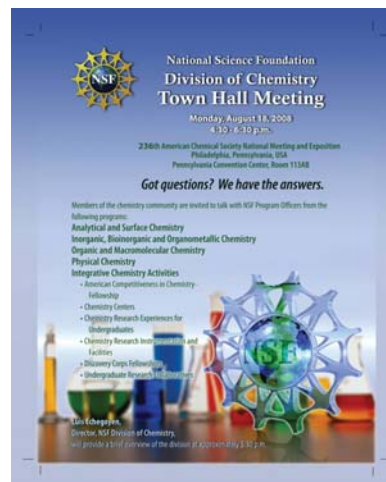
Got Questions? We Have the Answers.

We invite you to meet and speak with National Science Foundation (NSF) Division of Chemistry staff at the NSF Town Hall to be held at the National Meeting of the American Chemical Society (ACS) in Philadelphia, Pennsylvania on Monday, August 18, 2008, from 4:30 - 6:30 p.m. in the Pennsylvania Convention Center, Room 113AB.

The following NSF staff members will be available to meet with you at the Town Hall:

Wilfredo Colon
Katharine Covert
Luis Echegoyen
Jennifer Grasswick
Janice Hicks
George Kenyon
Tingyu Li
Luigi Marzilli
Carlos Murillo
Zeev Rosenzweig
C. Renee Wilkerson

The 2008 Town Hall meeting will provide an opportunity for interaction with NSF Division of Chemistry staff to discuss information and perspectives on developments in the Chemistry Community and at NSF. Post-docs, graduate students, and undergraduate students are especially invited to attend and learn about various NSF programs and funding opportunities that may be of interest to them. A brief presentation by Dr. Luis Echegoyen, Director of the Division of Chemistry, will offer highlights and updates of recent NSF Chemistry activities, including an update on the Division of Chemistry's Strategic Directions. We look forward to meeting with you in Philadelphia!



Click on image for larger version.



Letter from the Division Director

Dear Colleague,

It has been a pleasure to serve as Division Director for the Division of Chemistry during the past two years. It has been challenging and rewarding and I look forward to continuing my service throughout the next year, which will be the final year of my 3-year term. I am happy to report that during my tenure the Division has charted several new courses and has engaged in several exciting projects full of new ideas and directions. I would like to take this opportunity to share with you some of the latest developments in the Division, some good and some not so good.

As some of you may remember, the Division received the highest percent increase (10.2 %) in the President's request to Congress for FY 2008, the largest of all divisions in the Directorate for Mathematical and Physical Sciences (MPS). Disappointingly, only a slight budget increase (1.5 %) was realized, so this has been a rather difficult year. The President requested a 26% increase for CHE (~\$50M) for FY 2009. It is impossible to know what the final budget appropriation will be for FY 2009 and all we can do is hope that Congress and the new President are sensitive to the importance of basic science to the future of the country.

The Division remains committed to investing in chemical discovery, while advancing chemistry education, and contributing to America's competitive edge in chemical research. Under my directorship, four significant workshops and one summit meeting were supported to discuss and consider matters involving intellectual frontiers, workforce development, and innovation: i) "Enhancing Innovation and Competitiveness

through Investments in Fundamental Research", December 3-5, 2006, ii) "Complexity and Emergent Phenomena in Chemistry", May 14-15, 2007, iii) "Building Electronic Function in Molecular Architectures", June 7-8, 2007, iv) "Workshop on Excellence Empowered by a Diverse Academic Workforce: Achieving Racial & Ethnic Equity in Chemistry", September 24-26, 2007, and v) "Intellectual Property Issues Affecting Industry-University Partnerships", April 3-4, 2008, held as a follow-up to the aforementioned December 2006 Innovation Workshop. Workshops on global warming, cyber-enabled instruments, and instrument development are planned for mid-2008.

I am also very excited to share some of the developments in our programmatic and organizational activities. The Division expanded its international collaborations by including the United Kingdom (Engineering and Physical Sciences Research Council, EPSRC) and China (National Natural Science Foundation, NSFC) in the 2008 solicitation, "International Collaboration in Chemistry between US Investigators and their Counterparts in Germany, United Kingdom, and China." Such international partnerships serve to advance the chemical research enterprise by establishing new collaborations with a high level of synergy. The program also encourages meaningful participation of graduate students, postdoctoral research associates and junior investigators in the proposed international research collaborations as it seeks to develop a diverse, globally-engaged, U.S. science and engineering workforce. The Division continues its strong support for the Research Experiences for Undergraduates (REU) program, particularly by supporting international REU (iREU) grants. This summer, 60 US students participated in iREU experiences in Thailand, China, Brazil, Chile, France, Austria, Germany, Italy and the UK. Future budgets permitting, we hope to provide more REU opportunities for chemistry undergraduates. In August 2008, I will represent the Foundation in an international task force, coordinated by the International Union of Pure and Applied Chemistry (IUPAC), involving 20 countries to find mechanisms to fund international collaborative ventures in chemistry as part of our strategy to be proactive in the direction of global engagement. A recent Memorandum of Understanding between the National Science Foundation

and the United States Agency for International Development will also provide opportunities to support collaborative activities between higher education institutions, researchers and faculty in developing countries and the United States. The National Science Board publication "International Science and Engineering Partnerships: A Priority for U.S. Foreign Policy and Our Nation's Innovation Enterprise" provides further perspectives on the U.S. Government's role in international science and engineering policy and dynamics (<http://www.nsf.gov/nsb/publications/2008/nsb084.pdf>).

Within the framework of the Foundation's Strategic Outcome Goal of Stewardship, which seeks to support excellence in science research and education through a capable and responsive organization, the Division implemented several changes. Dr. Wilfredo Colon joined the Division of Chemistry and the Division of Molecular and Cellular Biosciences in the Directorate for Biological Sciences as a shared program officer in January 2008. Aims of this unique arrangement are to streamline and better facilitate co-review of the increasingly large number of interdisciplinary proposals, particularly those that straddle the biological/chemical interface. Early indications suggest that Dr. Colon's position has served the community very well and we believe the situation will continue to improve. I hope to be able to repeat this model with other divisions within NSF with whom we have extensive contacts, such as DMR and CBET, in order to better serve the growing communities at these interfaces.

The Division is well known for its emphasis on Diversity issues within the NSF. Chemistry became the first division within NSF to have its own Foundation-approved broadening participation plan. The "Plan for Broadening Participation in Chemistry" summarizes the Division's aspirations for broadening participation among panelists, merit reviewers, workshop participants, staff, and Committees of Visitors. With regard to staff, the Division was able to increase the number of permanent program officers from five to eight with plans of hiring one more in the near future. This increase in permanent staff illustrates our commitment not only to respond to the Community's concerns regarding institutional memory, succession planning, effective program management, and workload distribution, but also to attracting dedicated scientists with the expertise, experience, and reputation to act as stewards of our research and education programs.

Finally, I'd like to point out that our future and ongoing activities all fit under the umbrella of the Division's "U.S. National Science Foundation Division of Chemistry Strategic Directions 2008-2012" that was recently unveiled to the Community. Our stated mission is to support innovative research in chemical sciences, integrated with education, through strategic investment in developing a globally engaged U.S. chemistry workforce reflecting the diversity of America.

I look forward to continuing to lead those efforts.

Sincerely,

Luis Echegoyen

Reminder of NSF-NIST Supplement Opportunity

The Division would like to remind Principal Investigators of the NSF-NIST Interaction in Chemistry, Materials Research, Molecular Biosciences, Bioengineering, and Chemical Engineering supplement opportunity as described in the publication at <http://www.nsf.gov/pubs/2003/nsf03568/nsf03568.htm>.

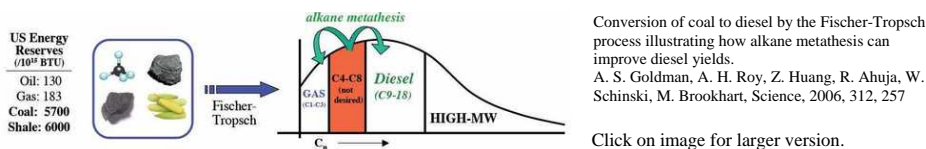
This cross-cutting Foundation-wide program is intended to facilitate interactions between faculty and students supported by the National Science Foundation (NSF) and scientists at the National Institute of Standards and Technology's (NIST) Chemical Science and Technology Laboratory (CSTL) and Materials Science and Engineering Laboratory (MSEL), including the NIST Center for Neutron Research (NCNR). Chemistry, materials research, molecular biology, bioengineering, and chemical engineering are centralized at NIST in these laboratories. Support may be requested for supplements to existing NSF awards to provide the opportunity for faculty and students to participate in research at NIST facilities. Investigators should contact their NSF program officer for additional information or refer to the program announcement.

Highlight Spotlight

The Division of Chemistry's highest priority is to provide support for research and education activities in the chemical sciences. We request "highlights" from our grantees to help us communicate the excitement, importance, and value of achievements derived from NSF-supported projects. Highlights are essential to advancing the Division's mission in several ways, including justifying our budget request at the Directorate, Foundation, and Federal levels. We would like to recognize Chemistry-supported work that was recently highlighted in NSF Budget requests to Congress.

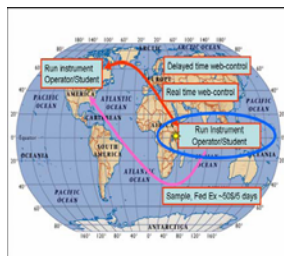
The President's Fiscal Year 2008 Budget Request to Congress for NSF

"Center for the Activation and Transformation of Strong Bonds (CATSB)", a Phase I Center award to the University of Washington (PI Karen Goldberg) was featured in the Fiscal Year 2008 NSF Budget Request section. This Phase I award eventually became a Phase II Center, "Center for Enabling New Technologies through Catalysis", to work on the development of efficient, inexpensive and environmentally friendly methods of synthesizing organic materials by way of activation of strong bonds. (CHE-0434568)



The *Centers for Chemical Innovation (CCI) Program* is designed to support the formation of centers that can address major, long-term basic chemical research problems that have a high probability of both producing transformative research and leading to innovation. Appropriate research problems are high-risk but potentially high-impact and will attract broad scientific and public interest.

"Chemical Discovery Across Continents", a Discovery Corps Senior Fellowship grant to Loyola University Chicago (PI Alanah Fitch) was also highlighted in the FY 2008 NSF Budget Request to Congress. The project established ties between students in East Africa and the Greater Chicago area, allowing them to carry out joint environmental analyses using instruments shared over the Internet. (CHE-0412187)



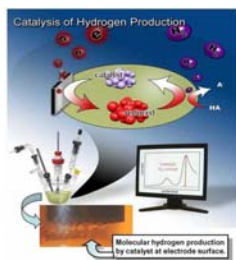
A collaboratory between the University of Dar Es Salaam, Tanzania, Egerton University and Kenya Methodist University of Kenya has been established with Loyola University Chicago. Credit: Alana Fitch, Loyola University Chicago

Click on image for larger version.

The *Discovery Corps Fellowship Program* is a program seeking new postdoctoral and professional development models that combine research expertise with professional service. Discovery Corps Fellows leverage their research expertise through projects that address areas of national need.

The President's Fiscal Year 2009 Budget Request to Congress for NSF

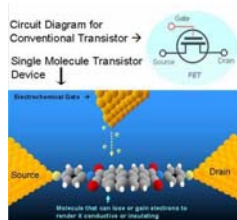
"Finding Efficient Catalysts for Generating Hydrogen as an Alternative Fuel", a Collaborative Research in Chemistry grant to a NSF Chemistry-supported team at the University of Arizona (PI Richard Glass) synthesized a new class of compounds that can catalytically produce hydrogen from acetic acid with very small over-potentials. The research can lead to more efficient hydrogen production and to new technologies needed for sustainable energy supplies. (CHE-0527003)



The rate of hydrogen production by these new catalysts is fast. As soon as the acetic acid diffuses to the electrode surface the catalyst converts it to hydrogen and bubbles can be seen at the electrode. Credit: Suzy Hunter, Greg A.N. Felton, Richard S. Glass, Dennis H. Evans, and Dennis L. Lichtenberger.

Click on image for larger version.

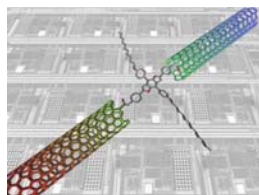
"Single Molecule Transistors" was highlighted in the FY 2009 NSF budget request to illustrate how researchers at Arizona State University (PI Nongjian Tao) can wire a single molecule to electrodes in order to directly measure electron transport through the molecules. Results offer an unprecedented opportunity to understand how charges transfer through molecules – a phenomenon that plays vital roles in many chemical and biological processes. It is also a basic requirement toward the goal of building an electronic device using single molecules.
(CHE-0554786)



Single molecule transistor system under development at Arizona State University. The top of the figure shows the schematic concept. Credit: Nongjian Tao, Arizona State University.

Click on image for larger version.

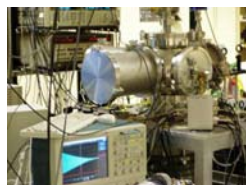
"How to Solder an Individual Molecule to an Electrode," discussed how a multidisciplinary team from the Columbia Center for Electronic Transport in Molecular Nanostructures (PI James Yardley) developed a new method to wire molecules directly into nanometer-scale gaps in conducting single-walled carbon nanotubes. This research will spur rapid progress in the drive towards molecular level electronics.
(CHE-0117752)



A nanotube electrode developed for directly measuring the conductance of single molecules. Credit: Image created by Dr. Colin Nuckolls, graduate student Jinyao Tang, and Dr. Shalom Wind of the Columbia Nanocenter. Funding provided by NSF and the New York State Office of Science, Technology, and Academic Research.

Click on image for larger version.

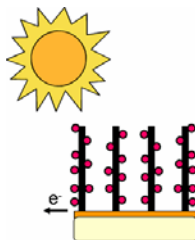
"Mission Impossible: An innovative microwave spectrometer for real life chemical detection" was highlighted to report on a technique to identify chemical agents. This Chemistry-supported Major Research Instrumentation (MRI) grant to a University of Virginia team (PI Brooks Pate) has dramatically reduced the time required for study of chemical structure in the gas phase, thus improving a variety of analytical chemistry applications, such as breath analysis and detection of chemical warfare agents.
(CHE-0215957)



Picture of the 11 GHz broadband Fourier transform microwave spectrometer (FTMW). Credit: Photograph by Gordon G. Brown, Department of Chemistry, University of Virginia

Click on image for larger version.

"Carbon Nanofiber Forests for Energy Conversion and Storage" was highlighted as a component of the National Nanotechnology Initiative. The highlight is focused on Chemistry-supported research at the University of Wisconsin-Madison that seeks to develop new energy-related chemistry technologies based on vertically aligned carbon nanofibers (PI Robert Hamers).
(CHE-0613010)



Schematic of vertically aligned carbon nanofiber (VACNF)-based solar energy conversion system. The VACNF forest collects sunlight and generates electricity (sunlight => electricity). Alternatively, the forest can generate hydrogen fuel (sunlight + water => hydrogen gas + oxygen gas).

Click on image for larger version.

Personnel Changes and Availability of Positions within the Division of Chemistry

The Division would like to wish Celeste Rohlring farewell as she departs the Division of Chemistry after 10 years of exemplary service. Dr. Rohlring recently joined the Directorate for Mathematical and Physical Sciences (MPS) as the Head of the Office of Multidisciplinary Activities (OMA). The Division of Chemistry looks forward to working with Celeste in her new position and wishes her continued success.

The Division welcomes the distinguished scientists who will be joining CHE soon. Dr. Tanja Pietrass, a Professor of Chemistry at the New Mexico Institute of Mining and Technology will join the Experimental Physical Chemistry Program; Dr. Evelyn Goldfield, Professor of Chemistry at Wayne State University will join the Theoretical and Computational Chemistry Program.

A complete listing of current staff is available at: http://www.nsf.gov/staff/staff_list.jsp?org=CHE&from_org=CHE.

The Division of Chemistry asks you to consider serving as a Program Officer should your circumstances permit it, and to help us identify other individuals who might serve in this capacity. Program Officers (PO's) are responsible for planning, coordinating, and managing programs that support research, education, and human resource development in the chemical sciences. They serve the community, help to shape the field of chemistry, and have excellent opportunities for professional development, particularly in program management. A little more than half of the Chemistry Division's 19 Program Officers serve in

short-term appointments ("rotational positions") to bring fresh insights to the Division of Chemistry's work at NSF. The positions are typically held for one or two years, but other arrangements are possible. Program Officers can maintain their research programs while working at the Foundation; the position oftentimes leads to establishment of new research directions. NSF provides time, travel resources, and use of technology to enable Program Officers to stay in touch with co-workers at their home institutions.

Applicants interested in rotational positions should send an email describing their interest and CV to the Chemistry Division Director, Luis Echegoyen, at echegoyen@nsf.gov. Applicants should have a Ph.D. or equivalent training in the chemical sciences, extensive knowledge of one or more chemistry subfields, and at least six years of successful independent research activity. Applicants should be familiar with the chemistry community and have administrative experience. Other important attributes are strong verbal and written communication skills, organizational skills, facility in using technology tools, and the ability to work effectively on a team. For additional information on NSF's rotational programs, please see "Rotational Programs for Scientists, Engineers and Educators" on the NSF website at http://www.nsf.gov/about/career_opps/.

Funding for Collaborative Research Projects

By Katharine Covert

Since 2001, NSF Chemistry has supported small groups of investigators through the Collaborative Research in Chemistry Program (CRC). This program was established to encourage the chemistry community to develop collaborations directed at more complex projects requiring lead personnel of differing expertise. The program had a special competition and limited funding. The program was successful in its goals and is now being mainstreamed back to the programs handling unsolicited proposals.

Collaborative research projects will be considered in the disciplinary research programs*. The existing CRC awards have been reassigned to a new program manager in a disciplinary research program and will be supported and managed by that program. We do not expect to offer CRC competitions after FY2008.

NSF Chemistry has carefully considered its review and funding allocation mechanisms to ensure that we can manage a fair and thorough review process of these larger and more complex proposals. We expect that many of these collaborative awards will be interdisciplinary and therefore will require reviewers from many different communities.

We expect that these collaborative projects will require more resources than awards to one PI, and have developed a plan that will let us consider these different size awards fairly.

If you are interested in submitting a proposal for a collaborative research project, we encourage you to contact a program officer in your area. You can get their contact information from the Chemistry webpage: <http://www.nsf.gov/chem>. Proposals are welcome during the submission windows in July and November, with bio-related proposals preferred in July and materials-related proposals preferred in November.

*Disciplinary Research Programs

Analytical and Surface Chemistry, Inorganic, Bioinorganic and Organometallic Chemistry, Organic and Macromolecular Chemistry, Physical Chemistry

Dear Colleague Letter regarding Collaborative Research

<http://www.nsf.gov/pubs/2008/nsf08052/nsf08052.jsp>

Proposal Submission Window

http://www.nsf.gov/mps/che/c_window.jsp

Reminder to Notify NSF of Major Publications or Announcements of a Significant Finding from NSF-Funded Research

The Division is focused on raising awareness of the outcomes of our funding, especially research results that have an obvious and direct impact on important societal problems and opportunities. We are particularly interested in better publicizing the results of Chemistry-supported projects. To help us in this endeavor, please be reminded that if you are publishing a paper with science news of interest to the public, planning a news release that involves work supported by NSF, or making a major presentation of your research, please notify your Program Officer and your institution's Public Information Officer well in advance of the event for possible inclusion as an NSF press release. If a journal has embargo policies related to publicity on forthcoming articles, we will work with all participants involved to ensure compliance with journal policies.

Check out these recent NSF Chemistry news updates at <http://www.nsf.gov/publications/index.jsp?org=CHE>:

- Experts to Discuss Recycling Carbon Dioxide, July 2008*
- A New Way to Think About Earth's First Cells, June 2008*
- A Model Photochemical Compass for Bird Navigation, April 2008*
- Lithium and Beryllium No Longer "Lack Chemistry", January 2008*
- Molecular Walker Takes Baby Steps, January 2008*

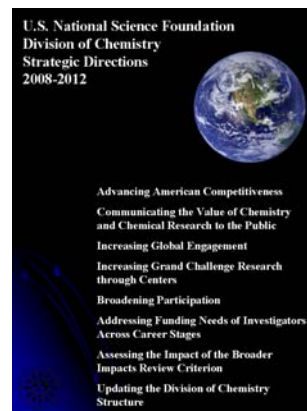
Additional information regarding public affairs support is available by contacting the Chemistry Media Specialist, Jennifer Grasswick (jgrasswi@nsf.gov) or by visiting http://www.nsf.gov/news/newsmedia/special_notice_pio.jsp.

NSF Division of Chemistry Strategic Directions 2008-2012

With a focus on continuous improvement and producing world class science and accompanying workforce, the Division of Chemistry identified strategic directions for its programs and other activities for 2008-2012. A draft of the Division's strategic directions document was presented (http://www.nsf.gov/mps/che/CHE_StrategicDirections.pdf) to the Chemistry Community through the NSF Chemistry website and at the spring 2008 town hall meeting held at the American Chemical Society meeting in New Orleans, Louisiana. An open comment period ensued and resulted in considerable input from various chemistry stakeholders including senior investigators to junior professors, company presidents, and not-for-profit educational organizations. Implementation of several objectives is well underway.

Some highlights of recent activities are:

- ◆ *The American Competitiveness in Chemistry-Fellowship solicitation was issued in 2008 as a post-doctoral fellowship opportunity that seeks to build ties between academic, industrial, and/or national laboratory, and/or Chemistry Division-funded center researchers, and as a vehicle for broadening participation in chemistry.*
- ◆ *A Division of Chemistry-sponsored summit on intellectual property was held in April 2008 where stakeholders from academia, government, and industry met with the aim of producing model intellectual property agreements and guidance for how to facilitate negotiations.*
- ◆ *Chemistry Science Assistant, Jennifer Grasswick has devoted 20 % of her time to serve as a liaison between the Division and the NSF Office of Legislative and Public Affairs (OLPA). An increase in news releases from Chemistry-sponsored research has been observed through coordinated efforts with Principal Investigators and their Public Information Offices with Chemistry staff and OLPA.*



Click on image for larger version.

- ◆ *The Division released a 'Best Practices for Writing and Formatting Highlights' document to guide Chemistry Principal Investigators (PIs) in preparing highlights. <http://www.nsf.gov/mps/che/nuggets/highlight-writing.pdf>*
- ◆ *The International Collaboration in Chemistry Program (formerly "Cooperative Activities in Chemistry Between U.S. and German Investigators") was expanded to include China (National Natural Science Foundation of China, NSFC) and the United Kingdom (Engineering and Physical Sciences Research Council, EPSRC) along with Germany (Deutsche Forschungsgemeinschaft, DFG) to enhance opportunities for collaborative activities between U.S. and foreign investigators.*
- ◆ *In partnership with the Directorate for Education and Human Resources, a pilot study was started to assess Broader Impacts activities in Chemistry-sponsored activities.*
- ◆ *Dr. Wilfredo (Freddy) Colon joined NSF in January 2008 as a shared program officer between the Divisions of Chemistry (CHE) and Molecular & Cellular Biosciences (MCB) to address proposals whose science is at the interface of chemistry and biology.*
- ◆ *Some Division of Chemistry Programs piloted the use of "Program Officer Comments" in Spring 2008 to provide timely and useful written feedback to PIs when their proposals are declined.*

For additional information on Division of Chemistry activities, please visit the Division of Chemistry 2008 Update page at http://www.nsf.gov/mps/advisory/cov_update.jsp.

List of Recent and Upcoming NSF Sponsored Workshops

Reversing Global Warming: Chemical Recycling and Utilization of CO₂, July 2008, sponsored by the NSF Division of Chemistry

Cyber Enabling Instrumentation in Chemistry Workshop, July 2008, sponsored by the NSF Division of Chemistry

Workshop on Instrument Development: Tools for the New Millennium, June 2008, sponsored by the NSF Division of Chemistry and NIH National Institute of General Medical Science

NSF Workshop on Knowledge Management & Visualization Tools in Support of Discovery, March and April 2008, sponsored by the Division of Information & Intelligent Systems
<http://vw.slis.indiana.edu/cdi2008/home.html>

2007 NSF Polymers Workshop, Interdisciplinary Globally-Leading Polymer Science & Engineering, August 2007, sponsored by the Division of Materials Research
<http://people.ccmr.cornell.edu/~cober/NSFPolymerWorkshop/index.html>

What Do You Think?

If you have an idea for a newsletter article, send it to:
chemplans@nsf.gov

Request for Qualified Reviewers

The Division of Chemistry seeks to enhance its pool of qualified reviewers of proposals. We invite researchers in the chemical sciences who have not previously reviewed for the Division of Chemistry but are interested in providing this service to contact us by visiting our website at http://www.nsf.gov/mps/che/reviewer/reviewer_info.jsp and completing the online registration form. Be sure to indicate that you are "willing to travel," if you are interested in serving as a panelist.

We welcome qualified reviewers from academic, industrial, and government employment, as well as from other countries. It is important to recognize that the NSF reserves the right to choose reviewers. While we are unable to assure individuals that they will be asked to review proposals, we do attempt to call upon as many qualified reviewers as possible, and we try to limit the number of requests that we make to any single individual, recognizing the many demands on our reviewers' time.

NSF Custom News Service

In order to receive NSF program announcements, vacancy announcements, newsletters or other information as soon as they are published, you can subscribe to a new email alert service called "National Science Foundation Update." National Science Foundation Update also includes subscription options for content categories, such as Images and Videos, Events, and Upcoming Due Dates for Funding Opportunities. For additional information, please visit the National Science Foundation Update page at https://service.govdelivery.com/service/multi_subscribe.html?code=USNSF&custom_id=823.

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