<table>
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<th>No.</th>
<th>Topic</th>
<th>Highlights</th>
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| 1   | Announcements (Balaji) | Announcements:  
  - Grad. Advisor position – 9 interviewed, 1st week Dec. will pick candidate  
  - Acct. Tech position – 7 will be interviewed  
  - Faculty search – approx. 300 applications, we will try to schedule interview for next semester  
  - Note on Zoom (like Skype) works well for video interviews  
  - See attached slides for notes on A-Card processing procedures |
| 2   | Campus Climate Survey (Will Srubar) | Students upset about mandatory fees, lack of information on resources, 22% have ‘been harassed’  
  - Immediate response:  
    − change language in offer letter, send to website about fees  
    − include resources in class syllabus  
    − develop metric for quality of mentorship  
    − will invite OEC office to faculty meeting |
| 3   | Website Upgrade (Emily and Laurence) |  
  - Focus to gear towards students  
  - Working on study of user behavior  
  - Meeting with CU platform  
  - Will send template to groups, fill out content  
  - Looking for pictures and content |
| 4   | Faculty Seminar (Ross Corotis) | Review of his research work. |
| 4   | Adjourn | |
CEAE Dept.
Faculty Meeting
Nov 18, 2015
Agenda

- Announcements
  - Faculty and Staff Search Updates
  - Campus Climate Survey
  - Dept. webpage upgrade status
  - A-card processing
  - Event Reminder

- TA Allocation

- Faculty Seminar: ‘former high ranking official’
  - a.k.a - Ross Corotis
Announcements

• Graduate Advisor – Status
  • ~40 applicants - John, Araceli and I reviewed and shortlisted ~9
  • Conducted online interviews Mon-Tue
  • Will have a shorter list ~3-4 today/tomorrow
    • Request references
    • Another round of interview
  • Selection by early Dec.

• Account Tech. - Job advt. posted
Announcements

- Faculty Search – Status
  - ~250+ applicants

- Review in progress

- Request for reference letters for ~3-6 candidates
  - CEM and BSP
  - GEO reviewing candidates
Graduate Directors Meeting (Oct 29) – Wil Srubar attended

- Students deeply angry about mandatory fees not told upfront

- Lack of information about support resources for – emotional, psychological, legal and medical issues

- 22% responded they have ‘been harassed’
  - Verbal harassment by faculty and staff

- How to incentive faculty to improve quality of mentorship?
- Faculty meeting to discuss this? With help from OEC
Dept. Web Page Upgrade

• REVIEW OF THE CURRENT WEBSITE
  • Main Menu Review (Laurence)
  • Quality Analysis of the Current CEAE Website (Laurence)
  • Tracking dead links, out of date content and getting familiarized with the current content and navigation menus.
  • Review Google Analytics (Emily and Laurence)

• TECHNICAL ANALYSIS
  • Meet with Joanne Bertrand from Strategic Relations (Laurence and Emily)
  • To study positive and negative aspects of creating a website using an off line platform versus working live on the online current website.
Dept. Web Page Upgrade

- **EXPLORE IMPROVED SITE MAP AND UPDATE CONTENT**
  - Brainstorm and finalize an improved site map and front page. (Emily and Laurence)
  - Contact the groups and create a template for them to fill out with updated content (Emily)
  - Get feedback from the Faculty group on the updated website structure (Emily and Laurence)

- **REDESIGN AND NAVIGATION IMPROVEMENT**
  - Redesign the overall look of the website (Emily and Laurence)
  - Improve the design of each individual page of the website (Laurence)
  - Improve the navigation of the website (Laurence)
  - Write new content (Emily)
  - Provide new pictures (Emily)
A-Card Processing

• After purchase/charge, card holder receives e-mail from the system of the charges

• Submit a copy of the receipts and speetype to our student employee (Harrison)

• Report is created by Harrison and sends e-mail to the faculty

• Faculty approves the report on concur
Emeritus Celebration

- Mike Brandehmuel
- Stein Sture

Date: Nov 30th 2015
Time: 5:30PM
Venue: C4C

Please RSVP by Today!

Classical music, Food, Company and Nostalgia
Recent Master’s Theses

Overcoming Public and Political Challenges for Natural Hazard Risk Investment Decisions
by Holly Bonstrom (with Keith Porter), 2011

The Expected and Extreme Losses due to Natural Hazards
by Jennifer Jones, 2011

Perception of Risk of Natural Hazards
by Maura Hurley, 2011

The Relationship between Seismic Hazard Vulnerability and Stage of Economic Development:
Illustration for Three Countries
by Lan Nguyen, 2011

Identifying Infrastructure Interdependencies and social vulnerabilities in Denver, Colorado through
Examining the Impact of Natural and Man-Made Stressors Applicable to the Region
by Alena Rein, 2011

Risk Perception and Effective Communication of Consequences for US Natural Hazards
by Daniel Oliver, 2013

Risk Analysis of Mast-Arm Structures
by Abhishek Paul, 2013

Development and Illustration of a Risk-Based Framework for Use
by the Colorado Department of Transportation’s Built Facilities
by Yolanda Chia-Yi Lin (with Abbie Liel), 2014

Multi-Hazard Mapping of the United States
by Daniel J. Hahn, 2015
Recent Ph.D. Theses

A First-Order Reliability Approach to Building Portfolio Loss Estimation and Mitigation Prioritization
by Holly Bonstrom, 2013

Confined Masonry: Theoretical Fundamentals, Experimental Test, Finite Element Models, and Future uses
By Lan T. Nguyen, 2014

Fuzzy Classification and Fuzzy Pattern Recognition of Seismic Damage to Concrete Structures
By Emily D. Elwood, 2015
Structural Reliability and Sustainable Resilience, NSF
Holly Bonstrom
Case Study – Loss Evaluation

**FORM vs. MCS Loss Exceedance Curves**

- Deviation in FORM results
  - Modify FORM results with refinement factor
- Required computation time reduced ~20x using FORM
- Neglecting spatial correlation reduces the variance in total loss

![Graph showing FORM vs. MCS Loss Exceedance Curves](image)
Case Study

SF Building Portfolio
- HAZUS building inventory (NIBS, 2012)
- 36 building / 33 occupancy types
- 4 seismic design codes
- Modified height distributions (Kircher et al. 2006)

Scenario Earthquake
- M7.2 on San Andreas Fault (ATC, 2010)
- Seismic intensity computed for each census tract

Reliability Space: 3000+ Random Variables
Defining Resilience

“…not only be able to withstand losses to a tolerable level, but also rebuild and recover within an acceptable time frame.” (Mileti, 1999)

Quantifying Resilience

- Robustness, $R_o$:
  \[ R_o(\%) = 100 - \frac{TL}{PTL} \]

- Rapidity, $R_a$:
  \[ R_a = \frac{dQ(t)}{dt} \]

- Resilience, $R$:
  \[ R(\%) = \int_{T_0}^{T_RE} \frac{Q(t)}{T_RE} dt \]
Mitigation Prioritization using Sensitivity Analysis

Case Study

\[ \Delta R_o & \Delta R_a \]

\( \text{Loss of resilience (\%)} \)

\( \text{Pe} \)

- No mitigation
- $50M
- $100M
- $150M

\( \Delta \text{Ro} & \Delta \text{Ra} \)

\( \text{ΔRo} & \text{ΔRa} \)

\[ \Delta \text{Ro} & \Delta \text{Ra} \]

$50M

- No mitigation
- $50M & $100M
- $100M & $150M

$100M

- No mitigation
- $100M & $150M

$150M

- No mitigation
- $150M

Retrofit more cost-effective
LoR < 40%

Post-hazard restoration more cost-effective
LoR > 40%
Structural Reliability and Sustainable Resilience, NSF
Emily Bonstrom
General Information Theory - Overview

- Generalized Information Theory (GIT) (Klir)
  - Recognize different types of uncertainty
  - Development of uncertainty theories
- Levels of development
- Two-dimensional framework
  - Probability theory: \( P(A) = \text{the probability of } A \)
Identify Damage Patterns

- Fuzzy Classification (also termed clustering)
  - Roots in biological taxonomy (Dunn and Everitt 1982)
  - Mathematical taxonomy
  - Mathematical properties
    - Fuzzy $c$-means clustering method
    - Closeness of data points (i.e., distance) $\approx$ similarity
    - Mathematically considers gradations $\rightarrow$ “fuzzy classes”
  - Feature selection
  - Building damage data

1994 Northridge Earthquake (Image from ATC 2001)
Building Damage Data

**Classification** (Identify Patterns)
- ATC-38 Near Strong-Motion Building Surveys (84 Records) (ATC 2001)
- ATC-38 Building Surveys (ATC 2001)

**Pattern Recognition** (Recognize Patterns)
- ATC-38 Near Strong-Motion Building Surveys (85 Records) (ATC 2001)
- EQE Int./OES Postearthquake Evaluations (51 Records)

**Model Performance:**
- Training Error
- Testing (Apparent) Error

Berkeley Study (UCB 2014)


LA Times Staff 2014
Recent Study Committees for The National Academies

“Dam and Levee Safety and Community Resilience” 2012
Community resilience maturity matrix and collaborative community engagement for risk management

“Reducing Coastal Risk on the East and Gulf Coasts” 2014
Land use and coastal risk management and moral hazard

“Tying Flood Insurance to Flood Risk for Low-Lying Structures in the Floodplain” 2015
Lack of FEMA information and procedures for actuarially sound insurance rates for NFIP and Congressional mandate
The Federal Emergency Management Agency, which oversees the flood program, knows the elevation of about 240,000 subsidized properties, or about a quarter of them. Elevation is important because the risk of flood damage is determined by a home's location relative to the 100-year storm height. A house 1 foot below that level could be damaged less than one 10 feet below it.

"In the short term, FEMA's going to have to do something to get an estimate of those elevations," said Ross Corotis, a committee member and a professor of engineering at the University of Colorado, Boulder.

"People need to make decisions being aware of that risk," Corotis said. "If the granularity isn't there, it's not a very effective tool to help them do that."
NSF EAGER: Uncertainty Quantification of Structural Systems: Generalized Information Theory

Risk, hazard mitigation and vulnerability/resilience need to reflect multi-disciplinary societal issues, including social, political and economic

Probabilistic methods have trouble with partial and dissimilar information

Exploratory research on Generalized Information Theory incorporating notions of linguistic vagueness and imprecision, ambiguity, possibility theory (necessity and ignorance) and evidence theory (belief and plausibility)
Department of Education GAANN: PhD Fellowships to Enhance the Design, Construction, and Maintenance of Resilient Communities

8 PhD Fellowships for up to five years each
U.S. citizens or permanent residents
Emphasis on increasing diversity, including women
12-month stipends @ $34,000 + tuition
Professional teaching development
Intended careers in teaching or research
Angela Bielefeldt (Lead Co-PI), Abbiel Liel (Co-PI), Amy Javernick-Will (Co-PI), Shideh Dashti (Co-PI), Keith Porter (Co-PI), Joe Kasprzyk, Wil Srubar, Scott Summers, Karl Linden
Thank You