NSF awards $5 million grant to establish Institute for Mechanics and Materials at UCSD

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To foster scientific collaborations in materials science and theoretical mechanics among academic, industrial and governmental researchers, the University of California, San Diego has been awarded a five-year $5 million grant from the National Science Foundation to form an Institute for Mechanics and Materials.

As envisioned, the Institute will serve as a lightning rod for the exploration of novel materials, from their synthesis and processing to computer modeling and the visualization of their microstructural characteristics. It is expected to focus on molecular and microstructural theories and experiments, computational methods, synthesis and processing, structural design, full-scale testing and forecasting needs, economic advantages and purposes of new materials.

"The Institute will not conduct extensive research per se, but will aim to serve as an intellectual forum to catalyze the formation of research groups when new areas or methods of approach are identified," said Richard Skalak, professor of bioengineering at UCSD, and the institute's director.

In recent years, materials science has witnessed a surge of research activity across several technological frontiers, including metals, ceramics, plastics, gels, foams, semiconductors, and magnetic devices, to name a few.

Several key industries already are benefiting from this research, including transportation, communications, electronics and biomedical devices.

"New materials are essential ingredients for progress in every technology, ranging from smart materials for space structures to fusion reactor containment and new biomaterials for implants," said Skalak. "We will aim to contribute to many of these applications and we will focus on practical, industrial problems."

The idea for the Institute came during a workshop in August 1991 sponsored by the Engineering Division, Program for Mechanics and Materials, of the National Science Foundation. A report from that workshop recommended the creation of an organization that would serve as a focus and liaison for a broad spectrum of research and researchers in theoretical mechanics and materials science.

Eleven proposals were received and two were selected for site visits. Based on the proposals and site visits, UCSD was selected as the host site.

Some of the formal activities at the Institute will include:

*Industrial liaison program--when problems are identified, industrial visitors will be invited to UCSD to explore solutions in collaboration with university faculty and scientists;

*Workshops--two or three-day meetings focused on particular research projects and industrial needs;

*Short courses--for topics that merit wider dissemination;

*Advanced education programs--open to doctoral students, post-doctoral fellows, faculty and engineers from industry and the national laboratories;

*Think-tank meetings--to discuss long-term planning and priorities, as well as broad research objectives in mechanics and materials science;

*Outreach program--a continuous program to develop communications among all sectors of applied mechanics and material science communities, including professional societies, national laboratories, and governmental agencies.

As director, Skalak will conduct the day-to-day management of the Institute, to be located in UCSD's Engineering Building. The Institute also will have four associate directors: Sia NematNasser, who is director of the Center of Excellence for Advanced Materials at UCSD; Robert J. Asaro, professor of applied mechanics and materials science; Gilbert A. Hegemier, director of the Charles Lee Powell Structural Systems Laboratory; and Marc A. Meyers, professor of materials science. The director and associate directors form an Executive Committee that represents a wide range of experience and expertise in mechanics and materials.

The Institute will be guided by two advisory committees--a Senior Advisory Committee, composed of senior researchers (many retired) who will advise on short-range and long-term goals and evaluate the Institute's performance; and a Young Investigators Committee, consisting of Presidential Young Investigators, National Science Foundation Young Investigators and Presidential Faculty Fellows.

Aside from the NSF grant, the Institute will be supported with matching funds from UCSD of approximately $250,000 a year. Additional funds are being sought from participating universities, government agencies and industrial affiliates.

Close collaborations also are underway with several local industries and organizations, including McDonnell Douglas' local laboratories; Science Applications International Corp. (SAIC); General Atomics; and the International Thermonuclear Experimental Reactor (ITER), the four-way collaboration between the United States, the European Community, Russia and Japan to design a fusion reactor.

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