

# THE ELEVENTH LOS ALAMOS DYNAMICS SUMMER SCHOOL

At Los Alamos National Laboratory, Los Alamos, New Mexico

June 7<sup>th</sup> through August 6<sup>th</sup>, 2010

We are currently soliciting applicants for the eleventh Los Alamos Dynamics 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 broad fields of engineering dynamics. The summer school has two focus areas. First, the multi-disciplinary nature of research in engineering dynamics will be emphasized throughout the summer school. To this end, the students will be assigned to 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 communications skills. The students will be required to document their progress and make several oral presentations during the course of the summer. 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 aerospace, civil, mechanical, and electrical engineering, computer science, and mathematics/statistics and disciplines related to nondestructive evaluation. **Salaries will range from approximately \$15-20/hr** depending on academic standing. **A relocation allowance is also provided for travel to and from Los Alamos.** We will work with students to find housing after they have been accepted into the program. More information about LANL's student programs can be found at <http://www.lanl.gov/education>. **This program is limited to US citizens.**

**Tutorials:** Students will participate in weekly tutorials on various aspects of engineering dynamics such as signal processing, experimental modal analysis, computational structural dynamics, controls, wave propagations, nonlinear dynamics, and model validation and verification. To reinforce these tutorials, all students will perform an analytical and experimental modal analysis of a structure.

**Projects:** The students will be placed into 3 person teams and will be 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 conferences. The 2010 Summer School students will present their research results during the February 2011 International Modal Analysis Conference in Florida.

**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 in engineering dynamics and structural diagnostics.

**Field Trips:** In addition to guest lectures, the students will participate in a field trip during the program.

**How to Apply:** Students should email ([womack@lanl.gov](mailto:womack@lanl.gov)), mail, or FAX (505-663-5225) 1.) A **1-page cover letter** describing your interest in this summer school as well as your 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:

**Kathie Womack**

**MS T001**

**Los Alamos National Laboratory**

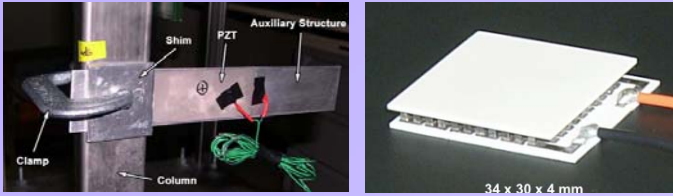
**Los Alamos, NM 87545**

Applications must be received by **Jan 15<sup>th</sup>, 2010**. Acceptance notifications will be sent by **Feb 5<sup>th</sup>**

Questions about the Summer School can be sent to **Chuck Farrar** ([farrar@lanl.gov](mailto:farrar@lanl.gov)), **Matt Bement** ([bement@lanl.gov](mailto:bement@lanl.gov)), or **Gyuhae Park** ([gpark@lanl.gov](mailto:gpark@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/>.

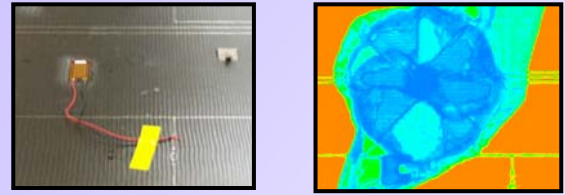
# Los Alamos Dynamics Summer School

## Energy Harvesting



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

## Ultrasonic Imaging



- Non-destructive detection of cracks, voids and delamination in metals and composite materials
- Commonly used to validate damage propagation for structural health monitoring research

## Typical Projects

### Manufacturing Process Monitoring

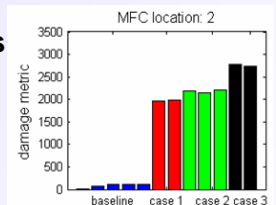


- Monitor product quality in real-time
- Model and control process physics

### Damage Detection in Pipelines

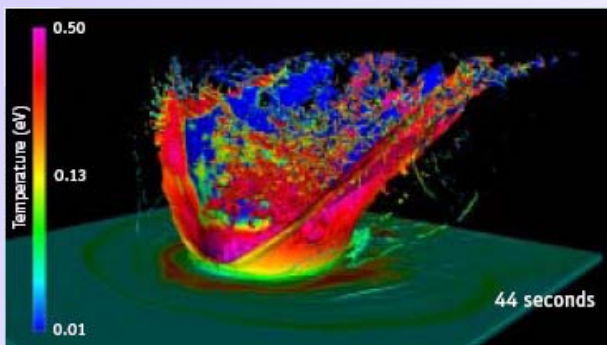


- Impedance measurements
- Lamb wave propagations
- Advanced signal processing



## Lecture Topics

- *Data Acquisition (Labview, etc.)*
- *Controls*
- *Vibrations*
- *Nonlinear dynamics*
- *Applying to Grad School*
- *Satellite design*
- *Asteroid impact*



## 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)*



- What?- 9 week program in the general area of dynamics (rigid body, to vibrations, to wave propagation)
  - 1/3 time in tutorials/guest lectures (including a very popular one on applying to grad school) (no homework!)
  - 2/3 time on a project
  - Write up results and present them at IMAC in Feb, 2011 in Jacksonville (LANL has paid travel in the past)
  - Pays generally between \$15-20/hr, 40 hours/week for 9 weeks.
- Who? High quality upper level US citizen undergraduates (typical GPAs range between 3.3-4.0)
- When? – June 7 – August 6, 2010
- Where? – Los Alamos, NM
- Why? – Recruiting. Goal is to expose top quality US citizens to stuff they typically will not get at the undergrad level, and encourage them to go to grad school.
  - Hired 10 students from past summer schools.
  - LANL is funding graduate school for another 10.
- How? – Apply by Jan. 15
  - Cover letter
  - Resume
  - Transcripts
  - Letter of recommendation