

# RESEARCHERS WORKSHOP: ADVANCED SIMULATION FOR NATURAL HAZARDS MITIGATION

December 5-6, 2016

LOCATION: LEHIGH UNIVERSITY

**OBJECTIVES:** To disseminate information on the use of the NHERI Lehigh Experimental Facility (EF) to conduct state-of-the-art research and recent advances in simulation to mitigate the effects of natural hazards on the civil infrastructure; identify challenges and the role of the NHERI program in addressing these challenges, facilitate sharing of ideas and research collaboration among workshop participants, and identify and develop opportunities for researchers to utilize the NHERI Lehigh EF.

## AGENDA:

### DAY 1 – MONDAY, DECEMBER 5, 2016

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|---------------|---------------------------------------------------------------------------------------------------------------------|
| 8:00 - 8:30   | Breakfast & Registration                                                                                            |
| 8:30 - 8:45   | Welcome, Objectives, and Agenda Overview – J. Ricles (Director, NHERI Lehigh EF)                                    |
| 8:45 - 9:00   | Overview of NHERI Lehigh EF – J. Ricles                                                                             |
| 9:00 - 10:10  | NHERI Lehigh Experimental Facility Capabilities and Protocols – J. Ricles, T. Marullo (IT Manager, NHERI Lehigh EF) |
| 10:10 - 10:25 | Break                                                                                                               |
| 10:25 - 12:30 | Technical Session I Participant Presentations – Large-scale Simulation/Natural Hazards                              |
| 10:25 - 10:50 | <i>Large-Scale Seismic Simulation</i> (J. Restrepo – Univ Calif San Diego)                                          |
| 10:50 - 11:15 | <i>Development and Validation of a Resilient Hybrid Bracing System for Seismic Hazards</i> (M. Head – Morgan State) |
| 11:15 - 11:40 | <i>Evaluation and Retrofit of Older West-Coast Braced Frames</i> (J. Berman – University of Washington)             |
| 11:40 - 12:05 | <i>Disaster Resilience Analysis Through Multiple Temporal and Spatial Scales</i> (P. Bocchini – Lehigh University)  |
| 12:05 - 12:30 | <i>Damage to Steel Buildings after 2011 Tohoku Earthquake in Japan</i> (M. Eslami – Clemson University)             |
| 12:30 - 1:30  | Lunch                                                                                                               |
| 1:30 - 2:45   | Technical Session II Participant Presentations – Computational Modeling/Hybrid Simulation                           |
| 1:30 - 1:55   | <i>MDOF Hybrid Shake Table Testing of Response Modification Devices</i> (A. Schellenberg – UC Berkeley)             |



1:55 - 2:20	<i>Large-Scale Hybrid Simulation for Structural Hazard Mitigation: Challenges and Opportunities</i> (X. Shao – University of Western Michigan)
2:20 - 2:45	<i>Real-Time Hybrid Simulation of a Reinforced Concrete Building using Force-Based Elements and Advanced Explicit Integration Algorithms</i> (C. Kolay – Lehigh University)
2:45 – 3:00	Break
3:00 - 4:40	Technical Session III – Example Prior Projects Conducted at Lehigh
3:00 - 3:25	<i>Large Scale Testing of Existing and Innovative Floor Diaphragm Components</i> (R. Fleischman - University of Arizona)
3:25 - 3:50	<i>Investigation of Seismic Response of Steel Building Structures with Nonlinear Viscous Dampers Using Real-Time Hybrid Simulation</i> (R. Sause – Lehigh University)
3:50 - 4:15	<i>Full-Scale Testing of Low-Ductility Braced Frames in the Lehigh Experimental Facility</i> (L. Fahnestock – University Illinois)
4:15 - 4:40	<i>Cast-in-Place RC Coupled Shear Walls: Unbonded PT Coupling Beams &amp; Debonded Starter Bars at Wall Base</i> (Y. Kurama – University Notre Dame)
4:40 - 4:55	Break
4:55 - 6:10	Forum: Emerging Topics and Grand Challenges in Natural Hazards Research

## **DAY 2 – TUESDAY, DECEMBER 6, 2016**

7:15 - 7:30	Breakfast
7:30 - 8:00	Q&A with NSF NHERI Program Director (J. Pauschke)
8:00 - 8:30	Summary and Discussion of Forum Outcomes
8:30 – 9:10	NHERI Facility Overviews
8:30 - 8:40	NHERI NCO (D. Zehner)
8:40 - 8:50	NHERI Sim Center (A. Schellenberg)
8:50 - 9:00	NHERI RAPID (J. Berman)
9:00 - 9:10	NHERI UCSD EF (J. Restrepo)
9:10 - 9:30	Overview of Large-Scale Damper Characterization and RTHS Demonstration (C. Kolay, T. Marullo, NHERI Lehigh EF)
9:30 - 10:45	Full-Scale Damper Characterization; Real-Time Hybrid Simulation Demonstration / NHERI Facility Tour (NHERI Lehigh Staff)

- 10:45 - 11:00 Break
- 11:00 – 11:15 Presentation and Discussion of Test Data
- 11:15 - 11:35 Guidelines for Proposal Preparation (C. Kusko, NHERI Lehigh EF)
- 11:35 - 11:45 Payload Project Protocol, Researcher Training (C. Kusko, NHERI Lehigh EF)
- 11:45 - 12:00 Summary, Discussion, and Q&A
- 12:00 – 12:15 Workshop Surveys

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