NSF Restructures MRSEC Program

www.mrsec.org

In direct response to the ever-changing landscape of materials science research and to recommendations from a study conducted by the National Research Council, the National Science Foundation (NSF) Division of Materials Research (DMR) has restructured its Materials Research Science and Engineering Center (MRSEC) program. Changes reflected in a June 2010 solicitation include the support of single interdisciplinary research teams that do not have the educational and industrial requirements of a center, the addition of an international component to traditional center requirements, and a call for more targeted efforts in integrating research with education and broadening participation.

The restructuring divides the MRSEC program into two parts: Materials Interdisciplinary Research Teams and Centers of Excellence for Materials Research and Innovation. With this split, the DMR aims to balance the benefits of interdisciplinary materials research teams focused on specific topics or scientific challenges with the breadth of activities undertaken by materials research centers.

"The goal of the restructuring is to broaden participation, to boost international collaboration, and to encourage high-risk, high-payoff and transformative interdisciplinary materials research, thus increasing opportunities for collaborative research and education," according to Zakya Kafafi, director of the DMR.

To this aim, the new program eliminates centers composed of a single interdisciplinary research group (IRG) and creates Materials Interdisciplinary Research Teams (MIRTs). MIRTs will focus on research topics, like the single IRG centers did, and will be reviewed exactly the same way as the IRGs within centers. However, in contrast with the previous approach, they will have fewer facilities management and outreach requirements. In creating MIRTs, DMR hopes to attract new participants, broaden participation, and increase diversity. The DMR also anticipates that reducing the requirements will enable the program to better integrate research with education and will give the teams an opportunity to focus on more high-risk, high-payoff and potentially transformative research.

The Centers of Excellence for Materials Research and Innovation (CEMRIs) in many ways will closely resemble the former centers (MRSECs) and will consist of two to five IRGs. They will continue to encompass the broader overarching objectives of a materials research and education center, which include integrating research with education, facilities management, educational and industrial activities, and connecting, perhaps through a cyberinfrastructure, to other teams, centers, and facilities managed by DMR.

In the restructured program, centers will be strongly encouraged to focus their educational efforts on a limited number of projects that take into account each center's overarching research goal, demonstrated impact, and the needs of its local community. Traditional MRSECs had a broad portfolio of education and outreach activities that in some cases resulted in resources being spread too thin for meaningful assessment and impact. This change is meant to emphasize the importance of impact and dispel the perception that mere quantity and innovation of programs are the most important factors.

Centers are also expected to contribute to a national network of materials research facilities, taking additional responsibility for the health and wealth of the U.S. materials research infrastructure through developing shared facilities. The facilities will be accessible to the centers, universities, and other institutions including programs managed by DMR, such as the Partnership in Research and Education for Materials (PREM) and Materials Interdisciplinary Research Teams.

The new solicitation makes international collaboration a formal requirement for centers, instead of being optional, as it was previously. "Science doesn't know any boundaries," said Kafafi. "This added component further enhances the division's superior international activities and aligns with the President's call for research that goes beyond the limits of national boundaries."

Many of these changes were initiated by a National Academy of Sciences National Research Council report, *NSF's MRSEC Program: Looking Back, Moving Forward*, whose findings were published in 2007. The report assessed the performance and impact of the MRSEC program over its 23-year history and gave recommendations on future directions and new roles. The MRSEC Impact Assessment Committee, which authored the report, included members from industry, national laboratories, and academic institutions (with and without MRSECs).

The report concluded that MRSECs were highly valued and had many achievements. Yet, the success of the program was threatened, because increases in resources were not keeping pace with increases in requirements. The NRC report reads, "This committee endorses the concepts embedded in the current MRSEC program, but it encourages a significant realignment of budget, program structure, and management oversight to ensure optimum effectiveness of the NSF group research program in the face of limited resources."

Since the establishment of the DMR in 1972, its support for materials research laboratories and groups have evolved with the field to meet emerging materials research needs and challenges. This

German-Israeli Exchange Program Continues Call for Proposals in Water Technology Research

www.most.gov.il

In order to encourage young scientists to engage in the Water Technology Research Program in the framework of the German-Israeli Cooperation agreement, the Federal Ministry of Education and Research in Germany and the Ministry of Science and Technology in Israel have initiated a young scientists exchange program and are currently accepting applications.

The program is open to Israeli and German graduate students, post-graduate students, doctoral candidates, and postdoctoral candidates who want to spend a training period in Israel or Germany for up to six months, but not less than one month. Funding will be provided to cover all necessary expenses of the applicant's visit abroad.

For more information and applications, contact (*Germany*): Hans Joachim Metzger, Forschungszentrum Karlsruhe GmbH, Project Agency for Water Technology and Waste Management for BMBF and BMWA (PTWT+E), P.O. Box 3640, 76021 Karlsruhe, Germany, tel. 49-7247-822355, fax 49-7247-827553, and e-mail hans-joachim.metzger@ptwte.fzk.de; or (*Israel*): Nurit Topaz, Director, Scientific Relations with Germany and Working Programs, Ministry of Science and Technology, P.O.Box 49100, Jerusalem 91490, Israel, tel. 972-2-5411157; fax 972-2-5825725; and e-mail nurit@most.gov.il.

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restructuring of the MRSEC program attempts to further improve the effectiveness, innovation, and creativity of NSF's materials research and education efforts.

The changes to the MRSEC program are outlined in solicitation NSF 10-568, posted on June 2, 2010. Preliminary proposals for CEMRIs are due on September 1, 2010, and preliminary proposals for MIRTs are due on September 3, 2010. Researchers interested in this opportunity should visit Web site, www.mrsec.org.

KENDRA REDMOND

U.S. House of Representatives Passes COMPETES Bill

http://science.house.gov

The House of Representatives passed H.R. 5116, *America COMPETES Reauthorization Act of 2010*, on May 28, by a vote of 262 to 150. The bill makes investments in science, innovation, and education.

To maintain a pipeline of ideas, the bill puts basic research programs on a path to doubling authorized funding levels over 10 years at the Department of Energy Office of Science, the National Science Foundation, and the National Institute of Standards and Technology.

The bill will help foster innovation in new energy technologies by reauthorizing the Advanced Research Projects Agency, which is pursing high-risk, high-reward energy technology development; and authorizing Energy Innovation Hubs, which are multidisciplinary collaborations with a single technological focus that currently presents a critical barrier to achieving national energy innovation goals.

The bill will also help ensure U.S. leadership in emerging and growing fields, including nanotechnology and information technology.

The bill supports local efforts to form Regional Innovation Clusters, which will strengthen regional economies and advance the work done in a given field by leveraging collaboration and communication between businesses and other entities.

The bill addresses immediate needs by creating Innovative Technology Federal Loan Guarantees to help small- and medium-sized manufacturers access capital to make necessary updates to increase efficiency and stay competitive.

The bill will also assist industry by ensuring that the Manufacturing Extension Partnership program at the National Institute of Standards and Technology (NIST) better reflects the needs and challenges facing manufacturers. In addition, the bill reorganizes NIST laboratories to reflect the multidisciplinary nature of technology and better meet the needs of industry in the 21st century.

The bill also will help improve science, technology, engineering, and math (STEM) education by reauthorizing the Noyce scholarships, which help give K–12 teachers a strong grounding in their fields, so they can more fully engage students. The bill also addresses coordination of STEM activities across the federal government, and improves STEM education at the undergraduate, graduate, and postdoctoral levels.

Committee chair Bart Gordon (D-Tenn.) said, "During committee consideration of this bill, we made some significant changes to the bill's authorization levels—cutting them by over 10 percent. Though we will maintain a doubling path for our research accounts, we do so on a slightly less aggressive trajectory."

International Energy Agency Launches Solar Energy Roadmaps

www.iea.org/papers/2010/pv_roadmap.pdf
www.iea.org/papers/2010/csp_roadmap.pdf

Solar electricity could represent up to 20–25% of global electricity production by 2050. This finding emerges from two new analyses by the International Energy Agency (IEA): the solar Photovoltaic (PV) and Concentrating Solar Power (CSP) roadmaps, launched on May 11 in Valencia, Spain, during the Mediterranean Solar Plan Conference hosted by the Spanish presidency of the European Union (EU).

"It is particularly appropriate to present the two solar roadmaps in Valencia today, given that Spain has taken a leading role globally in promoting solar power and other forms of renewable energy," said IEA Executive Director Nobuo Tanaka. "The combination of solar photovoltaics and concentrating solar power offers considerable prospects for enhancing energy security while reducing energy-related CO_2 emissions by almost six billion tonnes per year by 2050."

The roadmaps detail the technology milestones that would make this possible, highlighting that the two technologies will deploy in different yet complementary ways: PV mostly for on-grid distributed generation in many regions and CSP largely providing dispatchable electricity at utility scale from regions with brightest sun and clearest skies. PV also helps provide energy access off grid in rural areas. Together, PV and CSP could generate 9,000 TWh of power in 2050.

"This decade is crucial for effective policies to enable the development of solar electricity," Tanaka said. "Long-term oriented, predictable solar-specific incentives are needed to sustain early deployment and bring both technologies to competitiveness in the most suitable locations and times." These incentives will need to evolve over time to foster innovation and technology improvements. To support cost reductions and longer term breakthroughs, governments also need to ensure long-term funding for additional research, development, and demonstration efforts, according to the IEA.

With effective policies in place, PV on residential and commercial buildings will achieve grid parity—that is, with electricity grid retail prices—by 2020 in many regions, according to the IEA. PV will become competitive at utility-scale in the sunniest regions by 2030 and provide 5% of global electricity. As PV matures into a mainstream technology, grid integration and management and energy storage become key issues. The PV industry, grid operators, and utilities will need to develop new technologies and strategies to integrate large amounts of PV into flexible, efficient, and smart grids. By 2050, PV could provide more than 11% of global electricity, according to the IEA.

The IEA expects CSP to become competitive for peak and mid-peak loads by 2020 in the sunniest places if appropriate policies are adopted. Its further expansion will depend on the development of dedicated transport lines that will bring CSP electricity to a greater number of large consumption centers. Some of them will have to be developed within large countries such as China, India, and the United States. Others will cross borders, and many will be needed to link the southern and northern shores of the Mediterranean Sea. With respect to thermal storage, CSP can produce electricity around the clock and will become competitive with base load power by 2025 to 2030. North America will be the largest producer of CSP electricity, followed by North Africa and India. North Africa would most likely export about half its production to Europe, the second largest consumer. The overall contribution of CSP could—like that of PV—represent 11% or more of the global electricity demand by 2050.

Tanaka said that "solar PV and CSP appear to be complementary more than competing. The firm capacity and flexibility of CSP plants will help grid operators integrate larger amounts of variable renewable electricity such as solar PV and wind power. PV will expand under a broader range of climate conditions and bring clean renewable electricity directly to end-users." □