UCSD News

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UC San Diego and Los Alamos National Laboratory Establish Engineering Institute

LOS ALAMOS, NM, May 19, 2005 -- The University of California, San Diego and Los Alamos National Laboratory have forged a partnership for education, research and technology advancement that builds on a research-focused education initiative with the UCSD Jacobs School of Engineering. Los Alamos and UCSD today dedicated facilities at the Los Alamos Research Park for the Engineering Institute.

"This partnership strengthens our comprehensive approach to recruiting, training, retention and research in an effort to better meet future engineering needs relevant to the Lab's mission of enhancing global security," said Chuck Farrar, director of the Engineering Institute at Los Alamos.

Los Alamos may hire several hundred engineers over the next five years, and the Engineering Institute will help fill the need for a well-trained workforce. Through the partnership, UCSD faculty and students and Los Alamos scientists will address critical infrastructure management issues in the civil and defense sectors, such as stewardship of the U.S. nuclear weapons stockpile and maintenance of bridges, aircraft and ships, and manufacturing facilities.

Los Alamos is establishing additional partners within the UC system. Following the UCSD model, each Institute would focus on research areas and educational disciplines of strong interest to the Lab. Los Alamos recently announced a similar partnership to form an advanced studies institute with three New Mexico universities.

"We see this collaboration as a model for how UCSD can work with our University of California colleagues to expand the national presence and service of the university," said UCSD Chancellor Marye Anne Fox. "UCSD depends on partners like Los Alamos to ensure the relevance of our education and research by focusing on real-world needs and challenges."

"This project is another example of the rich interactions between the campuses and national laboratories of the UC system," said University of California Regent Peter Preuss. "The research and education to be conducted through this new initiative will be an important addition to the long list of accomplishments of Los Alamos National Laboratory and the University of California System."

Education

An ongoing focus of the collaboration is graduate-level engineering education offered by the UCSD Jacobs School and co-located at Los Alamos. Classes are delivered at both Los Alamos and UCSD via a two-way Internet link, and Los Alamos senior scientists serve as adjunct professors in the program. Courses focus on technologies to detect damage and predict the remaining useful life of engineered systems. In the master's program, students will complete a capstone design project proposed by Los Alamos or an industry partner. In the doctoral program, students participate in UCSD-Los Alamos collaborative research projects.

Eight engineering doctoral candidates at UCSD have received Los Alamos fellowships and 13 Los Alamos employees have concurrently enrolled in UCSD classes being offered between San Diego and the Los Alamos Research Park. At steady state, as many as 30 students a year may enroll in the multidisciplinary graduate program. Since 2003, the education program has received $1.3 million from the Weapons Engineering and Manufacturing Directorate at Los Alamos for fellowships, laboratory equipment, and distance-education facilities.

"This research-based education program in the emerging field of structural health monitoring and directed toward the needs of Los Alamos is the first of its kind," said Frieder Seible, dean of the Jacobs School. "The program leverages UCSD's strengths in large-scale structural testing, high performance computing and simulation, and sensor and sensor networks with Los Alamos' expertise in damage prognosis, modeling and characterization."

The Engineering Institute also encompasses a spectrum of educational opportunities. UCSD structural engineering faculty teach in the Dynamics Summer School at Los Alamos, an eight-week program for outstanding college students. By integrating the Dynamic Summer School with the Engineering Institute, Los Alamos hopes to recruit talented engineering students early, and provide opportunities for them to remain connected to the lab throughout their academic careers.

In addition, the Jacobs School's von Liebig Center for Entrepreneurism and Technology Advancement (von Liebig Center) and the California Institute for Telecommunications and Information Technology (a joint research center of UCSD and UC Irvine), will begin offering seminars and continuing education opportunities this summer at Los Alamos.

Research and Technology Advancement

The Engineering Institute provides a framework for Los Alamos scientists and UCSD faculty and students to collaborate in dual-use non-classified research. For example, Los Alamos scientists and UCSD structural engineers are developing a diagnostic system to monitor the structural integrity of composite-to-steel connections for next-generation Navy destroyers. The system employs novel vibration analysis algorithms and fiber-optic sensor networks. Such automated analysis tools will be critical as the Navy makes a transition from strictly scheduled maintenance routines to more cost-effective condition-based maintenance. The work also has applications for newly planned ships made with hybrid materials. Other projects focus on detecting damage in the composite wings of the Predator unmanned combat aerial vehicle; remote inspection of bolted joints using sensors and RF ID tags; and adaptation of shake table techniques for more accurate shock and vibration testing of critical defense and civilian structural components.

The collaboration also pools Los Alamos and UCSD resources for commercialization. One such opportunity is the Center for Commercialization of Advanced Technologies, a federally-funded San Diego program operated in partnership with the UCSD Jacobs School. CCAT provides business advisory services and gap funding to fast track promising inventions toward commercial and government marketplaces. Technologies jointly invented by UCSD faculty and Los Alamos employees are also eligible for seed funding and advisory services offered by the Jacobs School's von Liebig Center. The partnership with UCSD opens the door to collaborations with the Jacobs School's Corporate Affiliates Program membership which includes many of San Diego's defense industry contractors.