Natural Hazards Engineering Research Infrastructure (NHERI)

NHERI-Network Coordination Office

NHERI-NCO

Introduction to Facilities – LeHigh University

December 6, 2016
Purdue NCO Leadership Team

Julio Ramirez (PI)
Professor of Civil Engineering
Purdue University

Leadership Role and Expertise
- NCO Director
- Chair, NCO Strategic Committee

Antonio Bobet (Co-PI)
Professor of Civil Engineering
Purdue University

Leadership Role and Expertise
- Member, NCO Strategic Committee
- Leader for Geotechnical Engineering

JoAnn Browning (Co-PI)
Dean of Engineering
University of Texas at San Antonio

Leadership Role and Expertise
- Member, NCO Strategic Committee
- Leader for Education and Community Outreach

Billy Edge (Co-PI)
Professor of Practice
North Carolina State University

Leadership Role and Expertise
- Member, NCO Strategic Committee
- Expert in Coastal Engineering, Inundation, Wave Dynamics, and Surge Impact Modelling

DeLong Zuo (Co-PI)
Associate Professor of Civil Engineering
Texas Tech University

Leadership Role and Expertise
- Member, NCO Strategic Committee
- Expert in Wind Hazard Research and Link to Wind Experimental Facilities
NCO Leadership Team

Cheryl Ann Blain
Research Oceanographer
Naval Research Laboratory

Leadership Role and Expertise
- Member, NCO Strategic Committee
- Leader in Coastal Engineering Hazards

William T. Holmes
Structural Engineer, Private Practice
Oakland, California

Leadership Role and Expertise
- Member, NCO Strategic Committee
- Leader in Earthquake Engineering Structural Practice

Ian Robertson
Professor of Structural Engineering
University of Hawaii, Manoa

Leadership Role and Expertise
- Member, NCO Strategic Committee
- Expert in Tsunami Research

Thomas L. Smith
Architect
TLSmith Consulting Inc.

Leadership Role and Expertise
- Member, NCO Strategic Committee
- Leader in Wind Engineering and Architectural Practice

David R. Johnson
Assistant Professor of Industrial Engineering and Political Science
Purdue University

Leadership Role and Expertise
- Member, NCO Strategic Committee
- Leader in Social Sciences and Policy
NCO Professional Team

Daniel Zehner
Facility Scheduler and Operations Coordinator (FSOC)
Purdue University

Leadership Role and Expertise
- Coordination of Day to Day Operations
- Oversee, Maintain, and Manage Centralized Experimental Facilities Schedule

Chris Thompson
Technology and Media Specialist
Rosen Center, Purdue University

Leadership Role and Expertise
- Publicize Research and Other Deliverables; Implement Software Tools in Partnership with Cyberinfrastructure Awardee
NCO Internal Organization

Director
Julio Ramirez
Professor of Civil Engineering
Purdue University

Schedule & Operations Coordinator
Dan Zehner
Facility Scheduler & Operations Coordinator
Purdue University
(12 months)

Technology & Media Specialist
Chris Thompson
Software Engineer
Purdue Rosen Center
(6 months)

Central Scheduling Committee

Leader for Education & Community Outreach
JoAnn Browning
Dean of Engineering
University of Texas at San Antonio

Education Specialist
Karina Vielma-Cumpian
Assistant Research Scientist
University of Texas at San Antonio
(12 months)

Communications Specialist
Jordan Moss
Communications & Media
University of Texas at San Antonio
(4.2 months)

Education & Community Outreach Committee
- Marketing & Media
- REU
- Summer Institute
- Technology Transfer

Technology Transfer Committee

Strategic Committee
Vision of NHERI-NCO

...serve as a focal point and leader of a multi-hazards research community focused on mitigating the impact of future earthquakes and windstorms and related hazards...

Hurricane Katrina

NHERI-UCSD Facility
Role of the NHERI-NCO

- Leadership of Community and Governance
- Coordination of NHERI components
- Education and Community Outreach

Storm surge, Hurricane Fran, North Carolina 1996
Timeline of Key Deliverables In Year 1

• Establish Governance – 1/17
  - Memberships of 3 groups and Operational Procedures, and NHERI wide policies
  - Facility Scheduling Protocol and Dashboard

• Completion of 5-year NHERI Science Plan – 6/17

• UF Survey – 6/17

• REU and Summer Institute Implemented – 6/17

• Annual Council Report and Evidence of Progress in Building International Partnerships – 6/17
Education & Community Outreach

JoAnn Browning (Co-PI)
Dean of Engineering
University of Texas at San Antonio

Leadership Role and Expertise
• Member, NCO Strategic Committee
• Leader for Education and Community Outreach

Jordan Moss
Communications Specialist
University of Texas at San Antonio

Leadership Role and Expertise
• Communications Specialist with NCO
• Provide Support to REU and Summer Institute Recruitment and Marketing, and all Social Media Communications

Karina Vielma-Cumpian
Assistant Research Scientist
University of Texas at San Antonio

Leadership Role and Expertise
• Education Specialist with ECO
**ECO: Community Engagement**

**ECO Committee**
- **Members:** Site Representatives
- **Purpose:**
  1. Feedback on ECO programs
  2. Coordinate & leverage site programs

**Technology Transfer Committee**
- **Members:** Leaders in natural hazards community selected by NHERI Council
- **Purpose:**
  1. Identify research ready for implementation into practice
  2. Facilitate process
## ECO: Primary Activities

### REU
- 2 per site
- Adjuncts
- Mentorship
- Network-wide activities
- Longitudinal mentorship and assessment
- Paper and presentation
- Outreach to local schools
- Travel funds

### Summer Institute
- At UTSA
- 40 participants
- Educational products and assessment
- Site training/info
- Proposal writing
- Review Science Plan
- All may participate, portions telepresence

### Site ECO Coordination
- ECOC develop standards
- Common assessments
- Generalize content for broad audience
- Webinar coordination

### Dissemination & Outreach
- News and media presence
- Monthly community updates
- Sponsor webinars and technical sessions
- Research into practice (TTC)
- Special coordination with MSU
- Coordinate NHERI community participation at workshops and conventions
NHERI 15-598 Solicitation:

“Implement a centralized Facility Scheduling Protocol, working with EF Awardees and the Users Forum. To support transparent, open, and equal access, the NCO Awardee, rather than each EF Awardee, will be responsible for scheduling user time (NSF-supported and non-NSF-supported) at each EF, including the RAPID Facility.”

Research Team
at OSU Facility – Dan Cox, OSU PI
NCO Scheduling Protocol

Project Process

**Pre-approval Phase**
- FS sends documents to RPI
- RPI reviews documents
- FS schedules Phases 1 & 2

**Phase 1**
- User Training
- Schedules Phases 1 & 2

**Phase 2**
- Planning & Experimental Design
- Develop & submit ETP
- ETP signed by RPI & EF

**Phase 3**
- Specimen Construction & Instrumentation
- Specimen installed in test space & all instrumentation online
- Last test sequence detailed in ETP

**Phase 4**
- Testing
- Completed or last day occurs as detailed in ETP
- All raw data resides on NHERI & properly identified

**Phase 5**
- Upload Raw Data
- Specimen completely removed & instrumentation stored

**Phase 6**
- Demolition

Document Control

FS = Facility Scheduler
EF = Experimental Facility
RPI = Research PI
NCO Scheduling Tool: MS Project

- EF usage timeline
- Transparent scheduling
- Easy to update via mobile devices
- Less paperwork
NHERI-NCO Science Plan

**NHERI Vision**

**Grand Challenges**
- Characterization of earthquake, windstorm, tsunami & storm surge hazards
- Identification of infrastructure vulnerabilities
- Creation of technology to develop resilient infrastructure

**NHERI Community Research Objectives**

**Key Questions**
- What are loading actions on infrastructure?
- How do we improve & expand simulation?
- What are infrastructure vulnerabilities?
- How do we integrate smart technology?
- How do we integrate sustainability?
- What is the most efficient mitigation?
Development Process of 5-Year NHERI Science Plan

• Appoint Task Group
• Collect Awardees’ Science Plan
• Task Group assembles first draft
• Review by Governance
• By June 2017
  – Post for review by NHERI community
  – Community comments addressed
  – Post on the NHERI website
  – Revisited at Summer Institute
• In 2017-2018 (Year 2) workshops to update plan

Storm Surge Damage to Infrastructure
Hurricane Ike, Bolivar Peninsula, TX 2008
Global Vision for NHERI

**Strategy:**
- Access to Facilities
- Research Collaborations
- Data Exchanges
- Testing Techniques
- Condition Assessment
- Post-disaster perishable data collection
- Establish ICF

*Testing of 6-story structure at E-Defense, Japan*
Questions and Next Steps

NCO Purdue University
- Leadership
- Coordination
- Experience

NHERI
- Research & Partnerships
- Laboratories & Data Exchange
- Education
- Outreach

Increasing Resilience

Coastal Flooding
Windstorms
Tsunamis
Earthquakes