NSF's Future Investment Priorities Bode Well for Materials Research

The National Science Foundation's strategic plan for the next five years shows a slight shift in priorities from previous plans, in a direction that aligns well with current materials research priorities. The plan, "Investing in America's Future," was strongly influenced by the National Science Board's "2020 Vision for the National Science Foundation" and recent reports such as "Rising above the Gathering Storm."

The National Science Board's new vision for NSF is to drive the cutting edge of fundamental and transformative research; tap the talents of all citizens; develop and test new approaches to teaching science; provide the tools and instruments needed for discovery; and be an effective agent for excellence in learning, discovery, and innovation.

NSF's goals for FY 2006–2011, highlighted in "Investing in America's Future," were motivated by this new vision and include investing in *discovery, learning, research infrastructure,* and *excellence in stewardship*. The report states, "The strategic goals in this plan look toward and beyond today's horizons. They provide an overarching framework for progress in fundamental research and education that leaves ample room to experiment and adapt to changing circumstances."

NSF aims to foster discovery and transformative research across the full spectrum of the agency's research investments. Some of the areas that will be given investment priority in 2006–2011 are cross-disciplinary research, ethics, and safety research on new applications of technology; research that is likely to increase U.S. economic competitiveness; and projects that focus on sustainability issues.

Another key element of NSF's vision and plan is cultivating an educated, diverse science and engineering workforce and a more scientifically literate public. Additional emphasis will be placed on programs involving partnerships with federal and state agencies as well as academia and industry, advancing education and learning research, increasing informal education, and improving science and technology education for K–12 and undergraduate students.

One of the primary ways that NSF plans to foster discovery and learning is through investing in research infrastructure, in particular, advanced instrumentation, facilities, cyberinfrastructure, and experimental tools. This includes 2006–2011 investment priorities such as raising the limits on instrument funding opportunities, supporting the next generation of large research facilities, and encouraging the development of innovative partnerships.

NSF also identified an inward-focused goal of being a capable and responsible organization that supports excellence in science and engineering. Twelve areas of strategic focus are highlighted in the plan, including objectives such as modeling science ethics, increasing the participation of underrepresented groups in NSF activities, and improving the selection process for reviewers and panelists.

Although these are general investment priorities, their ties to materials research are clear, according to Lance Haworth, acting director of NSF's Division of Materials Research. The report specifically highlights the Materials World Network, a global collaboration between researchers and educators working to accelerate materials discovery and design and nanoscience as exciting examples of what happens when these priorities are supported.

Further materials connections are reflected in basic research related to communications and computers, essential for increasing economic competitiveness; biotechnology, a cross-disciplinary field with ties to ethics and safety; and the development of alternative energy sources, a major factor in ensuring the sustainability of life on earth. Although it remains to be seen if the new plan will increase the budget for materials research projects, "We make a strong case for it," said Haworth.

These goals looks slightly different from NSF's previous strategic goals of investing in people (in order to create a diverse, competitive, and globally engaged workforce), investing in ideas (to push the boundaries in science and engineering), investing in tools (to advance research and learning), and investing in organizational excellence; however, its commitment to strengthening the U.S. science and technology program remains the same.

The first three goals—investing in discovery, learning, and research infrastructure—directly align with the National Science Board's "2020 Vision for the National Science Foundation," released in December 2005. The National Science Board converged on the new vision in response to Congress's request during the Senate budget hearings in February 2005 for a bold new vision for NSF. Their report is available online at www.nsf.gov/pubs/2006/nsb05142/nsb05142.pdf.

These goals also strongly support the recommendations of the "Rising above the Gathering Storm" report, which cited concerns about the United States' ability to maintain competitiveness and standard of living in an increasingly global environment. In addition, the goals are attuned to President Bush's American Competitiveness Initiative, which aims to double the federal commitment to basic science research over the next 10 years.

"Investing in America's Future" can be accessed from the NSF Web site at www.nsf.gov/pubs/2006/nsf0648/nsf0648.jsp.

KENDRA RAND

Wind Energy Research Top Priority for EU's New Technology Platform

The European Technology Platform for Wind Energy (TPWind) was officially launched recently, raising the profile of European research in the field of renewable energy sources. At the launch conference in Brussels, public officials and industry players alike affirmed the leading role research and development (R&D) will take during the first stages in the development of the platform.

TPWind is designed to be the central forum for both policy debate on wind energy as well as what lies in store for wind energy research. It will also serve as a hub of international cooperation to aid those member states less active in wind research.

Wind energy technology is the leading source of renewable energy in Europe, and if properly funded, is expected to produce 23% of the European Union's electricity needs by 2030. TPWind is designed to help the EU achieve this goal by, among other things, developing a col-

UK Plans National Nuclear Laboratory

The future of the nuclear clean-up and research arms of British Nuclear Fuels (BNFL) were outlined by the government last October as it approved plans to break up and sell off British Nuclear Group, as recommended by the boards of BNFL and the Nuclear Decommissioning Authority. The ministers further announced their intention to establish a new National Nuclear Laboratory. The laboratory will play a central part in safeguarding the necessary skills for the U.K.'s civil nuclear industry.

Alistair Darling, secretary of state for trade and industry, said, "We have looked at how to best safeguard the UK's key nuclear R&D [research and development] skills and capabilities to ensure that our future requirements are met."

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laborative strategy for innovative technology R&D.

The main focus of the platform will be to reduce the overall costs of wind energy production through coordinated R&D. According to the International Energy Association (IEA), approximately 40% of wind energy cost reductions can be achieved through R&D activities.

Progress toward such goals is already underway through UpWind, the EU-funded, five-year, €22 million project. The project, funded from the Sixth Framework Programme, aims to develop and identify improved components for wind turbines. The components are designed to handle future large-scale energy production, such as through the use of offshore wind farms. They will have the capacity to generate up to several hundred megawatts of power. If successful, the project, which began in March last year, will raise the bar of wind energy production capabilities in Europe.

UpWind will focus on design tools for turbine components and will address the aerodynamic, aeroelastic, structural, and material design of rotors. UpWind brings together advanced European specialists headed by Risø National Laboratory in Denmark. In addition to Risø, the consortium includes members from the Netherlands, Greece, Germany, Spain, the United Kingdom, Finland, Belgium, Poland, the Czech Republic, and Sweden.

South Africa to Support Research Putting Biodiesel Waste to Agricultural Use

The beneficiation of biodiesel by-products, and possible economic spin-offs for rural agricultural communities, will receive a boost with South Africa's Department of Science and Technology (DST) providing financial support to the Council for Scientific and Industrial Research (CSIR) to conduct research in this area.

A DST-driven committee on biodiesel had identified the need to ensure that the contribution of by-products to the economic viability of biodiesel is maintained and improved. The committee then tasked the CSIR, in collaboration with the Agricultural Research Council (ARC), to prepare a research plan and proposal on value addition to the by-products of biodiesel production. This links well with related investigations by researchers from the CSIR and the ARC.

The main objective of the research is to improve the nutritional value of oil cake, a biodiesel by-product, thereby increasing its use in animal feed, specifically pig and poultry diets and fish food. Animal feed trials and related research will be done in collaboration with the ARC. Research will also be conducted into the possible future use of oil cake beyond animal feed. Another objective is to increase the economic viability of biodiesel and create manufacturing industries in semi-urban and rural areas.

"Research on value addition to the soybean oil cake will require investigations into other areas, such as the dehulling process, the type of oil production, variability in raw materials, and selection and type of oilseed," said Gatsha Mazithulela, executive director of CSIR Biosciences. During the research project, soybeans and sunflower seeds will be the two main crops used for biodiesel production. Information on these two readily available crops is extensive and the use of the oil cake by-products is established in the animal-feed market. "The project will draw on the expertise of food scientists, fermentation specialists, process chemists, and biotechnologists of the CSIR," said Mazithulela.

The project has been established against the background of the "White Paper on Energy Policy" with regard to the supply and consumption of energy in South Africa for the next decade. The policy recognizes that South Africa has not paid enough attention to the development and implementation of renewable energy applications. Government policy on renewable energy is concerned with the challenges of economically feasible technologies and applications, the level of national resources invested in renewable technologies, and constraints on the development of the renewable energy industry.

Renewable energy technologies are expensive due to high capital costs, compared with those of conventional technologies, for bulk energy supply to urban areas or major industries. Implementation of these technologies therefore requires significant initial investment and may need support for long periods before reaching profitability.

The potential of biofuels to contribute to rural development is recognized in the Integrated Rural Development Strategy, which aims to ensure that rural areas attain the internal capacity for integrated and sustainable development by 2010. The energy sector can provide an opportunity to create an economic base through agricultural and home-based industries and small-, micro-, and medium-sized enterprises in order to grow the income-generating potential of communities. This can include biodiesel processing or industries created to add value to the process by-products.

China's National Key Project on Lubricative and Antiwear Materials Officially Launched

The commencement of a national key basic research project on lubricative and antiwear materials (LAMs) was officially announced by the Ministry of Science and Technology of China in October of last year.

Headed by the Chinese Academy of Science's Lanzhou Institute of Chemical Physics (LICP), the project, under the title "Basic Researches on Lubricative and Antiwear Materials under Harsh Environment," was co-initiated by nine research bodies including CAS-LICP, Tsinghua University, the Harbin Institute of Technology, and the Wuhan Research Institute of Materials Protection.

Liu Weimin, researcher and vice director of the State Key Laboratory of Solid Lubrication at LICP, was appointed chief scientist of the project.

The studies will mainly involve the composition, structure, and performance variation of LAMs and their novel principles and technologies as well as function design and performance control. The results are expected to provide fundamental theories and techniques for LAM application under harsh environments such as super-microvacuum; radiation; alternating temperature; and high-current, high-field, high-speed, or heavy-burden circumstances.

Altogether, 65 projects were officially started during the project implementation conference for the first batch of projects (2006–2007) listed in China's 973 Plan representing ongoing national keystone basic research programs. □

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