

UC SANTA BARBARA

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## **UCLA-UCSB CALIFORNIA NANOSYSTEMS INSTITUTE AWARDED FUNDING TO PURSUE BREAKTHROUGHS IN THE SCIENCE OF THE VERY SMALL**

The California NanoSystems Institute --- a wide-ranging research enterprise poised to make a major impact in areas ranging from information technology and household lighting to medical treatment ---was named today as one of the three research efforts statewide to each receive \$100 million in support to help propel the future of the state's economy.

A joint enterprise of UCLA and UC Santa Barbara, the California NanoSystems Institute was one of three proposals selected for support over the next four years under Gov. Gray Davis's California Institutes for Science and Innovation program.

Scientists worldwide are on the brink of a new revolution at the nanoscale, with breakthroughs occurring at the atomic level. Expected to be a leader in this race, the California nanosystems effort has attracted nearly 30 corporate partners.

The Institute will explore the power and potential of manipulating structures atom-by-atom to engineer new materials, devices and systems that will dramatically

change virtually every aspect of our technology, including medical delivery and health care, information technologies and innovations for the environment.

Smaller, faster and more efficient computers. A lamp that uses one-tenth as much energy as modern light bulbs and yet never burns out. Lighter and stronger building materials that may make cars, buses and other forms of transportation more energy efficient. Medicines that target the molecular errors that cause disease, rather than treating the symptoms of illness. These are some of the goals of the Institute.

Nanosystems is a rapidly evolving area of science and engineering that holds the promise of creating new ways to manufacture products, advance information technology and transform the practice of medicine.

"The California NanoSystems Institute will bring the research communities of UCLA and UC Santa Barbara together with business and industry to create the technologies of California's future," said UCLA Chancellor Albert Carnesale. "Future generations in California and the world will benefit from the discovery and innovation pioneered by this unique enterprise."

"We are deeply grateful to Governor Davis for his wisdom in initiating such a bold and visionary program. We are also indebted to President Atkinson for his leadership and guidance," said UCSB Chancellor Henry T. Yang. "The

Institute will draw on the interdisciplinary strengths of our two campuses, and on our common vision that developments in the science and technology of nanosystems will be the basis for revolutionary advances in fields as diverse as computation, health-care technology, and multimedia art and entertainment. These advances will help fuel our economy and profoundly improve the quality of life in our society over the next decade and beyond."

Martha Krebs, former assistant secretary of energy and former director of the U.S. Department of Energy 's Office of Science, will become the Institute's founding director.

She believes the establishment of the Institute will position California to build on its national leadership in federal research programs.

"The excitement of nanosystems research is that it will capitalize on insights and advances across many disciplines," Krebs said. "The challenge for our Institute is to

create and sustain the many partnerships needed to carry out nanosystems research --- among disciplines, between our two campuses, and with our industry and national laboratory colleagues."

The three California Institutes for Science and Innovation announced by Davis today are expected to produce scientific advances in fields critical to the future of the California economy. They also will play an important role in training a new generation of scientists and engineers, and in stimulating the creation of new businesses and jobs for California.

Each of the institutes selected by Davis is designed to foster discovery in areas in which the complexity of the research agenda requires the advantages of scope, scale, duration, equipment and facilities that a comprehensive center can provide.

Gov. Davis has committed to provide \$25 million in support to each of the three institutes over the next four years, with each institute committed to matching every \$1 in state funds with \$2 raised from other sources.

The California NanoSystems Institute already has agreements with nearly 30 companies that have pledged nearly \$50 million in support for the enterprise, ranging from information technology giants like Hewlett-Packard and Sun Microsystems to smaller specialized biotechnology firms, like Sequenom and Ceres.

"We see in the California NanoSystems Institute a tremendous potential for leveraging academic and industrial expertise to tackle the pressing and broad ranging research challenges posed by nanosystems," said Dick Lampman, vice president of research for the Hewlett-Packard Co. "Indeed, we view the establishment of the California

NanoSystems Institute as an exceptional opportunity to build together the nanoscience and nanotechnology infrastructure in California that will be so important to our future."

The California NanoSystems Institute is based on the idea of exploiting the realm of the very, very small to create new methods to build products and solve problems. NanoSystems is science done at the scale of a nanometer --- one billionth of a meter or about one one-thousandth the thickness of a human hair.

Among the goals of the Institute is to create new materials that may combine unusual properties, such materials that are stronger than steel and yet lighter than plastic. In some cases, researchers are finding ways to combine biological and engineered components to create materials and devices with unique combinations of properties.

"The ability to engineer and control materials at the nanometer scale gives us the opportunity to create entirely new materials with properties that would uniquely suit them for specific applications," said Evelyn Hu, a UC Santa Barbara professor of electrical and computer engineering and materials who is scientific co-director of the Institute. "As nature does, we can optimize the operation and performance of the system by engineering the performance of the nanostructure components, making materials that are more optically efficient, more environmentally friendly, or more durable."

NanoSystems also seeks to create a new way of manufacturing products by mimicking the building processes found in nature.

Since the dawn of the Industrial Age, manufacturing has been based on taking raw materials and shaping them into a product, usually by whittling down a large mass into a smaller, usable one. But nanosystems seeks to replace that process by developing products that are created from the bottom-up, with a molecular-level precision, to achieve materials and devices that have a characteristics well beyond what can be manufactured today.

"Bottom-up or biologically-inspired fabrication is at the heart of nanotechnology," said James Heath, a UCLA chemistry professor who is the Institute's other scientific co-director. "This approach to manufacturing has huge ramifications, and will transform nearly all industries, from high technology to transportation to medicine."

The Institute will be founded on existing strengths at both UCLA and UC Santa Barbara. At UCLA, those strengths include tight scientific links between the schools of medicine and engineering and the College of Letters & Science, and a strong array of core research facilities, ranging from bio-imaging facilities to the new Institute of Pure and Applied Mathematics.

At UCSB, those strengths include world-recognized leadership in the areas of materials research, optoelectronics, and biomimetic and biomolecular materials. Both UCLA and UCSB have extensive and expanding research facilities in the

materials and engineering fields, including a node at UCSB of the National Science Foundation-funded National Nanofabrication Users Network.

With major new buildings on both campuses, the California NanoSystems Institute will be the premier place in the world for academic, industrial, and national lab researchers working on nanosystems.

The research efforts will be complementary, but also collaborative. The centers will be linked by common management, a single graduate student recruiting and education program, and shared user facilities.

For more background see: <http://www.ia.ucsb.edu/pa/0510-cnsi/cnsi.html>.

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## **About UC Santa Barbara**

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.