

2008 SCEC Earthquake Engineering & Science Workshop Report

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SCEC Seismic Hazard and Risk Analysis

OBJECTIVE

This half day workshop, held immediately preceding the SCEC Annual Meeting on September 7, 2008, offered engineers and scientists an opportunity to focus plans for future collaborative activities related to earthquake engineering and science. The question central to the workshop was: *How should SCEC collaborate with the earthquake engineering community?* Interested earthquake engineers and scientists were invited to provide recommendations for future research activities through discussions of 1) current collaborative activities supported by SCEC, and 2) relevant activities and needs of the earthquake engineering community. Representatives from the earthquake engineering community (e.g. ASCE 7, BSSC, CUREE, EERI, LATBSDC, MAE, MCEER, NEES, PEER) and SCEC scientists provided brief summaries to stimulate discussions. The presentations made at the Workshop have been archived. The workshop proceedings and recommendations will be used to plan future SCEC research directions.

AGENDA

- 1:30-1:35 Workshop Introduction (*Luco*)
- 1:35-1:55 Brief Overview of SCEC Activities (*Somerville*)
- 1:55-2:55 Examples of Current Collaborations (20 minutes each)
 - Tall Buildings Initiative (*Moehle, Bozorgnia, or Naeim; Graves*)
 - ShakeOut (*Graves, Krishnan*)
 - OpenSHA and OpenRisk (*Field, Porter*)
- 2:55-3:10 Break
- 3:10-5:10 Activities and Needs of Engineering Organizations (10 minutes each, plus time for discussion)
 - American Society of Civil Engineers 7 (*Hamburger*)
 - Building Seismic Safety Council (*Hamburger*)
 - Consortium of Universities for Research in Earthquake Engineering (*Whittaker*)
 - Earthquake Engineering Research Institute (*Anagnos*)
 - Los Angeles Tall Buildings Structural Design Council (*Naeim*)
 - Mid-America Earthquake Center (*Elnashai*)
 - Multidisciplinary Center for Earthquake Engineering Research
 - Network for Earthquake Engineering Simulation (*McCabe*)

- Pacific Earthquake Engineering Research Center (*Moehle*)
- 5:10-5:30 Workshop Summary and Closing Remarks from Participants (*Luco/Somerville*)

IDENTIFIED RESEARCH NEEDS

- **PSHA for Building Codes**
 - Improved attenuation relationships
 - Consideration of effects of rise time & rupture velocity not already reflected in observed data?
 - Incorporation of rupture directivity, basin effects, site effects
- **PSHA for Risk Assessment**
 - OpenSHA development
 - OpenRisk development
 - Structural fragility/vulnerability development
 - Improved ground motion measures/parameters
- **Extreme Ground Motions ("Upper Bounds")**
- **Time Histories for Building Codes**
 - Selection & scaling/modification of recordings
 - Simulations as an alternative
- **Time Histories for Scenarios/Risk Assessment**
 - Large M & short R, CEUS ground motions
 - Potential buildings (exposure) and their response
 - Understanding of expected ground motion characteristics (variability → uncertainty → reduced uncertainty)
 - Verification & validation, dissemination, need for broad band simulations, building cluster effects
- **Time Histories for Laboratory Experiments**
- **Structural Instrumentation (e.g., of tall buildings)**
 - Instrumentation expertise, experience, and guidance
 - Placement guidance
- **Post-earthquake Response**
 - Ground motion information *available*
 - Ground motion information *needed*
 - Collection and archiving methodologies

- **Other earthquake-related hazards**
 - Tsunamigenic sources
 - Effects of tsunamis on structures
 - Design of evacuation structures
- **Geotechnical Engineering Problems**
 - Local soil response
 - Liquefaction
 - Lateral spreading
 - Local soil failure
- **Communication for risk reduction (Preparedness)**
 - Scenarios and "community risk profiles" through collaboration
 - Advocacy and tools for resilience
 - Joint seminars, publications, competitions
 - Dissemination through website, conferences
 - Joint communication with decision makers and public
- **Educating each other**

PARTICIPANTS

Thalia Anagnos	SJSU - EERI
Domniki Asimaki	Georgia Tech
Jack Baker	Stanford
Paolo Bazzurro	AIR Worldwide
Greg Beroza	Stanford
Yousef Bozorgnia	PEER
Ian Buckle	UNR
Ken Campbell	EQECAT
Amr Elnashai	UIUC - MAE
Ned Field	USGS
Christine Goulet	UCLA
Rob Graves	URS Corp
Ron Hamburger	Simpson Gumpertz & Heger
Tom Heaton	Caltech
Jon Heintz	Applied Technology Council
Tara Hutchinson	UC San Diego
Tran Huynh	SCEC
Tom Jordan	USC
Erol Kalkan	CGS
Monica Kohler	UCLA
Swami Krishnan	Caltech
Nico Luco	USGS
Steve McCabe	NEES
John McRaney	SCEC

Farzad Naeim	LATBSDC
Keith Porter	Colorado
Glenn Rix	Georgia Tech - MAE
Hope Seligson	MMI Engineering
Tom Shantz	Caltrans
Paul Somerville	URS Corp
John Wallace	UCLA
Jennie Watson-Lamprey	Watson-Lamprey Consulting
Farzin Zareian	UC Irvine