Discussion Draft

Meeting Minutes of the Subcommittee on Disaster Reduction

5 March 2009, 10:00 a.m. to 12:00 p.m., Department of Commerce, Room 4813

Italics indicate absent members. "T" indicate members participating via teleconference.

Officers

David Applegate (USGS), Chair
Margaret Davidson (NOAA), Vice-Chair (T)
Dennis Wenger (NSF), Vice-Chair

NSTC Liaison

Jonathan Kolak (OSTP)

Designated Representatives

BLM *Edwin Roberson*
Ronald Huntsinger
CDC *Mark Keim*
DHS Bruce Davis (T)
DHS/FEMA *Mike Buckley*
DHS/USCG *Steven Cohen*
DOD *Al Johnson*
DOE *Patricia Hoffman*
DOT Sheila Duwadi
Cheryl McQueary
Tim Schmidt
EOP / OSTP Jonathan Kolak
EDA *Audrey Clarke*
EPA *Peter Jutro*
Stephen Clark
FERC *Berne Mosley*
HUD *David Engel*
NASA *Andrea Donnellan*
NGA *Stephen Homeyer*
NGB *Dave Wilmot*
NIH *Allen Dearry*
NIST *William Grosshandler*
Jack Hayes
NOAA Margaret Davidson (T)
NSF *Dennis Wenger*
OPHS Sven Rodenbeck (T)
State Cari Enav
Fernando Echavarria
USACE *Barbara J. Sotirin*
Dimitra Syriopoulou
USAID Sezin Tokar
USDA *Melissa Simpson*
USFS *Susan Conard*
USGS David Applegate
Paula Gori (T)

Other Attendees

DHS/FEMA Stephen Carruth
NASA Craig Dobson
NOAA Nell Codner
Yana Gevorgyan
Maria Honeycutt
Chris Maier
Margaret McCalla
Jamie Rhome
Natalie Valette-Silver (T)
NGA Dana Miller
NGB Lisa Burg
Secretariat Emily Wallace
Ross Faith
USFS Mike Hilbrunner
National Academies
Lauren Alexander Augustine
William Hooke

Agenda

10:00 Welcome and Introductions
10:05 Approval of February Meeting Minutes
10:10 Report from the Chair
10:30 Report from the Vice-Chairs
10:45 Report from the NSTC Liaison
11:00 Outstanding ISDR Items
11:15 Update: Disasters Roundtable of the National Academies
11:55 Close and Next Actions

Handouts

- Agenda
- February Meeting Minutes
- USGEO Paper: Observing Earth Observations
- USGEO Membership List
- National Academies Disasters Roundtable #24 Announcement
- American Meteorological Society Forum Announcement: "Rising Above the Weather"

I. Call to Order and Introductions

Subcommittee on Disaster Reduction (SDR) Chair David Applegate (USGS) called the meeting to order at 10:01 a.m.

II. Approval of Meeting Minutes

The February Meeting Minutes were approved with no abstentions or oppositions.

III. Report from the Chair

Subcommittee Chair David Applegate (USGS) opened his report by commenting that it would helpful for the SDR to get a sense of what opportunities the Federal stimulus package holds for disaster risk reduction efforts. He encouraged members to seek details about what funds are going/can go to activities related to implementation of the Grand Challenges.

Applegate (USGS) stated that the stimulus package contains funds for the U.S. Geological Survey (USGS) to enhance earthquake, volcano, and streamgage monitoring. The bill's language also calls for improvements to *The National Map* and LIDAR (Light Detection and Ranging) programs.

Margaret Davidson (NOAA) stated that the National Oceanic and Atmospheric Administration (NOAA) has also received stimulus funds for mapping. NOAA and the USGS are currently synchronizing efforts to digitally model the Earth using LIDAR sensing platforms.

Sheila Duwadi (DOT) stated that the Department of Transportation is receiving stimulus money to fund shovel-ready projects but not for research and development.

Stephen Carruth (FEMA) reported that the Federal Emergency Management Agency (FEMA) is receiving additional funding for homeland security-type programs and projects. Carruth mentioned that stimulus money will also go to retroactively fund hazard mitigation grant projects in Los Angeles.

Stephen Clark (EPA) told members that stimulus funds flowing to the Environmental Protection Agency (EPA) are being allocated for waste and drinking water programs and to cleaning up Superfund sites.

Jon Kolak (OSTP) noted that the Office of Science and Technology Policy (OSTP) and the Office of Management and Budget (OMB) are working to release the OSTP/OMB Fiscal Year 2011 Budget in May. He stressed that the timeframe of the FY 2011 budget cycle will be compressed and informed members that OSTP will request a quick turnaround time once it calls for agency input.

David Applegate (USGS) reminded members about the 2009 Annual Hazards Research and Applications Workshop, July 15th—18th, 2009, at the Omni Interlocken Resort, just outside of Boulder, Colorado. Members should inform Dave or the Secretariat (ewallace@grs-solutions.com) if they are interesting in attending.

IV. Report from the Vice-Chairs

Vice-Chair Margaret Davidson (NOAA) stated that the next step for the GCRP/SDR/USGEO one-pager would be transmittal to the USGEO and GCRP for review. She hoped that the triad of subcommittees would reach agreement on the document by early spring.

Applegate (USGS) noted that the goal of this effort is to produce a document that will give OSTP a well-measured sense of the potential for interagency collaboration in this arena.

Davidson (NOAA) reported that the Department of Homeland Security (DHS) Science and Technology Directorate is funding a National Academies study on the role of the private sector in disaster risk reduction.

V. Report from the NSTC Liaison

Jon Kolak (OSTP) recapped the presentation Jamie Rhome gave at the SDR's February meeting and asked members whether they thought forming a storm surge/coastal inundation (SS/CI) working group is something the subcommittee should take on.

David Applegate (USGS) suggested that forming a SS/CI working group could be a good opportunity to review and assess how *Grand Challenges for Disaster Reduction Implementation Plans* are actually implemented.

Margaret McCalla (NOAA) asked what the terms of reference, purpose and deliverables of this working group would be.

Jon Kolak (OSTP) thought these questions would be flushed out in the terms of reference drafting process.

Jamie Rhome (NOAA) stated that current efforts to reduce the risk of SS/CI are often duplicated and lack coordination.

Margaret Davidson (NOAA) opined that the Federal community has not worked as a team to address implementation of SS/CI risk reduction efforts. She noted that the DHS Science and Technology crosscutting plan on storm surge is more specific than the *Grand Challenges for Disaster Reduction Implementation Plan*: Coastal Inundation.

Jon Kolak (OSTP) stated that OSTP has held conversations regarding the establishment of a storm surge/coastal inundation working group and is ready to support the SDR if it decides to undertake the effort. He recommended that members start conversations within their agencies about who might serve on the working group.

As a way to get the formal process going, David Applegate (OSTP) invited anyone interested in drafting the SS/CI working group terms of reference to contact him or the SDR Secretariat (ewallace@grs-solutions.com). Applegate also asked members to identify other individuals within their agencies who might be interested.

Sezin Tokar (USAID) thought that standing up a SS/CI working group would offer good opportunities to link with related international efforts and therefore, would also be timely.

Sheila Duwadi (DOT) commented that the Federal Highway Administration (FHWA) is particularly interested in hurricane impacts on bridges as well as the need to develop better bridge safety standards.

Jon Kolak (OSTP) updated members on progress made by the WindHRP Working Group to produce a Congressionally-mandated Windstorm Impact Reduction Program Biennial Progress Report for Fiscal Years 2007-2008. Kolak congratulated the agencies on a good job of pulling together

initial reports for the most recent teleconference, held February 23rd. He noted that WindHRP members will be working to fine tune the agency contributions in advance of the next teleconference on March 13th.

Kolak (OSTP) reported that the *Grand Challenges for Disaster Reduction Implementation Plan*: Space Weather and the SDR's Guidance to NOAA on Satellite Resolution Requirements are on indefinite hold at OSTP and would let members know when things get rolling again.

Kolak (OSTP) noted that OSTP's review of the SDR NSTC Survey Response has not yet commenced but would hopefully begin shortly.

Kolak (OSTP) reported that the President has named Sherry Abbott as OSTP Associate Director for Environment. He noted that OSTP is being reorganized to include four associate directors – one for each NSTC Committee. Kolak also expected each director to assume a greater leadership role within his/her respective committee than was customary under the former OSTP structure.

VI. Outstanding ISDR Items

David Applegate (USGS) stated that Dennis Wenger is presently working on a draft memo for the Department of State and is waiting for input from members about agency inactions with ISDR. Members should send comments by Monday, March 9th to Dennis Wenger (dwenger@nsf.gov) so he can draft and send the memo to Cari Enav (State), who will be attending the ISDR 1st Session of the Regional Platform for Disaster Risk Reduction in the Americas, March 16th—19th in Panama City, Panama.

Cari Enav (State) announced that in preparation for the meeting in Panama City, the ISDR has sent her a questionnaire, which she asked SDR members to help her answer. The SDR Secretariat will draft strawman answers to these questions and circulate the document to members on Friday, March 6th. Members should return comments by Monday, March 9th to the SDR Secretariat (ewallace@grs-solutions.com). Enav noted that the Panama City meeting in March will set the stage for the ISDR-wide meeting in Geneva in June.

Enav (State) reported that Margarita Wahlström (UN/ISDR) wants to come meet with the SDR but is unsure about the timing of her prospective visit. Enav also asked members for input as to whether it would be worthwhile for Margarita to call upon and chat with the acting administrators of their agencies. Cari can be reached at EnavCR@state.gov.

VII. Update: Disasters Roundtable of the National Academies

David Applegate (USGS) introduced Bill Hooke and Lauren Alexander Augustine of the National Academies Disasters Roundtable (DR).

William H. Hooke has served as chair of the Natural Disasters Roundtable Steering Committee since 2002. He is a Senior Policy Fellow and the Director of the Atmospheric Policy Program at the American Meteorological Society (AMS) in Washington, DC. Prior to arriving at AMS in 2000, Hooke worked for the National Oceanic and Atmospheric Administration (NOAA) and antecedent agencies for 33 years. After six yeas of research with NOAA he moved into a series of Propagation Laboratory Atmospheric Studies Branch, Director of NOAA's Environmental Sciences Group (now the Forecast Systems Lab), Deputy Chief Scientist, and Acting chief Scientist of NOAA. Between 1993 and 2000, he held two national responsibilities: Director of the U.S. Weather Research Program Office, and Chair of the interagency Subcommittee for Natural Disaster Reduction of the National Science and Technology Council Committee on Environment and Natural Resources. Hooke was a

faculty member at the University of Colorado from 1967 to 1987, and served as a fellow of two NOAA Joint Institutes (CIRES, 1971-1977; CIRA 1987-2000). The author of over fifty refereed publications and co-author of one book, Hooke holds a B.S. (Physics Honors) form Swarthmore College (1964), and S.M. (1966) and PhD (1967) from the University of Chicago. He was elected a member of the American Philosophical Society in 2006.

David Applegate (USGS) recalled the longstanding, close relationship between the SDR and Disasters Roundtable (DR) and noted that the *Grand Challenges for Disaster Reduction* began life as a Roundtable workshop. Applegate informed members that he understood Hooke would be stepping down as Chair of the Roundtable Steering Committee and used the opportunity to congratulate Bill on a productive chairmanship, observe that his shoes would be tough to fill, and comment that he would be missed.

Bill Hooke (DR) thanked Applegate for his remarks. He then joked that progress happens one retirement at a time. Hooke announced that Jack Harrald, Director of The George Washington University Institute for Crisis, Disaster, and Risk Management will take over the chairmanship in June. Dr. Harrald is a Professor of Engineering Management and Systems Engineering in the GWU School of Engineering and Applied Science, a member of the National Research Council Disasters Roundtable Steering Committee, and a former Coast Guard Officer.

Hooke (DR) then introduced Lauren Alexander Augustine, Director of the Disasters Roundtable at the National Academies in the Division of Earth and Life Studies and Country Director in the Academies' African Science Academy Development Initiative. Dr. Alexander Augustine worked at the US Geological Survey in the Water Resources Division doing hydrogeomorphic research in Coastal Plain wetlands. She came to the National Academies in 2002 as a study director for the Water Science and Technology Board in the National Research Council and directed many studies on a range of topics, including Texas instream flows, endangered species in the Klamath and Platte River Basins, and forest hydrology. Dr. Alexander Augustine received her B.S. in applied mathematics and systems engineering and her Masters degree in environmental planning and policy from the University of Virginia; she completed her Ph.D. from Harvard University in an interdisciplinary program that combined hydrology, geomorphology, and ecology.

Hook (DR) then turned the floor over to Lauren noting that he would pick up on some international themes after her update.

Lauren Alexander Augustine (DR) thanked David Applegate and SDR members for the opportunity to update them on the Disasters Roundtable's current work and, in particular, its recent workshop, "Cascading Disasters: How Disasters Unfold," held on February 26th in Irvine, California. Alexander Augustine noted that the Disasters Roundtable has three locations: Washington, DC; Woods Hole, Massachusetts; and Irvine, California. She allowed that Irvine was a challenging location to hold a workshop because of its distance from many policymakers in Washington, D.C. Alexander Augustine commented that the Irvine audience, which was heavily weighted towards practitioners, academics, and first responders, contrasted with those typically drawn by the Washington workshops. A chief rationale of holding the workshop in Irvine was to capitalize on the lessons and energy of *The Great Southern California ShakeOut.*

Alexander Augustine (DR) provided members with a handout that included the Irvine workshop agenda and bios of the speakers (see Appendix A). She explained that the workshop investigated how disasters progress and may cascade into multi-disaster catastrophes. Starting at the benchmark "time(t) = zero," panelists and participants studied the incremental stages of unfolding disasters by

examining specific, critical moments in time, or "freeze frames," to acquire a clearer picture of causality. Alexander Augustine explained that advances in technology, modeling, and social science have made this type of examination more useful for the disaster risk reduction professional by illuminating potential opportunities to intervene and limit losses.

Alexander Augustine (DR) informed members that a workshop report will be available on the Disasters Roundtable website (http://dels.nas.edu/dr/) in a few months. In addition to a 15-20 page report (the format Roundtable reports have traditionally followed), the highlights of the Irvine workshop will also be captured in a glossy 4 page brief. Alexander Augustine stated that the Roundtable will be looking for feedback and will tailor future reports according to which format(s) people prefer.

Bill Hooke (DR) commented that the workshops are not designed to produce official recommendations, but often serve as a forum to tee up ideas that are not quite ready for study in the Roundtable's more formal committee process. Hooke also offered another perspective, stating that the topics chosen for the workshops are, in a way, proto-recommendations for future committee study. The Disasters Roundtable Steering Committee is composed of 16 members, including ex-officio members and representatives from academia.

Alexander Augustine (DR) noted that the idea driving the Irvine workshop was to give academics and sociologists a window into making better models. She also commented that the extent of instant messaging on Twitter and Blackberry-like devices was an interesting and illuminating phenomenon for the workshop participants, who were surprised to see real-time information disseminated through these networks competing with official websites.

Alexander Augustine (DR) shed light on the novelty of the Irvine workshop. While opportunities for disaster risk reduction professionals to meet and interact in Washington, DC are many, elsewhere in around the country they are fewer and farther between. In this vein, she noted that one hallmark of the Irvine workshop was the particularly energetic interaction that occurred between practitioners and academics.

Alexander Augustine (DR) informed members that the Disasters Roundtable typically produces three workshops per year and expected 2009 to be no different. The Roundtable will hold its next workshop (No. 25) – on the socio-economic distress disasters place on children – on June 25th, 2009, in Washington, DC, at the Kaiser Family Foundation, which has the ability to broadcast internationally. Alexander Augustine noted that the non-profit organization Save the Children has expressed interest in partnering with the Roundtable for the event.

Alexander Augustine (DR) noted that the Roundtable is looking to focus its 26th Workshop on the role of science and technology in disaster risk reduction. She specified that the National Academies is interested in exploring this topic with the Federal Emergency Management Agency (FEMA) and the Department of Homeland Security (DHS). Alexander Augustine stated that the Roundtable is considering the topic of "international disasters" for its 27th Workshop. She also touched upon the vulnerability of Federal facilities as a possible future topic.

Bill Hooke (DR) stated that future workshop topics might also include Earth observations and climate change resiliency.

Noting that the SDR is a central part of the Roundtable's target audience, Lauren Alexander Augustine (DR) invited members to follow up with her (Laugustine@nas.edu or 202-334-2243) with ideas for future workshop topics, feedback on the Roundtable holding future workshops outside Washington, DC, and updates on agency activities related to disaster risk reduction.

Lisa Burg (NGB) stated that the Department of Defense (DOD) was conducting a critical infra-structure program to investigate scenarios including loss of water, electricity, and other vital services.

Lauren Alexander Augustine (DR) stated that the DOD was not currently represented on the Disasters Roundtable Steering Committee and suggested she and Captain Burg speak offline about DOD coming onboard.

Bill Hooke (DR) reinforced Lauren's earlier points and comments. He noted that disasters and, in particular, Hurricane Katrina and its fallout have significantly affected the national psyche in recent years. Hooke commented that the assumption that Americans would get behind any community challenged by such a disaster had proved illusory and that the U.S. could not afford another letdown.

Hooke (DR) also noted an opportunity to revitalize international relations based on engagement to reduce disaster risk abroad.

Hooke (DR) stated that the International Council for Science (ICSU) – comprised of 30 international science organizations and 110 foreign entities similar in makeup to the National Academies – has been asking the fundamental question of why despite increasing knowledge of disasters, losses from them continue to clime. He urge members to read the ICSU Integrated Research on Disaster Risk (IRDR) science plan (www.icsu.org/3_mediacentre/GA_29.html) and consider participating as well as ways their agencies might contribute to it.

David Applegate (USGS) asked about the relationship between the ICSU and the United Nations International Strategy for Disaster Reduction (ISDR).

Bill Hooke (DR) stated that the ISDR is a participant at ICSU meetings, underscoring the close relationship between the two organizations.

Cari Enav (State) noted that she had received a survey from the ISDR in preparation for the1st Session of the Regional Platform for Disaster Risk Reduction in the Americas. The SDR Secretariat will provide strawman answers to the questionnaire and circulate them to members for comments. Members should send comments to Emily Wallace (ewallace@grs-solutions.com) by C.O.B. Monday, March 9th.

David Applegate (USGS) thanked Bill Hooke and Lauren Alexander Augustine for attending the meeting and updating SDR members on events at the Disasters Roundtable.

IX. Adjournment

The meeting adjourned at 11:45 a.m.

X. Future Meetings

The SDR meets on the first or second Thursday of every month from 10 a.m. to 12 p.m. unless otherwise noted. **The next meeting of the SDR, originally scheduled for April 2nd, has been moved to Tuesday, March 31st.**

March 31, 2009	July 2, 2009	October 1, 2009
May 7, 2009	August 6, 2009	November 5, 2009
June 4, 2009	September 3, 2009	December 3, 2009

XI. Agenda Items and Other Communications with the Subcommittee

Please send proposed agenda items and any other items intended for distribution to the full Subcommittee to Emily Wallace (ewallace@grs-solutions.com).

XII. Contact Information SDR Leadership

David Applegate, Chair, 703-648-6714, applegate@usgs.gov
Margaret Davidson, Vice Chair, 843-740-1220, Margaret.davidson@noaa.gov
Dennis Wenger, Vice Chair, (703) 292-8606, dwenger@nsf.gov

Secretariat
Emily Wallace, 703-560-7448, ewallace@grs-solutions.com

XIII. Summary of March Actions

Action	Lead	By When
Send comments on attached draft U.S. answers to the attached UNISDR Regional Platform Survey to Emily Wallace (ewallace@grs-solutions.com).	SDR Members	C.O.B. March 9, 2009
Send a summary of any agency activity related to ISDR to Dennis Wenger (dwenger@nsf.gov).	SDR Members	C.O.B., March 9, 2009
Send nominations to the ad hoc committee that will draft a terms of reference for a new SDR working group on storm surge/coastal inundation to Emily Wallace (ewallace@grs.solutions.com).	SDR Members	March 18, 2009.
Let Emily know if you are interested in funding the National Research Council Study on Measuring Community Resiliency.	SDR Members	ASAP
Let Emily know if you are interested in attending the Annual Hazards Workshop in Boulder (ewallace@grs-solutions.com).	SDR Members	ASAP
Review and edit titles on OMB MAX.	SDR Members	ASAP
Send David Applegate (applegate@usgs.gov) and/or Emily Wallace (ewallace@grs-solutions.com) speaker suggestions for the Annual Hazards Research and Applications Planning Workshop plenary sessions.	SDR Members	ASAP
SDR financial support: Contact Dave (applegate@usgs.gov) if you would like a personalized support request letter to your agency.	SDR Members	Standing
Contact Emily (ewallace@grs-solutions.com) to receive copies of the Grand Challenges for Disaster Reduction Implementation Plan packets or CD.	SDR Members	Standing
Let Emily or Dave know how you use the implementation plans, including when you link to the plans from your agency websites.	SDR Members	Standing
Send Emily or Dave additional distribution suggestions, including relevant contact information.	SDR Members	Standing
Coordinate a CODE briefing to the SDR.	Secretariat	Spring 2009

XIV. Appendix A

Disasters Roundtable Workshop 24
Cascading Disasters: How Disasters Unfold

THE NATIONAL ACADEMIES
The Beckman Center • 100 Academy • Irvine, California

February 26, 2009

The objectives of this workshop are to identify:

- A framework that describes how disasters cascade
- The interacting effects of disasters on people and the built environment
- Interventions or strategies to prepare for, mitigate against, or respond to cascading disasters

9:00 a.m. **WELCOME AND INTRODUCTION**
William H. Hooke, American Meteorological Society and Chair, Disasters Roundtable

9:10 a.m. **OPENING ADDRESS**
Stephanie Chang, Centre for Human Settlements, University of British Columbia

9:30 a.m. **QUESTION & ANSWER**

9:45 a.m. **BREAK**

10:00 a.m. **PANEL I:** ***Triggers of Unfolding Disasters***
Moderator: Dennis Wenger, National Science Foundation

Natural Triggers: Earthquakes, Hurricanes, Floods, and Fire
Lucile M. Jones, U.S. Geological Survey Multi-Hazards Demonstration Project for Southern California

Willful Disasters: Human Acts of Terrorism
William Waugh, Georgia State University

Technological Disasters
Reginald Desroches, Georgia Tech, Department of Civil and Environmental Engineering

Economic Impacts of Disasters
Adam Rose, University of Southern California, School of Policy, Planning, and Development

11:30 **DISCUSSION**

12:00 p.m. **LUNCH**

1:00 p.m. **PANEL DISCUSSION II:** ***Cascading Disasters: People, Infrastructure and Environments***
Moderator: Darlene Sparks Washington, DSW Consulting

Civil Infrastructure Systems and Cascading Disasters
Masanobu Shinozuka, Department of Civil and Environmental Engineering, University of California, Irvine

Built Environment and 'Hard' Critical Infrastructure Cascades: Intradependence, Interdependence, and Socio-technical Coupling
Leonardo Duenas-Osorio, Department of Civil and Environmental Engineering, Rice University

Ground Zero Personnel, Impacted Populations, and Emergent Networks: 'Soft' Infrastructure during Disasters
Carter T. Butts, Department of Sociology, University of California - Irvine

Interaction between Elements of Community Capital during Disasters
Scott Miles, Huxley College of the Environment, Western Washington University

2:30 p.m. **DISCUSSION**

3:00 p.m. **BREAK**

3:15 p.m. **PANEL DISCUSSION III:** ***Interventions and Strategies for Cascading Disasters***
Moderator: Jack Harrald, Virginia Tech

Preparing for Disasters: Ways to Mitigate or Prevent the Cascade
Eric Holdeman, ICF International

The Role of IT Communication in Improving Communication and Mitigating the Effects of Cascading Disasters
Michael Byrne, ICF International

The Role of Recovery Strategies
Sandi Fowler, Assistant to City Manager, Cedar Rapids, IA

Ways to Achieve Sustainability in Recovery Strategies
Gavin Smith, Center for the Study of Natural Hazards and Disasters, University of North Carolina at Chapel Hill

4:45 p.m. **DISCUSSION**

5:15 p.m. **CLOSING STATEMENT**
Ellis Stanley, Dewberry

5:30 p.m. **FINAL REMARKS and Adjournment**
William H. Hooke, Chair, Disasters Roundtable Committee

BIOGRAPHIES

Speakers and Panelists:

Carter T. Butts is currently Associate Professor in the Department of Sociology and Institute for Mathematical Behavioral Sciences at the University of California, Irvine. Dr. Butts obtained his Ph.D. from the Department of Social and Decision Sciences at Carnegie Mellon University, where he was a member of the Center for the Computational Analysis of Social and Organizational Systems and the Institute for Complex Engineered Systems. He currently serves as an area editor for the journal Computational and Mathematical Organization Theory, holds paper awards from the ASA's Sections on Mathematical Sociology and Aging and the Life Course, and is a recipient of the Linton C. Freeman Award from the International Network for Social Network Analysis. Dr. Butts's research involves the application of mathematical and computational techniques to theoretical and methodological problems within the areas of social network analysis, mathematical sociology, quantitative methodology, and human judgment and decision making. Currently, his work focuses on: the structure of spatially embedded large-scale interpersonal networks; models for informant accuracy, network inference, and graph comparison; representation and modeling of intertemporal relational data; and models for human behavior in strategic settings. Dr. Butts also studies social phenomena related to emergency situations, and is involved in research which seeks to combine social science and information technology to improve group and organizational responses to disasters and other adverse events.

Michael Byrne is senior vice president at ICF International in Fairfax, Virginia. He has worked disaster responses from both the local level as 1st deputy director of NYC OEM and federal level as FEMA operations chief for the response to the attack on the WTC and senior director for preparedness response and recovery at the White House Office of Homeland Security.

Stephanie Chang is associate professor at the University of British Columbia, Canada, with a joint appointment in the School of Community and Regional Planning (SCARP) and the Institute for Resources, Environment, and Sustainability (IRES). She holds a Canada Research Chair in Disaster Management and Urban Sustainability. Her specialty is in the socio-economic impact of natural disasters, particularly earthquakes. She has coedited a book on *Modeling Spatial Economic Impacts of Disasters* (2004) and published extensively on loss estimation models for critical infrastructure systems, infrastructure interdependencies, economic evaluation of disaster mitigations, and urban disaster recovery. Dr. Chang currently serves on the editorial boards of the journals *Earthquake Spectra* and *Papers in Regional Science*, and recently served on the U.S. National Research Council's Committee on Disaster Research in the Social Sciences. She was the 2001 recipient of the Shah Family Innovation Prize, awarded by the Earthquake Engineering Research Institute, and was a 2008 Aldo Leopold Leadership Fellow. Dr. Chang received her B.S.E. in Civil Engineering (1989) from Princeton University and Ph.D. in Regional Science (1994) from Cornell University.

Reginald DesRoches is a Professor and Associate Chair of Civil and Environmental Engineering at the Georgia Institute of Technology, Atlanta, GA. He earned his bachelors, masters, and doctoral degrees from the University of California, Berkeley. Professor DesRoches's primary research interests are seismic resistant design and retrofit of bridges, passive energy systems for bridges and buildings, structural applications of smart and auto-adaptive materials, and earthquake response of seaport structures. Professor DesRoches is currently the deputy director of the NEESR Grand Challenge Project on Seismic Risk Management for Port Systems. He has published over 140 articles in Archival Journals and Conference Proceedings, and has supervised

25 doctoral and MS thesis students. He is Chair of the ASCE Seismic Effects Committee, is a member of the executive committee of the Technical Council on Lifeline Earthquake Engineering (TCLEE), and is on the Board for the Earthquake Engineering Research Institute. He is a past member on the board on Infrastructure and the Constructed Environment for the National Research Council. Dr. DesRoches was a 2001 National Science Foundation CAREER award recipient, and was awarded the Presidential Early Career Award for Scientists and Engineers (PECASE) in 2002. He is a two-time invitee to the National Academy of Engineering Frontiers of Engineering Program (2002 & 2004). He is a recipient of the 2007 Walter L. Huber Civil Engineering Research Prize (ASCE), and the Georgia Tech ANAK Award (2007) for leadership in teaching and research.

Leonardo Duenas-Osorio was born in Bogotá, Colombia in 1976. He obtained his Ph.D. in Civil and Environmental Engineering from the Georgia Institute of Technology in 2005. He joined Rice University as Assistant Professor of the department of Civil and Environmental Engineering in July of 2006. The research interests of Dr. Dueñas-Osorio are in the area of complex system reliability and risk assessment. Applications of his work include the response characterization of interdependent lifeline systems subjected to natural or man-made hazards, real-time reliability prediction of smart utilities, topological investigation of civil infrastructure layouts, and regional hurricane risk assessment of single family residential houses and utility systems in coastal cities. Recognitions for his work include the Science Applications International Corporation (SAIC) award in 2005 for the paper entitled "Interdependent Response of Networked Systems", the Best Ph.D. Thesis Award in Civil and Environmental Engineering from the Georgia Institute of Technology in 2006, and the NSF CAREER award in 2008 to investigate new mitigation principles for reliability enhancement of smart interdependent infrastructure systems. In terms of professional service, he is Associate Member of the American Society of Civil Engineers (ASCE), Member of the Earthquake Engineering Research Institute (EERI), and Member of the Institute for Electric and Electronic Engineers (IEEE). Regarding teaching activities, Dr. Dueñas-Osorio teaches a graduate course on the topology and reliability of complex lifeline systems, and an undergraduate course on hurricane risk assessment for residential housing and utility systems.

Sandi Fowler serves the City of Cedar Rapids, Iowa as the Assistant to the City Manager. Cedar Rapids is a city of 120,000 that changed to the council/manager form of government in 2006, and suffered from a devastating flood in June 2008. Sandi has held several positions in her 19 years in city government in Cedar Rapids, ten as the assistant to the public safety commissioner under the commission form of government, and another eight serving as the liaison to neighborhood associations. Sandi holds a bachelor's degree in business administration and a master's degree in public administration.

Eric Holdeman joined ICF International in 2007 and is a Principal, serving in the Emergency Management and Homeland Security Practice. His areas of expertise include building regional coalitions between agencies, governments, the private sector and non-profits. Regional planning, Emergency Operations Center (EOC) design and construction, multi-media public education programs, Joint Information Center (JIC) formation and operations, media relations, and integration of technology into emergency management and homeland security programs are just a few of the areas in which he has extensive experience. Pandemic flu planning and exercises is another area in which he has experience. In March 2007 he was recognized by Government Technology Magazine as one of the Top 25 people in the nation who, "Challenge convention, confront entrenched bureaucracy and promote innovation." Eric has a blog at www.disaster-zone.com.

Lucile M. Jones has been a seismologist with the US Geological Survey and a Visiting Research Associate at the Seismological Laboratory of Caltech since 1983. She is currently serving as the

Chief Scientist for the Multi Hazards Initiative in Southern California, developing a new program to integrate hazards science in urban areas with economic analysis and emergency response to increase community resiliency to natural disasters. Her most recent accomplishment is leading the creation of the Great Southern California ShakeOut, a public emergency preparedness event involving over 5 million people. She is also a Commissioner of the California Seismic Safety Commission, and serves on the California Earthquake Prediction Evaluation Council. Dr. Jones has authored over 80 papers on research seismology with primary interest in the physics of earthquakes, foreshocks and earthquake hazard assessment, especially in southern California. She has received numerous awards, including the Alquist Award from the California Earthquake Safety Foundation, the Shoemaker Award for Lifetime Achievements in Science Communication from the USGS. Dr. Jones received a Bachelor of Arts degree in Chinese Language and Literature, Magna Cum Laude, from Brown University in 1976 and a Ph. D. in geophysics from the Massachusetts Institute of Technology in 1981.

Scott Miles is an expert on disaster risk reduction, science-intensive decision support, and collaborative planning. Dr. Miles was a member of the U.S. Geological Survey Western Region Earthquake Hazards Team for six years, where he developed hazards information tools for public decision-making using GIS. Dr. Miles received his Ph.D. in geography from University of Washington, where he studied the synergy between modeling, disaster mitigation, and deliberative democracy. He received a post-graduate diploma from the University of Edinburgh in GIS, with a focus on environmental modeling. His MS in Civil and Environmental Engineering is from University of Massachusetts-Amherst, where he focused on geotechnical earthquake engineering and numerical methods. An undergraduate degree in the same field was received from Washington State University. Dr. Miles has twelve years of experience with the use and assessment of research programs and information tools in the context of decision-making and planning. He has focused specifically on how modeling can facilitate stakeholder involvement, as well as how stakeholders can aid in the development of hazard and risk models. He has developed and implemented group-based methods for communicating and evaluating models and other information tools. At the USGS, he worked with Dr. David Keefer to develop a GIS-based model of earthquake-induced landslide hazards for use within collaborative planning. With Dr. Stephanie Chang, Dr. Miles has also developed a prototype computer model of community recovery from disasters, initially supported by the Multi-disciplinary Center for Earthquake Engineering Research and now support by NOAA. Upon completing his Ph.D., Dr. Miles was the project coordinator for an NSF project in the Department of Geography at University of Washington, headed by Dr. Timothy Nyerges, investigating internet-based tools for supporting transportation improvement program decision-making. He then served as the program manager of the University of Washington's Urban Ecology Research Lab, directed by Dr. Marina Alberti. As an independent consultant, Dr. Miles has designed and conducted several collaborative processes on science- and technology-intensive issues, as well as conducted trainings on the topic. He is currently an assistant professor in the Department of Environmental Studies at Western Washington University. He has been instrumental in establishing WWU's new Institute for Global and Community Resilience, as well as their Disaster Reduction and Emergency Planning undergraduate program.

Adam Rose is Research Professor in the School of Policy, Planning and Development at the University of Southern California, and Coordinator for Economics at the DHS Center for Risk and Economic Analysis of Terrorism Events. Before coming to USC, he served as professor and head of the Department of Energy and Environmental Economics at Penn State. He received his Ph.D. in Economics from Cornell University. Much of Professor Rose's research is on the economics of man-made and natural hazards. He recently served on a National Research Council panel on the benefits of advanced seismic monitoring and as a lead researcher for a report to the U.S. Congress on the benefits of FEMA hazard mitigation grants, and a project for the National

Biodefense Analysis and Countermeasures Center to develop an expanded modeling framework for economic consequence analysis. He is currently a co-principal investigator on an NSF grant to estimate the economic impacts of risk amplification in urban areas in the aftermath of a disaster and on a project to develop a hazards decision-support model for the Los Angeles Department of Water and Power. A major focus of his research has been on resilience to natural disasters and terrorism at the levels of the individual business, market, and regional economy. Professor Rose is the author of several books and over 100 professional papers. He has served as a member of the editorial boards of the Journal of Regional Science, Resource and Energy Economics, Energy Policy, Resource Policy, and Pacific and Asian Journal of Energy. He has served as the American Economic Association Representative to the American Association for the Advancement of Science, and on the Board of Directors of the American Association of Geographers Energy and Environment Specialty Group. He is the recipient of a Woodrow Wilson Fellowship, East-West Center Fellowship, American Planning Association's Outstanding Program Planning Honor Award, Earthquake Engineering Research Institute Special Service Recognition Award, and Applied Technology Council Outstanding Achievement Award.

Masanobu Shinozuka is Distinguished Professor and Chair of the Department of Civil and Environmental Engineering, University of California, Irvine. Dr. Shinozuka is a world-renowned expert on earthquake and structural engineering. He has a strong background in systems engineering with an emphasis on structural and system reliability. He is particularly experienced in risk assessment of lifeline systems including water, electrical power and transportation network and analysis of the socio-economic impacts of natural disasters. He is a member of the National Academy of Engineering since 1978. He has received B.S. and M.S. Degrees from Kyoto University, Japan, and Ph.D. in Civil Engineering from Columbia University.

Gavin Smith is the Executive Director of the Center for the Study of Natural Hazards and Disasters (UNC Hazards Center) and the Department of Homeland Security's Center of Excellence - Natural Disasters, Coastal Infrastructure and Emergency Management (DIEM). The UNC Hazards Center research focus areas include modeling, land use planning, technology applications, the social implications of hazards and disasters, environmental hazards management, law and policy, public health, business and economics. In this role Dr. Smith oversees the administration of the UNC Hazards Center including the identification of research opportunities, building partnerships among hazard scholars and practitioners and managing additional research initiatives and sub-centers as they emerge. Dr. Smith also serves as the Executive Director of the Department of Homeland Security, Center of Excellence - Natural Disasters, Coastal Infrastructure and Emergency Management. The Center of Excellence research focus areas include: hazard modeling, engineering, human behavior, and land use planning. Dr. Smith is currently engaged in planning-related research within the center, focused on a national evaluation of local and state hazard mitigation plans. Dr. Smith is an Associate Research Professor in the Department of City and Regional Planning at the University of North Carolina at Chapel Hill and teaches courses in Disaster Recovery, Hazard Mitigation and Special Topics. Dr. Smith is currently writing the text, *A Review of the United States Disaster Assistance Framework: Planning for Recovery* (Public Entity Risk Institute) and recently completed book chapters addressing the linkage between hazards analysis, planning and sustainable development. Dr. Smith completed his Ph.D. from the Hazard Reduction and Recovery Center at Texas A&M University, in Urban and Regional Planning, specializing in environmental planning and policy, environmental dispute resolution and hazard mitigation. Gavin also received B.S. and M.S. degrees in Sociology from Texas A&M University. Areas of emphasis included urban sociology, the politics of urban development and demography

Ellis M. Stanley, Sr. is director of Western Emergency Management Services at Dewberry, Los Angeles, CA. Prior to that, he was General Manager of the City of Los Angeles Emergency Preparedness Department. He has directed emergency management programs around the U.S. for 25 years and has also served as a County Fire Marshal, Fire and Rescue Commissioner, and County Safety Officer. Mr. Stanley was President of the International Association of Emergency Managers, the American Society of Professional Emergency Planners, and the National Defense Transportation Association. He is the City of Los Angeles' representative in the Cluster Cities Project of the Earthquake Mega-cities Initiative -- a project that fosters sharing of knowledge, experience, expertise, and technology to reduce risk to large metropolises from earthquakes and other major disasters. Mr. Stanley is also an advisor to the Multidisciplinary Center for Earthquake Engineering Research. He is a member of the National Research Council's Natural Disasters Roundtable. He has a B.S. (1973) in political science from the University of North Carolina at Chapel Hill. Mr. Stanley's inclusion on this committee will ensure that the committee has an understanding of the needs of some of DHS's stakeholders.

William Waugh is an internationally known scholar in disaster studies and emergency management. He is the author of *Living with Hazards, Dealing with Disasters* (2000), *Terrorism and Emergency Management* (1990), and *International Terrorism: How Nations Respond to Terrorists* (1982); co-author of *State and Local Tax Policies* (1995); editor of *Shelter from the Storm: Repairing the National Emergency Management System after Hurricane Katrina* (2006) and *The Future of Emergency Management* (2006); and co-editor of *Emergency Management: Principles and Practice for Local Government*, 2nd Edition (2008); *Disaster Management in the US and Canada* (1996), *Cities and Disaster* (1990), and *Handbook of Emergency Management* (1990). He is also the author or coauthor of over a hundred articles, chapters, and reports published in the US, Canada, Europe, and Asia. He is the editor-in-chief of the *Journal of Emergency Management* and serves on the editorial boards of *Public Administration Review*, *Public Organization Review*, the *International Journal of Economic Development*, and the *International Journal of Strategic e-Commerce*. Dr. Waugh has been a consultant to public, private, and nonprofit organizations and the media on dealing with terrorist threats, responding to disasters, and building governmental and nongovernmental capacities for managing hazards and disasters. He has served on expert panels and participated in workshops on hospital surge capacity, the Homeland Security Advisory System, applying natural hazard lessons to Homeland Security, using community rating systems to encourage risk reduction, emergency management education, emergency management in Homeland Security, and Homeland Security education and training. He has developed prototype college courses for FEMA's Higher Education Project, worked on the last two Atlanta city charter reviews, helped develop a strategic management training program for Solidarity trade union's national council, and conducted training programs on emergency management and professional development for federal, state, and local agencies and nongovernmental organizations. Dr. Waugh has served as chair of the American Society for Public Administration's Section on Emergency and Crisis Management three times, as well as serving in other ASPA leadership roles. He served two terms on the CEM Commission (International Association of Emergency Managers) that oversees the Certified Emergency Manager program and currently serves on the EMAP Commission (The Council of State Governments) that oversees the Emergency Management Accreditation Program and sets standards for state and local emergency management programs. Dr. Waugh is the coordinator of the Andrew Young School's Graduate Certificate in Disaster Management.