

**NSF Notes****Funding Announced for 11 Science and Technology Centers**

After an extensive merit review of 323 proposals, a Presidential initiative to bolster U.S. scientific research recently reached a milestone, as the National Science Foundation named 11 Science and Technology Centers (STCs) that it intends to support with up to approximately \$24.7 million during their first year.

The university-based Science and Technology Centers are located in California, Illinois, Michigan, New Jersey, New York, Oklahoma, Texas, and Virginia.

Following guidelines set by the National Academy of Sciences, NSF established the STC Research Program to promote basic research that can most effectively be accomplished through centers—complex research problems that are large scale, of long duration, and that may require special facilities or collaborative relationships.

Applicants were required to shape their proposals around a unifying intellectual theme; to include a strong educational component; to incorporate mechanisms for stimulating the transfer of basic research knowledge to those interested in building upon it; and to establish linkages with government, industry, states, or other institutions. NSF officials hope that linking university researchers with their peers in industry and national labs will contribute to a shorter time span between actual discovery and utilization.

Recommended awards for the first year range from \$900,000 to more than \$4 million. Awards will be negotiated by NSF and host institutions through cooperative agreements. NSF support after the first year of the five-year awards will depend on available funds and on satisfactory progress by each center.

A 23-member multidisciplinary review committee recommended—and the NSF Board approved—programs for the following STCs:

**University of California at Berkeley, Center for Particle Astrophysics—\$1,825,000**

Under the direction of Bernard Sadoulet, the University of California at Berkeley—in collaboration with the University of California at Irvine, the University of California at Santa Barbara, San Francisco State University, Stanford University, and Lawrence Berkeley Laboratory—will establish a center where researchers will search for the essence of the invisible matter which makes up more than 90% of the mass of the universe. This effort will connect particle physics, astrophysics, and cosmology in a

multidisciplinary approach to one of the most fundamental questions in science. Center researchers will devote major efforts to the development of sensitive cryogenic detectors to aid in the search.

**University of California at Santa Barbara, Center for Quantized Electronic Structures—\$2,100,000**

At this center, scientists will explore novel concepts for producing extremely small structures in a new generation of compound semiconductors made from gallium, arsenic, and other materials. These explorations could one day lead to new very high speed integrated circuits and to tiny lasers for use in fiberoptic circuits, but first scientists must reach a basic understanding of how the movement of subatomic particles is controlled in these materials. A multidisciplinary team of researchers with expertise in surface chemistry, materials research, electrical engineering, applied physics, and condensed matter physics will pursue this fundamental research under the direction of James L. Merz.

**California Institute of Technology, Center for the Development of an Integrated Protein and Nucleic Acid Biotechnology—\$3,050,000**

Leroy Hood will direct a cooperative effort by Caltech and Jet Propulsion Laboratory scientists, who will improve upon and integrate the most advanced techniques in genetic engineering, protein chemistry, and data analysis in order to develop new technology to speed research in protein and gene regulation. Their efforts should ultimately open up new possibilities for understanding, diagnosing, and treating diseases at a molecular level. New technology will be in a form that can easily be transferred to biological scientists in academia and industry. Projects include development of a new and more sensitive method for determining how the components of DNA and protein are ordered, and new methods for analysis of biological databases that will allow scientists across the country to compare this sequence data on proteins and genes.

**University of Illinois at Urbana-Champaign, Center for High Temperature Superconductivity—\$4,250,000**

At this center, strong emphasis will be given to understanding the interactions that give rise to high temperature superconductivity. Participating scientists will probe high  $T_c$  superconductors to learn more about their structural and chemical properties, how they conduct, how to

make them, and how to shape them into thin films and other usable forms. Researchers at three NSF-funded materials research laboratories at the University of Illinois, the University of Chicago, and Northwestern University will collaborate with scientists at Argonne National Laboratory. Center funds will more than double existing support for high  $T_c$  superconductivity at the four laboratories. Miles V. Klein will direct the center.

**Michigan State University, Center in Microbial Ecology—\$1,100,000**

Groundwater quality, hazardous waste disposal, plant pest control, recycling of organic material, and the products of biotechnology, fermentation, and other industrial processes may all be improved through basic knowledge to be acquired by researchers studying microbes at the Michigan State Center. Microbiologists, soil scientists, molecular geneticists, chemists, engineers, and mathematicians will work together to better understand the physiology and genetics of microbes, and how they are affected by their surroundings. This work will complement ongoing plans by the U.S. Environmental Protection Agency. The center will be directed by James M. Tiedje.

**Northwestern University, Center for Advanced Cement-Based Materials—\$1,750,000**

Researchers at Northwestern, including Center director Surendra P. Shah, in association with colleagues at the University of Illinois, the University of Michigan, Purdue University, and the National Institute of Standards and Technology, will study properties and processes of cements and will establish comprehensive principles for designing cement-containing materials with improved properties. [See related article in the January 1989 issue of the MRS BULLETIN, p. 14.]

**University of Oklahoma, Center for Analysis and Prediction of Storms—\$900,000**

University of Oklahoma and National Oceanic and Atmospheric Administration scientists will create better mathematical models for predicting tornadoes, flash floods, and severe thunderstorms. Through use of new ground-based radar and advanced parallel-processing supercomputers, modelers hope to develop and test new mathematical techniques to explain phenomena that can give rise to damaging storms. Douglas K. Lilly will direct the center.

**Rice University, Center for Research on Parallel Computation—\$4,100,000**

This center will explore advanced computer networks, parallel programs, and computational mathematics. Another research area will be powerful workstations creating real-time, 3-D graphics to allow researchers to watch movie representations of their work, instead of copious numerical output that is increasingly impossible to interpret. Under the direction of Ken Kennedy of Rice, scientists from California Institute of Technology, Argonne National Laboratory, and Los Alamos National Laboratory will combine expertise in computer architecture, programming systems, computational mathematics, and scientific applications to investigate these problems.

**University of Rochester, Center for Photoinduced Charge**

**Transfer—\$1,650,000**

The University of Rochester, in collaboration with Eastman Kodak Company and Xerox Corporation, will investigate how light drives important chemical reactions, including naturally occurring biological processes such as photosynthesis, as well as photochemical processes that are important in photographic films, copiers, printers, data storage, and photovoltaic energy devices. These reactions all depend on the light-activated transfer of subatomic electrons from atom to atom, a process that might be manipulated to create desirable electronic effects in various states of matter. David G. Whitten will head the center.

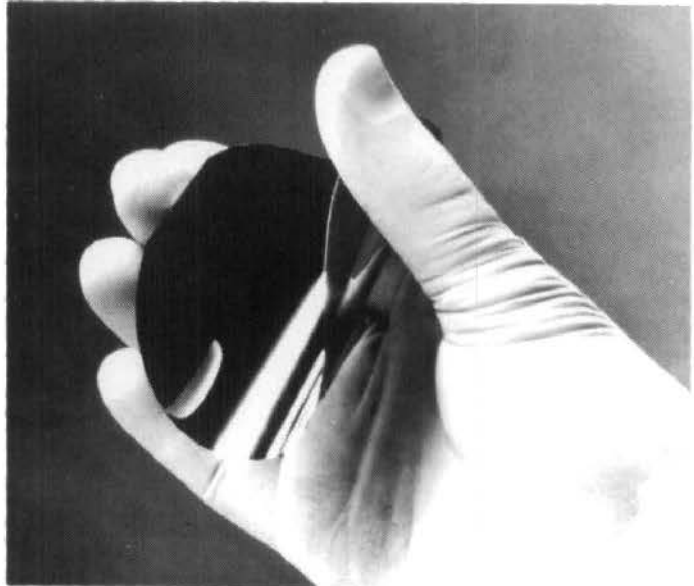
**Rutgers University, Center for Discrete Mathematics and Theoretical Computer Science—\$1,825,000**

Rutgers, in cooperation with Princeton University, AT&T Bell Laboratories, and Bell Communications Research, will establish a center where mathematicians and theoretical computer scientists not only share findings to advance their own disciplines, but ultimately contribute to progress in telecommunications, transportation, and computer design and manufacture. The director will be Daniel Gorenstein.

**Virginia Polytechnic Institute and State University, Center for High-Performance Polymeric Adhesives and Composites—\$2,124,000**

Although high-performance adhesives and composites have been the focus of research in other technologically advanced countries, until now no U.S. university has supported such integrated investigations. These will range from the creation of new materials, to the study of mechanical and molecular behavior on a microscopic level within and between adhesives and com-

# “ULTRA THIN”



**One-mil thick  
silicon wafers!**

**We should say  
one-mil THIN  
wafers!**

**Two-, three- and four-inch diameter  
double-sided polished wafers with:**

- less than 3 microns surface flatness
- less than 2.5 microns taper

**Also available in 1-, 1½-, 2¼-inch diameter  
and other thicknesses. Thickness variation  
on wafer lot can be maintained to  $\pm .0001$ ".**

**VSI makes the most dimensionally stable  
thin wafers. In addition, our throughput  
capabilities exceed 3,000 thin wafers/week.  
All processing, from crystal growth to  
polishing, is done on VSI premises.**

**For your  
thin wafer needs,  
call the leader!**



**VIRGINIA SEMICONDUCTOR, INC.**

1501 Powhatan Street, Fredericksburg, VA 22401

Phone (703) 373-2900

Telex 9102506565 • Fax (703) 371-0371

posite layers, to the measurement and prediction of large-scale mechanical properties. James E. McGrath will direct the center.

## DOE Notes

### SSC Environmental Impact Statement Available

The U.S. Department of Energy has released its final environmental impact statement (EIS) on the proposed Superconducting Super Collider scheduled for construction in Texas.

The statement covers all 13 sites under consideration prior to the final selection of the Texas site in December. It includes a "Comment Response" volume that reproduces both the comments received on the draft EIS and DOE's responses to those comments. The EIS has been revised, where needed, in response to comments. The EIS and three appendices have been reprinted in their entirety, and revision and errata sheets for the remaining 13 appendices have been prepared.

The most notable changes from the draft to the final EIS concern the addition of measures to alleviate projected adverse impacts of construction on air quality and wetlands.

DOE is currently preparing a supplemental EIS to address the impacts of constructing and operating the SSC at the Texas site. The supplemental EIS will be based on more detailed design of the project and will also identify alternatives for mitigating adverse impacts.

To obtain a copy of the final EIS, and for more information about the supplement, contact DOE, Washington, DC 20585; (202) 586-5806.

### Companies Selected for SSC Magnet Program

DOE recently selected 16 industrial participants for Phase I of the Magnet Industrialization Program of the Superconducting Super Collider (SSC). The program will aid in establishing an industrial capability to produce the nearly 10,000 superconducting magnets needed for the SSC.

The first phase of the program—technology orientation—started in January at Brookhaven National Laboratory, Upton, New York; Fermi National Accelerator Laboratory, Batavia, Illinois; and Lawrence Berkeley Laboratory, Berkeley, California. Representatives from each of the selected companies were to observe and discuss superconducting magnet fabrication proc-

esses, specification requirements, quality control, and testing techniques at the laboratories, as well as receive drawings of the magnets.

The Magnet Industrialization Program is being administered by DOE's contractor for the Super Collider R&D program—Universities Research Association, Inc.—through its SSC Central Design Group. The companies selected are:

Alstom (Belfort Cedex, France)  
 Asea Brown Boveri Technology Co. (North Brunswick, New Jersey)  
 Babcock and Wilcox (Lynchburg, Virginia)  
 Elin-Union (Vienna, Austria)  
 Fuji Electric Co., Ltd. (Tokyo, Japan)  
 General Atomics as a team with Kawasaki Heavy Industries, Ltd. (San Diego, California and Tokyo, Japan)  
 General Dynamics—Space Systems Division (San Diego, California)  
 General Electric Co.—Magnet Systems Div. (Florence, South Carolina)  
 General Motors Corp.—Electro-Motive Div. (La Grange, Illinois)  
 Grumman Corp.—Space Systems Div. as a team with Ansaldo (Bethpage, New York, and Genoa, Italy)  
 Hitachi, Ltd. as a team with Mitsubishi Electric (Tokyo, Japan)  
 Interatom as a team with Siemens (Bergisch Gladbach and Mulheim, West Germany)  
 Intermagnetics General Corp. (Guilderland, New York)  
 Kobe Steel, Ltd. (Tokyo, Japan)  
 Noell (Wurzburg, West Germany)  
 Westinghouse Electric Corp. (Orlando, Florida)

DOE is encouraging additional industrial participation in other areas of the project and is planning other orientation programs geared to suppliers of sub-assemblies and components of the SSC.

### SSSC Spring Forum to Focus on MS&E Study

The 1989 Solid State Sciences Committee (SSSC) Spring Forum will be held in the auditorium of the National Academy of Sciences Building, Washington, DC, April 3-4, 1989. This year's forum will be jointly sponsored by SSSC and the National Materials Advisory Board (NMAB).

The program for the forum will focus on major research themes and conclusions from the Materials Science and Engineering (MS&E) Study which is expected to be

available then. The MS&E Study which was jointly sponsored by SSSC and NMAB has been completed by a blue-ribbon committee and panels involving more than 100 materials scientists and engineers from industries, universities, and government laboratories. Co-chairs for the study were Praveen Chaudhari of IBM T.J. Watson Research Laboratory and Merton Flemings of Massachusetts Institute of Technology.

The opening session of the 1989 Spring Forum will feature a keynote address from a leading member of the U.S. Congress involved in legislation affecting science policy and education in the United States. An address from the Science Adviser or a leading adviser on science policy to the newly elected President will follow. An overview of the findings and recommendations of the MS&E Study and reports on the 1989 funding status and plans from the major funding agencies will complete the opening session on the morning of April 3.

The remainder of the Spring Forum program will be devoted to findings and assessments of the MS&E Study. Panel discussions will encourage participation and advice from the audience on how to achieve the goals of the materials science and engineering community.

The forum is open to the public.

For additional information contact:

Bill R. Appleton  
 Chairman-Elect, SSSC  
 Oak Ridge National Laboratory  
 P.O. Box 2008  
 Oak Ridge, Tennessee 37831-6240  
 Telephone (615) 574-4321  
 Fax (615) 576-2912

### Activities and Functions of the SSSC

The Solid State Sciences Committee is a continuing interdisciplinary body with expertise in solid-state physics, solid-state chemistry, electronics, materials, metallurgy, polymers and the basic materials aspects of ceramics. It is a committee of the Board of Physics and Astronomy of the National Research Council, which is the operating arm of the National Academy of Sciences and the National Academy of Engineering. Members of the SSSC are drawn from universities, industry, government, and federal laboratories.

The charge to the committee is twofold: (1) to ascertain the nature of and to make recommendations on materials research, development, and applications opportunities and (2) to provide guidance to federal agencies regarding their materials science and research programs. □