

Applicants Sought for Research Experiences for Undergraduates Paid Summer Internship: Cornell University & University at Buffalo

Application Deadline: April 8, 2011

Research Experiences for Undergraduates (REU) Program

The 9-week-long REU program offers two undergraduate students (one at Cornell University and the other at the University at Buffalo) a unique research opportunity and lab experience.

Project

NEESR-CR: Earthquake Response and Rehabilitation of Critical Lifelines

Principal Investigator

Tom O'Rourke, Cornell University

Co-Principal Investigator

Andre Filiatrault, University at Buffalo

Project Description

This research will transform the seismic mitigation of lifelines by 1) qualifying in situ lining technology to retrofit existing underground infrastructure, 2) developing fundamental understanding and analytical capabilities for the in situ reinforcement of lifelines, 3) combining full-scale experimental validation and computational simulation in design and construction guidelines, 4) developing undergraduate classroom projects related to seismic vulnerability and design of lifelines, and 5) delivering short courses for industry and students, with web-based lectures, seminars, and notes. The research will correct a critical deficiency in current practice, namely the lack of verification of in situ pipe lining technologies for seismic retrofitting.

Stipend

Each participant will receive a stipend of \$4,800 plus additional travel funds.

REU Mentors

The REU student will be integrated into the project research team and will participate in all related activities.

Eligibility

- U.S. citizen or permanent resident (NSF regulation)
- Junior or senior undergraduate (for upcoming Fall 2011) in good academic standing



How to Apply

1. Complete an [application form](#)
2. Provide an unofficial **transcript** from your college/university
3. Provide **two letters of recommendation** from faculty and their contact information
4. Submit a brief **personal statement** about your interest in the REU project (500 words or less)
5. Indicate your **site preference** (Cornell or UB)

Important Dates:

Application deadline: April 8, 2011

REU selection: April 18, 2011

REU program: June 6 – August 5, 2011

Email Completed Application & Materials to:

Sofia Tangalos, MCEER

Email: tangalos@buffalo.edu, Phone: 716-645-1157

Cornell University

The research at Cornell will be performed through physical modeling at the **NEES@Cornell** NEES @ Cornell Large-Scale Lifelines Testing Facility, in combination with advanced computational simulation to characterize the behavior of underground lined piping systems. Large-scale testing will involve the development of pipeline instrumentation methods, pipeline assembly approaches, data acquisition methods, soil placement, and overall procedures within the laboratory.

Cornell REU student will contribute to the following:

- Assist the research staff with soil placement and measurements of soil properties.
- Calibrate instrumentation and develop procedures for placing sensors on and around buried piping.
- Assist in the development of data measurement systems and interpretation of test data.
- Assist in the development of numerical simulations to characterize pipeline behavior under large ground displacements.
- Assess modern methods of pipeline rehabilitation, i.e., in situ lining technologies, that are used world-wide for pipeline repair and strengthening.

Preferred Background

Basic mechanics and practical engineering skills



Cornell University



University at Buffalo
The State University of New York



University at Buffalo

The UB project involves a three-year experimental and analytical investigation of critical lifelines to quantify their earthquake response and qualify in situ lining technologies with the objective of mitigating the seismic risk of underground lifelines. Full-scale pipeline experiments are planned in each of the three years, employing the NEES @ UB Large-Scale Real Time Dynamic Testing Facility, twin re-locatable shake tables. Dynamic tests employing the coupled tables will be utilized to simulate the differential uniaxial and rotational motions of piping sections and joints. The project also makes use of UB NEES DAQ hardware and software systems, a suite of instrumentation to capture the force-deformation and movements of the test pipes including: displacement and velocity transducers, accelerometers, strain gages, load cells, still and video cameras and the UB-NEES KRYPTON system, and staff for instrumentation, hardware assembly and IT tasks.



UB REU student will contribute to the following:

- Design of the test set-up and specimen instruments
- Material testing
- Preliminary analysis

Preferred Background

Structural Analysis coursework, software skills such as SAP and/or MATLAB and practical engineering skills



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