NSF Notes

Two Minority Research Centers of Excellence Receive Grants

The National Science Foundation has established two new Minority Research Centers of Excellence through grants of up to $5 million over five years. The centers will be located at Clark Atlanta University in Georgia and at Hampton University in Virginia.

Clark Atlanta University's Center for Theoretical Studies of Physical Systems will focus on research problems in chemistry, mathematics, and physics. The center will expand research capabilities in atomic and molecular theory, quantum physics, and mathematical physics and applied mathematics.

Hampton University's Center for Nuclear and High Energy Physics will conduct research in theoretical and experimental areas. The theoretical component will accelerate work on interactions between atomic nuclei. The experimental component will expand work on designing and fabricating new generations of particle detectors.

The primary goals of Minority Research Centers of Excellence are to conduct competitive research and strengthen graduate programs in science and engineering. The centers also have outreach components to increase the participation of minority faculty and students.

The first two Centers were established in 1987, and the six existing centers are at Alabama A&M University, City College of New York, Howard University, Heharry Medical College, University of Puerto Rico, and University of Texas at El Paso.

Plasma Processing Technology is Critical to Implementing Key MS&E Study Recommendations, Says NRC Panel

Plasma processing of materials is a technology critical to implementing some of the key recommendations of the National Research Council's MS&E study, *Materials Science and Engineering for the 1990s,* concludes a report by an NRC Panel on Plasma Processing of Materials. In fact, the panel recommends viewing its report within the context set by the MS&E study because "most if not all of the recommendations and findings in that report also apply here." Plasma processing of materials is also critical to enhancing the health of the technologies identified in the *Report of the National Critical Technologies Panel,* says the panel.

Plasma processing of materials is a broad field encompassing numerous technologies and industries in the world—the aerospace, automotive, steel, biomedical, and toxic waste management industries, but foremost is the electronics industry. To focus its research, the panel concentrated on the electronics industry, and the report devotes an entire chapter to plasma processes in fabricating microelectronic circuits. The report does identify key science issues and research

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needs in plasma physics and chemistry at surfaces, and it presents the panel's recommendations regarding research funding, educational issues, and cooperation among universities, industry, and the national laboratories.

Despite the importance of plasma technology and the development of "an impressive arsenal of both experimental and numerical tools, significant gaps in understanding and lack of instrumentation limit progress," says the report. The panel also finds that the demand for technology development is outstripping understanding of many low-energy plasma processes.

"Research resources in low-energy plasma science in the United States are eroding at an alarming rate," says the report. U.S. scientists trained in this area in the 1950s and early 1960s are retiring or are moving to other areas of science for which support is more forthcoming.

Current funding is also uncoordinated, says the report. No central agency monitors federal funding, and the panel found that at least 14 federal divisions or offices invest about $17 million in plasma process science and technology. Industry contributes about $3 million per year, but this total excludes proprietary research by chip manufacturers and plasma equipment vendors. The report describes funding and coordination efforts in Japan and France.

Compared to Japan and France, the U.S. educational infrastructure in plasma processing also lacks focus, coordination, and funding, says the panel. Graduate programs are not offering adequate educational opportunities, and the most serious need in undergraduate education is adequate, modern teaching laboratories. The panel recommends that government and industry together support cooperative programs specific to plasma processing with universities and national laboratories.

In its consideration of science issues, the panel recommends computer-aided design and modeling over empirical development. Three areas need concerted, coordinated experimental and theoretical research, says the report: surface processes, plasma generation and transport, and plasma-surface interactions.

Developing a coordinated national focus to target research, technology development, policy issues, funding, and education will not be easy, says the panel, but its main recommendation is "that plasma processing be identified as a component program of the Federal Initiative on advanced materials synthesis and processing that currently is being developed by the Office of Science and Tehnology Policy."

The panel's 75-page report, *Plasma Processing of Materials: Scientific Opportunities and Technological Challenges,* is available from: National Academy Press, 2101 Constitution Avenue NW, Washington, DC 20418; phone (800) 624-6242 or (202) 334-3313.

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