

EARTHQUAKE ENGINEERING
RESEARCH INSTITUTE
NEWSLETTER

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NEWS OF THE INSTITUTE

**Clinton Carlson Awarded
EERI/FEMA NEHRP Graduate Fellowship**

CLINTON CARLSON, a Ph.D. candidate in Civil Engineering (Geotechnical Engineering) at the University of Michigan, Ann Arbor, has been selected as the 2013-2014 EERI/FEMA NEHRP Graduate Fellow in Earthquake Hazard Reduction. EERI awards this fellowship each year in a cooperative program with the Federal Emergency Management Agency's National Earthquake Hazards Reduction Program. The award is given to foster the participation of capable individuals in furthering the goals and practice of earthquake hazard mitigation. The fellowship provides \$12,000 for a nine-month stipend and \$8,000 for tuition, fees, and research expenses.



*NEHRP Graduate Fellow
Clinton Carlson*

Carlson was selected from a group of highly qualified applicants studying anthropology, architectural engineering, civil engineering, earthquake engineering, environmental engineering, structural engineering, and structural mechanics at universities in California, Colorado, Delaware,

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10NCEE: Conference Updates



Tenth U.S. National Conference
on Earthquake Engineering (10NCEE)
"Frontiers of Earthquake Engineering"
Anchorage, Alaska, July 21-25, 2014

Provisional Acceptance of Papers

Authors will receive email notification of provisional acceptance of their 10NCEE abstracts by **August 15, 2013**. Format requirements for submission of full papers will accompany the notification. For more information about the 10NCEE paper submittal process, visit the conference website at <http://10ncee.org/>.

10NCEE Sponsors



COMPUTERS AND STRUCTURES, INC. (CSI) is a Sponsor of 10NCEE. CSI is a pioneering leader in software tools for structural and earthquake engineering, backed by more than three decades of research and development.

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ANNOUNCEMENT

Edwards Wins ASCE Duke Lifeline Earthquake Engineering Award

CURTIS L. EDWARDS, Vice President at Psomas, won the 2013 Charles Martin Duke Lifeline Earthquake Engineering Award from the American Society of Civil Engineers (ASCE). The award was established by the ASCE Technical Council on Lifeline Earthquake Engineering (TCLEE) in honor of Martin Duke for his pioneering contributions in lifeline earthquake engineering.

Funds for the ASCE Charles Martin Duke Lifeline Earthquake



Curtis L. Edwards

Engineering Award were obtained through the solicitation of gifts from the many students, colleagues, admirers and friends of Martin Duke. Major contributors include: R. C. Thacker, EQE Engineering, John Blume, Dames and Moore, the Earthquake Engineering Research Institute, Kinometrics Systems, LeRoy

Crandall and Associates, Fluor Daniel, Robert Duke, and the ARCO Pipeline Co.

Edwards (P.E.; F. ASCE; and M. EERI, 1999) received the Duke Lifeline Earthquake Engineering Award for his outstanding contributions in the advancement of lifeline earthquake engineering, his leadership in post-earthquake investigations, and his extensive efforts documenting lifeline system performance, recovery, and lessons learned.

10NCEE: Conference Updates

continued from cover page

The **FEDERAL EMERGENCY MANAGEMENT AGENCY** is the first major Sponsor of 10NCEE.

GOLDER ASSOCIATES is a new Silver Sponsor of 10NCEE. Golder Associates is a global, employee-owned organization providing independent consulting, design, and construction services in specialist areas of earth, environment and energy.

HAYWARD BAKER is a Silver Sponsor of 10NCEE. Hayward Baker is a geotechnical construction company that provides the full range of construction services for foundation rehabilitation, settlement control, liquefaction mitigation, soil stabilization, groundwater control, slope stability, excavation support and underpinning.

KINOMETRICS OPEN SYSTEMS AND SERVICES (OSS) is a new Silver Sponsor of 10NCEE. Kinometrics OSS is a multi-disciplinary team of geoscientists, earthquake engineers,

and information technologists specializing in the design, integration and implementation of custom seismic and structural monitoring systems.

ITT ENIDINE is a new Bronze Sponsor of 10NCEE. ITT Enidine is a diversified manufacturer of highly engineered critical components and a provider of customized technology solutions for growing industrial end-markets in energy infrastructure, electronics, aerospace and transportation.

Friends of 10NCEE

NORTHERN GEOTECHNICAL ENGINEERING – TERRA FIRMA TESTING, INC. (NGE-TFT) is a financial supporter of 10NCEE. NGE-TFT is an employee-owned company that specializes in cold-region geotechnical exploration and engineering, and provides materials testing, third-party QA/QC, and special inspection services.



For information about 10NCEE sponsorship opportunities, contact Jay Berger at 10ncee@eeri.org.

OPPORTUNITY

Call for Applications: GEM Secretary-General

The GEM Foundation is announcing a call for applications for the position of Secretary-General, its organizational leader and chief executive. The mandate of the current Secretary-General terminates at the end of the first 5-year working program in December 2013.

For the next working program (2014-2018), the role of Secretary-General has been refined to have a predominantly external focus, with the responsibility to strengthen the organization's leadership in collaborative assessment and reduction of earthquake risk.

Read the full job posting on the GEM website at <http://www.globalquakemodel.org/gem/organisation/jobs/>. Applications should be submitted by **September 1, 2013**.

Clinton Carlson Awarded EERI/FEMA NEHRP Graduate Fellowship

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Georgia, Illinois, Indiana, Iowa, Minnesota, Nebraska, Nevada, New York, Oregon, Tennessee, Utah, Virginia, and Washington. The EERI Student Activities Committee, chaired by Scott Brandenburg of UCLA, reviewed over 30 applications.

Carlson is conducting research on the impact of ground motion modification techniques on ground motion characteristics and on the responses of subsequent seismic analyses. Seismic design for all major civil infrastructure requires dynamic analyses and the use of earthquake ground motion. Many times in practice, ground motions need to be modified to match a target spectrum, but the effects of modification are not well understood. Modifying ground motions to match a target spectrum is considered conservative, but Carlson's current research shows that it need not be.

Dr. Dimitrios Zekkos (M. EERI since 2002), University of Michigan Assistant Professor and Carlson's faculty supervisor states, "Clinton is exploring the factors that impact the ground motion modification process so that he can provide systematic criteria for ground motion modification. There are two main techniques for ground motion modification: time domain and frequency domain techniques. In my professional experience, leading practitioners and researchers have made definitive statements, e.g., that one technique is better than another, or that scaling is preferred to modification. Clinton's work has already shown

that, similarly to many other issues in earthquake engineering, such definitive responses are not valid and that the impact of ground motion modification on ground motion characteristics is sometimes significant, but sometimes it is not.

Modification sometimes leads to higher seismic response of models compared to scaling, but many times, it leads to lower seismic responses. Neither time domain nor frequency domain modifications are always more conservative. Clinton's work has shown that the result of modification depends on the target spectrum, the seed motion, the characteristics of the ground motion, the misfit between the original ground motion and the target spectrum, as well as the modification technique that is used. Clinton's research work has led to one published paper in *Earthquake Spectra* and a conference publication for the 5th International Conference on Earthquake Geotechnical Engineering which took place in Santiago, Chile on January 10-14, 2011."

Carlson's goal for his research is to provide a fundamental understanding of the effects of modification and to assess the bias in the response history analyses introduced by the modification process. Carlson will match several ground motions to different target spectra using different ground motion modification techniques in order to investigate the role that the initial misfit with the target spectrum has on the effects of modification. The impact of the modification process on ground motion characteristics (e.g., Arias intensity)

as well as resulting time histories will initially be investigated. Subsequently, the impact on the dynamic response of geotechnical and structural systems will be investigated. A product of Carlson's Ph.D. work will be a free computer program to aid engineers in the selection of the most appropriate modification technique for a given design scenario.

Upon completing his degree, Carlson will pursue a consulting or academic career in forensic engineering with a focus in earthquake engineering. Carlson hopes his interdisciplinary knowledge in the structural and geotechnical fields of earthquake engineering will provide him with a unique perspective on how to solve complicated earthquake problems in industry or academia.

Fellowship Finalists

The EERI Student Activities Committee recognizes two outstanding fellowship finalists:

- **BRETT MAURER**, a Ph.D. candidate in civil engineering (geotechnical) at Virginia Tech, and
- **TIM WRIGHT**, a Ph.D. candidate in structural engineering at Georgia Tech.

To honor the finalists, EERI is pleased to offer a complimentary registration for the 10th U.S. National Conference on Earthquake Engineering scheduled for July 21-25, 2014 in Anchorage, Alaska.

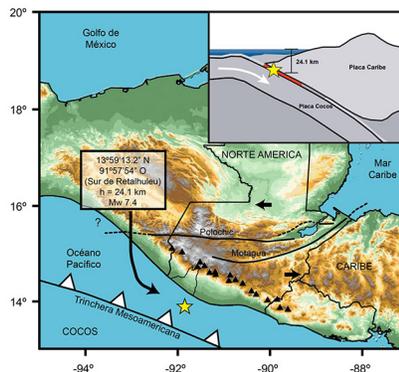
LEARNING FROM EARTHQUAKES

M7.4 Guatemala Earthquake and Its Implications for Disaster Reduction and Mitigation

During the first week of April 2013 a group of engineers from EERI and AGIES (Asociación Guatemalteca de Ingeniería Estructural y Sísmica), along with consultants from the World Bank, visited some of the areas affected by the November 7, 2012 M7.4 earthquake. The main purpose of the visit was to collect information about the effects of the earthquake and to gain insight into current construction practices in the damaged regions.

The *November 7, 2012 M7.4 Guatemala Earthquake and Its Implications for Disaster Reduction and Mitigation* report is the first in a series of case studies being developed by EERI on recovery and resilience in developing countries. It was funded by a grant agreement between EERI and the Global Facility for Disaster Reduction and Recovery (GFDRR) at The World Bank. The field study conducted by AGIES, EERI and the World Bank is a practice worthy of replication for understanding the causes of structural damage and improving building codes and standards accordingly.

As AGIES is actively trying to improve building practices in the country, this reconnaissance visit provided a great opportunity for the EERI team to gain a better understanding about challenges related to resilience and recovery in a developing country. At the same time, it gave the AGIES members the opportunity to discuss their concerns and exchange knowledge with EERI experts on various aspects of Guatemalan construction practice including earthquake design of engineered and



Epicentral location of the November 7 event related to subduction of the Cocos Plate along the length of the Middle America trench (Source: J.P. Ligorria).

non-engineered structures, construction material quality, and enforcement policy.

The report, which provides technical information and engineering insight into damage and recovery needs, also complements existing reports of socio-economic loss and recovery needs from the November 2012 earthquake. One

remarkable aspect of this earthquake is that the intensity of the ground shaking in the affected regions was low. Although there are a few strong motion records available, all showed peak ground accelerations less than 0.04g, even in the epicentral region. The complex topographical setting of the region, combined with the complex geological setting of the country and the lack of adequate strong motion instrumentation, make it difficult to provide a clear explanation of why the levels of shaking and damage were low.

Read the Full Report

To read the report online or to download a PDF of the report, visit https://www.eeri.org/cohost/Special-Earthquake-Reports/M7.4_Guatemala_Earthquake/. A Spanish version of the report translated by the Word Bank will be available.

NEWS OF THE INSTITUTE

EERI Joins Global Earthquake Model

EERI is the tenth Associate Participant of the Global Earthquake Model (GEM). EERI has a long-standing relationship with GEM and has already contributed to several GEM components: the Physical Vulnerability Project, the Building Taxonomy, and the Socio-Economic Vulnerability and Resilience Data and Tools.

GEM is a collaborative effort providing organizations and people with tools and resources for transparent assessment of earthquake risk anywhere in the world. By pooling data, knowledge and people, GEM acts as an international forum for collaboration and exchange, and

leverages the knowledge of leading experts for the benefit of society.

“The partnership with EERI is an asset for GEM and its global community,” said Rui Pinho, GEM Secretary-General. “EERI, with its international membership, has been supporting GEM outreach and knowledge exchange initiatives on many occasions, such as the Expert Elicitation workshops conducted in Lisbon (September 2012) and Oakland (May 2013), and the evaluation and testing for the taxonomy component, a priceless contribution.”

NEES NEWS

NEEShub Project Warehouse: Data Updates

The Project Warehouse on the NEEShub is the centralized data repository for sharing and publishing earthquake engineering research data from experimental and numerical studies. The data in the Project Warehouse are associated with research projects funded by a variety of agencies and include experiments performed at NEES and non-NEES equipment sites. Two highlighted projects, which take advantage of data sharing and presentation within NEEShub, are summarized below.

Seismic Simulation and Design of Bridge Columns Under Combined Actions, and Implications on System Response

PIs: DAVID SANDERS, ABDELJELIL BELARBI, SHIRLEY DYKE, AMR ELNASHAI, PEDRO SILVA, JIAN ZHANG
NEEShub Project: <http://nees.org/warehouse/project/71>

The objectives of this project are to develop a fundamental knowledge of the impact of combined actions on column performance and system response, and to establish analysis and design procedures that include the impact of combined actions at both the component and system levels. The research integrated analytical and experimental approaches in which physical tests were driven by analyses and simulations that examine the system response of various bridge types under different loading conditions. The experimental program included (1) quasi-static testing at the Missouri University of Science and Technology of twenty-seven large-scale columns providing fundamental behavior including the impact of torsional moments, (2) pseudo-dynamic testing of four large-scale columns with variable axial load, within a bridge system simulation, at the University of Illinois (NEES@UIUC), (3) real-time dynamic testing of eight large-scale columns with bidirectional, torsional and axial load inputs at the University of Nevada, Reno (NEES@Nevada), and (4) an integrated experiment with three columns (two large-scale and one small-scale) linked through simulation, conducted at NEES@UIUC by George Washington University in cooperation with the University of Houston and the University of Nevada.

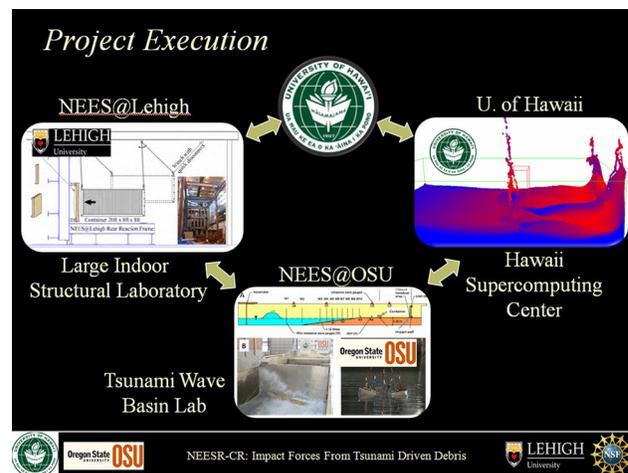


Impact Forces from Tsunami-Driven Debris

PIs: H.R. RIGGS, DANIEL COX, MARCELO KOBAYASHI, CLAY NAITO

NEEShub Project: <http://nees.org/warehouse/project/942>

The objective of this research project was to improve the understanding of, and predictive capabilities for, impact forces from tsunami-driven debris on structures. Experiments were conducted at NEES@OSU and NEES@Lehigh to investigate the low-speed impact of heavy debris and to develop and validate two numerical models: a simplified model that can be used for design, and a more complex fluid-structure interaction model based on computational fluid dynamics. Experiments at the NEES@Lehigh facility quantified nonlinear behavior when full-scale shipping containers collide with structural elements. These results were used to calibrate computational models. The experimental and model results were used to design a simpler, 1:5 scale model that mimics container behavior for a second series of tests at the NEES@OSU Tsunami Research Facility. These tests provide actual data from water-driven debris, which are used to validate numerical models and also shed light on the amplification of forces that may result from the surrounding fluid mass.



* * * Please Post * * *

EERI Annual Student Paper Competition

The **Earthquake Engineering Research Institute (EERI)** is pleased to announce its Annual Student Paper Competition. The purpose of the competition is to promote active involvement of students in earthquake engineering and the earthquake hazards research community.



The general rules of the contest are as follows:

Graduate Category

1. The paper must be an original contribution in a discipline directly related to earthquake engineering or earthquake hazard reduction.
2. The paper must not exceed 12 pages in length inclusive of all tables and figures.
3. The paper must represent the original work of the student and be authored by the student alone. An advisor can provide feedback before submission of the paper but may not co-author the paper. The advisor's name should be included in the "Acknowledgments" section of the paper.

Undergraduate Category

1. The paper must be directly related to earthquake engineering or earthquake hazard reduction.
2. The paper must not exceed 12 pages in length inclusive of all tables and figures.
3. The paper must be authored by the student alone. In addition, a faculty member or other advisor is required to oversee the preparation of the manuscript. The advisor can provide feedback before submission of the paper but may not co-author the paper. The advisor's name should be included in the "Acknowledgments" section of the paper.

Applicants must be enrolled at an accredited U.S. college or university and must be U.S. residents.

Guidelines for preparing the manuscript are accessible from the EERI website (http://www.eeri.org/about-eeri/honors-awards/eeri-competitions/#student_paper). All papers must be e-mailed by **November 1, 2013**, to Juliane Lane at the EERI office, eeeri@eeri.org.

Up to four student authors will be invited to the **10th U.S. National Conference on Earthquake Engineering (10NCEE)**, July 21-25, 2014 in Anchorage, Alaska, and will receive travel support for this purpose. Their papers may also be considered for publication in *Earthquake Spectra*. The top paper in the graduate category may be presented at 10NCEE.

* * * **Deadline: November 1, 2013** * * *

Calendar

The issues containing the first and subsequent appearances are indicated at the entry's end. Items listed for the first time are shown in bold.

2013

AUGUST

Aug. 18-23
22nd Int'l Conference on Structural Mechanics in Reactor Technology (SMiRT-22), San Francisco. www.smirt22.org (2/12, 4/12, 10/12, 2/13)

Aug. 28-30
Vienna Congress on Recent Advances in Earthquake Engineering and Structural Dynamics (VEESD2013), Vienna, Austria. <http://veesd2013.conf.tuwien.ac.at> (8/12)

SEPTEMBER

Sept. 5-7
4th EUGEO Congress, Rome, Italy. www.eugeo2013.com (3/13)

Sept. 8-12
Int'l Conference on Earthquakes & Structures (ICEAS-2013), Jeju, Korea (part of the World Congress on Advances in Structural Engineering & Mechanics [ASEM13]). <http://asem.cti3.com/asem13.htm> (1/13)

Sept. 17-21
2013 SEAOC Convention, San Diego, CA. (1/13)

Sept. 25-28
38th DFI Annual Conference on Deep Foundations, Phoenix, Arizona. <http://www.dfi.org/conferencedetail.asp?id=226> (12/12)

Sept. 26-27
International Conference on Seismic Design of Facilities, Aachen, Germany. www.SeDIF-Conference.de (2/13)

OCTOBER

Oct. 25-27
2nd IACGE Int'l Conference

on Geotechnical & Earthquake Engineering, Chengdu, China. www.iacge2013.org (12/12)

NOVEMBER

Nov. 7-15
PEER NGA-West2 Seminar Series: Salt Lake City, Nov. 7; Long Beach, Nov. 8; Seattle, Nov. 14; and San Francisco, Nov. 15. (6/13, 7/13)

Nov. 8-9
5th Int'l Conf. on Advances in Experimental Structural Engineering (5AESE), Taipei, Taiwan. <http://aese5.ncree.narl.org.tw> (11/12)

2014

APRIL

April 30-May 2
Annual Meeting, Seismological Society of America, Anchorage, Alaska. <http://www.seismosoc.org/meetings/> (7/12)

JUNE

June 30-July 2
Ninth International Conference on Structural Dynamics (EURODYN 2014), Porto, Portugal. <http://paginas.fe.up.pt/~eurodyn2014/>

JULY

July 7-9
9th Int'l Masonry Conf, Guimarães, Portugal. <http://www.9imc.civil.uminho.pt> (4/13, 6/13)

July 7-11
7th Int'l Conf on Bridge Maintenance, Safety, and Management (IABMAS 2014), Shanghai, China. <http://www.iabmas2014.org> (11/12)

July 13-16
2nd Int'l Conference on Vulnerability and Risk Analysis and Management (ICVRAM2014) & 6th Int'l Symposium on Uncertainty Modeling and Analysis (ISUMA2014), Liverpool, UK. <http://www.icvram2014.org> (1/13)

July 21-25
10th Nat'l Conference on Earthquake Engineering, EERI Annual Meeting, & NEES Quake Summit 2014, Anchorage, Alaska. <http://10ncee.org> (9/12, 1/13, 2/13, 6/13, 7/13)

AUGUST

Aug. 24-29
Second European Conference on Earthquake Engineering and Seismology, Istanbul, Turkey. <http://www.2eecesistanbul.org/> (2/13)

NOVEMBER

Nov. 16-19
3rd International Symposium on Life-Cycle Civil Engineering (IALCCE), Tokyo, Japan. <http://www.ialcce2014.org> (11/12)

OPPORTUNITY

Call for Applications: FM Global Senior Research Specialist

FM Global is seeking a Senior Research Specialist, Structures\ Earthquakes, in Norwood, Massachusetts. The person in this position will be responsible for planning and conducting research regarding structural response and damage induced by natural catastrophes with emphasis on earthquakes, and subsequent property losses. He or she will be responsible for the evaluation, implementation and development of techniques, computer models or experiments related to property loss.

To view the full job description, visit the FM Global website at <http://googl/adiAF>.



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NEWS OF THE INSTITUTE

2014 Board Nominees

The 2014 EERI Nominating Committee has submitted a slate of candidates for the president-elect position and the two director positions, which will become open when directors David A. Friedman and Ivan Wong complete their terms next January. The nominees are:

For President-Elect:

- **MARY COMERIO**, Professor, Department of Architecture, UC Berkeley

For Director A:

- **CHARLIE HUYCK**, Executive Vice President, ImageCat, Inc., Long Beach, California
- **JAMES MALLEY**, Structural Engineer, Degenkolb Engineers, San Francisco, California

For Director B:

- **DAVID FROST**, Professor of Civil Engineering, Georgia Institute of Technology, Atlanta
- **DAVID WALD**, Seismologist, U.S. Geological Survey, Lakewood, Colorado

Additional nominations may be made by the membership in accordance with Article VII of the EERI Bylaws (Sections 4 and 5), upon submission of a petition with signatures of 25 members. Petitions must be received before November 1. Biographies of the candidates and short vision statements will be published in a future issue of the Newsletter and posted on the EERI website. EERI wishes to thank the Nominating Committee: **William Anderson** (chair), **Ross Boulanger**, **Joe Maffei**, **Susan Tubbesing**, and **Sharon Wood**.

EERI Communications Updates

On June 6, 2013, the EERI Board of Directors approved the creation of a bi-weekly EERI e-newsletter — sent via email — that will feature announcement and calendar-type items, short updates, and reports on EERI projects, members, and activities of peer organization.

The Board also approved the transition of the monthly *EERI Newsletter* in its printed format to an annual or semi-annual magazine-style publication. This new magazine format is an opportunity to feature, in greater depth, EERI projects, members, events, advocacy efforts and other issues of interest to our members. A bi-weekly electronic newsletter will be more timely and a more efficient use of staff and budget resources.

Summary

EERI Newsletter. The final commemorative issue of the *EERI Newsletter* will be published in early September.

The Pulse of Earthquake Engineering. The inaugural issue of *The Pulse*, EERI's bi-weekly e-newsletter, will be sent via email to all EERI members, starting September 15.

The inaugural issue of an EERI annual or semi-annual review will be published in 2014.