THE FOURTEENTH LOS ALAMOS DYNAMIC SUMMER SCHOOL

At Los Alamos National Laboratory, Los Alamos, New Mexico

June 10th through August 9th, 2013

(Late arriving students on quarter system will be accommodated)

We are currently soliciting applicants for the fourteenth Los Alamos Dynamic Summer School. The purpose of this summer school is to focus a select group of prospective upper level undergraduate students and first year graduate students on the multi-disciplinary field of cyber-physical dynamic systems. Cyber-physical systems (CPS) are defined by the National Science Foundation as "engineered systems that are built from and depend upon the synergy of computational and physical components." The summer school has two focus areas. First, the multi-disciplinary nature of research in cyber-physical systems will be emphasized throughout the summer school. The students will be assigned to multi-disciplinary teams where they will work with a mentor on a research topic that has both an analytical and experimental component. Second, efforts will be made to develop the students' written and oral communication skills. More information regarding the Summer School can be found at: **http://institute.lanl.gov/ei/dynamics-summer-school/.**

Students: The program is designed for 15 upper division (Junior or Senior) undergraduate students or first year graduate students. Attempts will be made to identify high quality students from diverse backgrounds, including academic and institutional diversity, as well as human diversity. Acceptance into the program will be based on academic record and letters of recommendation. As a general guideline, students should have sufficient academic achievement that they are, or will be, eligible for graduate school. A variety of academic disciplines are being sought, including computer science, aerospace/mechanical/electrical engineering, and mathematics/statistics. **In lieu of salaries, the students will be provided with a fellowship that is intended to also cover relocation and housing expenses. Fellowship amounts range from $7000 to $10,500, depending on academic standing (i.e. junior, senior, 1st yr. grad) and the point of origin for the student's travel to LANL.** We will work with students to find housing after they have been accepted into the program. **This program is limited to US Citizens.**

Tutorials: Students will participate in weekly tutorials on various aspects of cyber-physical systems, such as signal processing, dynamic systems, system identification, embedded systems, model validation, nonlinear systems, and machine learning. To reinforce these tutorials, all students will design, build, test, and apply cyber-physical systems to pertinent research questions.

Projects: The students will be placed into 3-person multi-disciplinary teams and assigned a research activity that can be completed in an intense 9-week time frame. The goal is for the students to produce results and document their activities in a manner suitable for reporting at professional conferences. The 2013 Summer School students will present their research results at an international conference.

Mentors: Each research group will have a LANL staff member acting as a mentor for their project. Visiting lecturers will give talks on current research related to cyber-physical dynamic systems.

How to Apply: Students should email Jutta Kayser (jkayser@lanl.gov), mail, or FAX (505-663-5225):
1) 1-page cover letter describing their interest in this summer school, multi-disciplinary cyber-physical dynamic systems research, as well as their near term (1-3 year) academic and professional goals; **2) resume**; **3) official transcripts** (a copy is fine for application purposes, but the original will be needed prior to the start of the summer school; **and 4)** at least **one letter of recommendation** to:

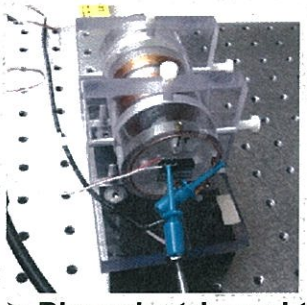
Jutta Kayser, Engineering Institute, MS T001
Los Alamos National Laboratory
Los Alamos, NM 87545

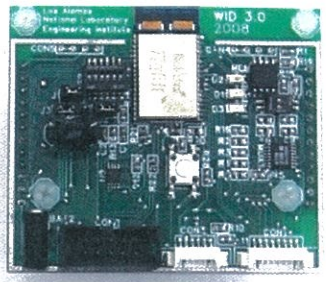
Applications must be received by January 14th, 2013. Acceptance notifications will be sent by February 1, 2013. Questions about the Summer School can be sent to Chuck Farrar (farrar@lanl.gov), or David Mascarenas (mascarenas@lanl.gov), or visit the "FAQ" and "advice from former students" portion of the summer school web page http://institute.lanl.gov/ei/dynamics-summer-school/.

Los Alamos Dynamics Summer School

Typical Projects

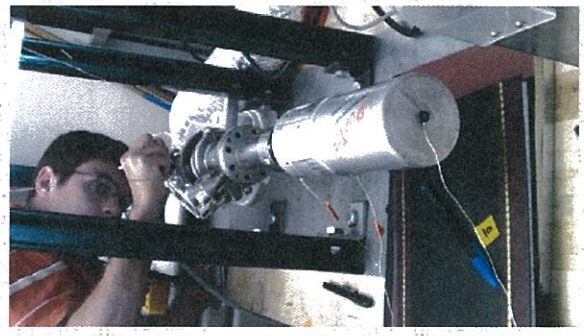
Energy Harvesting for Wireless Sensing





- Piezoelectric and thermoelectric materials convert ambient energy into useful electricity.
- Energy harvesting devices will lead to completely self-contained sensor systems

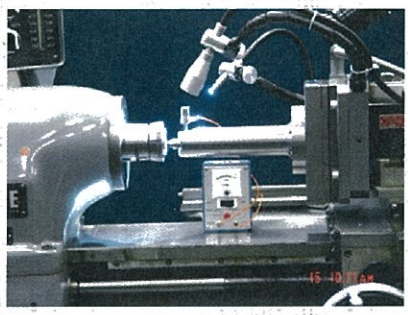
Sensor Nodes for Nonproliferation

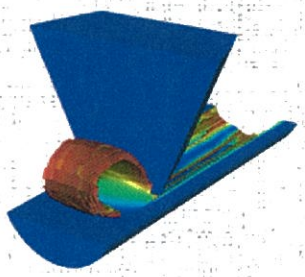


Applying adaptive signal processing to enable remotely deployed nuclear detectors for non-proliferation applications.

Manufacturing Process Monitoring

- Monitor product quality in real-time
- Model and control process physics





Sensory Substitution

Vibro-haptic human-machine interface utilizing principles of sensory substitution.

Lecture Topics

- *Sensor networks*
- *Controls/Dynamic Systems*
- *Probability and Statistics*
- *Signal Processing*
- *Embedded Systems*
- *System Identification*
- *Detection Theory / Machine Learning*
- *Model Validation and Verification*

About Los Alamos and LANL

- *18,000 population*
- *7,300 ft elevation*
- *Lots of outdoor activities*
- *35 miles from Santa Fe*
- *LANL employs ~ 10,000 (> 1,000 summer students)*

Los Alamos

UCSD Jacobs School of Engineering