

SCHEDULE

MONDAY, JUNE 22, 2009

| Begin Time | End Time | Event | Location |
|------------|------------|---|-----------------|
| 8:00 a.m. | 12:00 p.m. | <p>Pre-Conference Workshop (Invitation Only) Interdisciplinary Design as an Instructional Discipline <i>Tim Simpson, Pennsylvania State University</i> <i>Matt Parkinson, Pennsylvania State University</i></p> <p>Creativity and innovation in our approaches to design have never been more important. Engaging non-engineering disciplines such as industrial design, architecture, business, and the information sciences leverages their perspectives and design capabilities, but requires new skills of everyone involved in order to be effective. Interdisciplinary graduate design programs provide one opportunity for bringing these faculty and students together. A series of workshops, funded by NSF, has provided an opportunity to benchmark several of these programs and discuss obstacles to their creation and success. We have also been discussing the “ideal” interdisciplinary graduate design program as well as several interdisciplinary research questions that we face as designers. This workshop will provide an industry perspective on these issues and the design challenges industry faces in today’s global—and economically turbulent—marketplace. This will include relevant research questions as well as the opportunity to discuss the many facets of these challenges in a collaborative, multi-disciplinary setting. As one outcome from the workshop, participant teams will explore a research question that could then be developed into a competitive research proposal for NSF.</p> <p><i>Organizers: Tim Simpson, Matt Parkinson, Sam Hunter, Dave Celento, Russ Barton, John Messner, and Cari Bryant-Arnold (Pennsylvania State University), Ann McKenna, Wei Chen, Don Norman, Liz Gerber, and Ed Colgate (Northwestern University), Panos Papalambros, Rich Gonzalez, and Shanna Daly (University of Michigan), and Larry Leifer and Bernie Roth (Stanford University)</i></p> | Room 317 |
| 8:00 a.m. | 3:00 p.m. | <p>Pre-Conference Workshop Multifunctional Materials and Distributed Renewable Energy for Sustainable Infrastructure <i>Cengiz Camci, Wilson Chiu, Jane Davidson, Gregor Henze, Ian Hiskens, Kanti Jain, Michael Lepech, George Lesieutre, Vivian Loftess, Annie Pearce, David Riley, David Sailor, Sean Shaheen, Susan Trolier-McKinstry, and Scott Turn</i></p> <p>Addressing the intertwined issues of energy, the environment, economic development, and population growth is the imperative of our time. In the U.S., our built infrastructure is associated with 40% of the energy used and CO₂ generated nationally. Current events highlight the need for the nations of the world to pursue sustainable development in the future, and to use all natural resources more efficiently. Sustainable infrastructure has to do with incorporating sustainability practices</p> | Room 312 |

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| Begin Time | End Time | Event | Location |
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| | | <p>throughout the lifecycle of infrastructure systems. Various defined, sustainability has the broad objectives of environmental conservation, economic development, and social equity. In many cases, sustainable practices require the development of new materials and practices that are effective, with minimal impacts on the environment, to the benefit of future generations. The required advances are of such a scale that they cannot be realized in a business-as-usual approach—they will require major commitments at the global, national, and local levels alike. To address the issues, there is a need to deploy members of all technical communities that could potentially contribute. While there is general appreciation for the issues within the civil and environmental engineering community, researchers from outside that community need to be attracted to address the interdisciplinary research problems. New advances in the science and technology of multifunctional materials and distributed energy production for sustainable infrastructure will be pursued by bringing together researchers from the infrastructure community with others involved in scientific research and technology development related to materials and energy.</p> <p><i>Steering Committee: George Lesieutre, David Riley, and Cengiz Camci (Pennsylvania State University)</i></p> | |
| 8:00 a.m. | 3:00 p.m. | <p>Pre-Conference Workshop Engineering Education in the 21st Century <i>V. Narayanamurti, Harvard University, Chair</i> <i>Adnan Akay, Bilkent University & Carnegie Mellon University, Co-Chair</i> <i>Richard Miller, Olin College</i> <i>Henry Yang, University of California, Santa Barbara</i></p> <p>Reform of engineering education has captured the attention of many over the last decade. This continuing emphasis stems from the need to prepare graduates to face societal challenges—from health care to information management to sustainability—and to address the effects of globalization and the ever increasing role of technology in daily life. The purpose of the workshop is to bring together several leaders from both within and outside the discipline to share their thoughts and make recommendations to the community and to NSF. Topics will include: the role of engineers in the 21st century; engineering as a ‘liberal art’; entrepreneurship, physics, and technology for future presidents; and organizing research universities for an interdisciplinary future. The workshop will also explore innovative means of educating engineering students to undertake engineering responsibilities in the 21st century. In particular: are there any key elements of engineering as distinct from reductionist science which need to be highlighted in the curriculum and which make engineering a distinct discipline in its own right?</p> | Room 311 |

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| Begin Time | End Time | Event | Location |
|------------|------------|--|-------------------|
| | | <i>Presenters include: Sharad Malik (Princeton University), Richard Miller (Olin College), Richard Muller (University of California, Berkeley), Seeram Ramakrishna (National University of Singapore), James Plummer (Stanford University), Ambuj Sagar (Harvard University), Tina Seelig (Stanford University), Henry Yang (University of California, Santa Barbara), and Jackie Ying (Massachusetts Institute of Technology)</i> | |
| 9:00 a.m. | 12:00 p.m. | Pre-Conference Student Workshop (Pre-Registration Required) <i>Matthew T. Carnavos, NSF</i> | Ballroom C |
| | | Students are invited to participate in a workshop that will orient them to the conference and NSF, as well as to provide information on the nature of interdisciplinary research. Students will have the opportunity to interact with other students attending the conference from both U.S. and foreign institutions, and learn how their studies can be enhanced through interdisciplinary thinking. The featured speaker will be Dr. Bernard Amadei, Founding President of Engineers Without Borders, U.S. and the co-founder of the Engineers Without Borders International network. Dr. Amadei will speak about his experiences with interdisciplinary engineering research. | |
| 12:00 p.m. | 12:30 p.m. | How to Find NSF Funding (for Undergraduate Students) <i>Matthew T. Carnavos, NSF</i> | Ballroom C |
| | | Undergraduate research is an exciting and effective way for students to learn about engineering beyond what is taught in the classroom. It allows students to explore various areas of research and put their academic training into practice while still in school. Many students, however, do not know how to become part of such efforts, especially at schools or other research centers beyond their own home institutions. NSF, an independent U.S. Federal government agency charged with advancing the frontiers of science and engineering through support of basic research, encourages undergraduate participation in research as a means to prepare and encourage the next generation of scientists and engineers. NSF has several programs, including the Research Opportunities for Undergraduates (REU) site and supplement programs, to encourage this. As an outcome of this talk, students will learn about these and other ways to get involved in this important activity, as well as how NSF as a whole can serve them now and in the future. | |
| 12:00 p.m. | 7:00 p.m. | Registration and Information Desk Open | Main Lobby |

MONDAY, JUNE 22, 2009 (CONTINUED)

| Begin Time | End Time | Event | Location |
|------------|-----------|--|------------------------------|
| 1:15 p.m. | 3:15 p.m. | Research Program Development Workshop <i>George A. Hazelrigg, NSF</i> | Room 310 |
| | | <p>This workshop covers many topics that are crucial to planning, proposal writing, and development of a sound academic research program. The subject matter is appropriate for graduate students and young faculty about to begin a career involving academic research, and for more senior faculty who would benefit from an update on how one interfaces with NSF. The workshop is presented by George Hazelrigg, who has overseen the review of more than 5,000 proposals and who has conducted several hundred panel reviews during his 27-year tenure at NSF. George will present many of the lessons learned from his experience.</p> | |
| 1:30 p.m. | 5:30 p.m. | NEES REU Student Workshop (Invitation Only) | Room 321 |
| 3:15 p.m. | 3:30 p.m. | Afternoon Break | Ala Halawai Concourse |
| 3:30 p.m. | 5:00 p.m. | Program Directors Cluster Breakout Sessions | |
| | | Advanced Manufacturing | Room 317 |
| | | <ul style="list-style-type: none"> ▸ Materials Processing and Manufacturing <i>Joycelyn S. Harrison, NSF</i> ▸ Manufacturing Enterprise Systems <i>Cerry M. Klein, NSF</i> ▸ NanoManufacturing <i>Shaochen Chen, NSF</i> ▸ Manufacturing and Construction Machines and Equipment <i>George A. Hazelrigg, NSF</i> | |
| | | <p>The Advanced Manufacturing Cluster supports fundamental research leading to transformative advances in manufacturing and building technologies across size scales from nanometers to kilometers, with emphases on efficiency, economy, and minimal environmental footprint. Research is supported to develop predictive and real-time models; novel experimental methods for manufacturing and assembly of macro, micro, and nanoscale devices and systems; and advanced sensing and control techniques for manufacturing processes.</p> | |
| | | Mechanics and Engineering Materials | Room 312 |
| | | <ul style="list-style-type: none"> ▸ GeoMechanics and GeoTechnical Systems <i>Richard J. Fragaszy, NSF</i> | |

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- **Materials and Surface Engineering**

Clark V. Cooper, NSF

- **Mechanics of Materials**

Glaucio H. Paulino, NSF

- **Nano and Bio Mechanics**

Demitris A. Kouris, NSF

- **Structural Materials and Mechanics**

Lawrence C. Bank, NSF

The Mechanics and Engineering Materials Cluster supports fundamental research aimed at advances in the transformation and use of engineering materials efficiently, economically, and sustainably. The Cluster's programs support research topics relating to the design and use of solid and biological materials that span multiple time scales and length scales from nanometers to meters.

Resilient and Sustainable Infrastructures**Room 311**

- **Geotechnical Engineering**

Richard J. Frigaszy, NSF

- **Civil Infrastructure Systems; and Infrastructure Management and Extreme Events**

Dennis E. Wenger, NSF

- **Hazard Mitigation and Structural Engineering**

M.P. Singh, NSF

- **George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) Research and NEES Operations**

Joy M. Pauschke, NSF

The Resilient and Sustainable Infrastructures Cluster supports research to advance fundamental knowledge and innovation for resilient and sustainable civil infrastructure and distributed infrastructure networks. The Cluster funds research on geotechnical, structural, and earthquake engineering; distributed infrastructure systems management; and response to hazardous events. Research on social, behavioral, and economic issues related to natural and technological hazards is also invited. The Cluster plays a major role in the National Earthquake Hazards Reduction Program (NEHRP), created by Congress by the Earthquake Hazards Reduction Act of 1977.

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| Begin Time | End Time | Event | Location |
|------------|-----------|---|-------------------------------|
| | | System Engineering and Design <ul style="list-style-type: none"> ▸ Control Systems <i>Suhada Jayasuriya, NSF</i> ▸ Dynamical Systems <i>Eduardo A. Misawa, NSF</i> ▸ Engineering Design and Innovation <i>Christina L. Bloebaum, NSF</i> ▸ Operations Research <i>Robert L. Smith, NSF</i> ▸ Sensors and Sensing Systems <i>Shih-Chi Liu, NSF</i> ▸ Service Enterprise Systems <i>Cerry M. Klein, NSF</i> | Room 318 |
| | | <p>The System Engineering and Design Cluster supports fundamental research on the decision-making aspects of engineering, including design, control, and optimization as applied at levels ranging from component to enterprise systems. Supported research examples include sensors, sensing, and the use of sensor data in decision-making and control, and extends to service enterprise systems that address healthcare delivery. Support is provided to enable advances in engineering decision-making, optimization and control, and their application to engineered systems.</p> | |
| 5:00 p.m. | 7:00 p.m. | Student Poster Session | Exhibit Hall III |
| 7:00 p.m. | 9:00 p.m. | Opening Reception | Rooftop Garden/Terrace |

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| Begin Time | End Time | Event | Location |
|------------|------------|--|-------------------------|
| 6:30 a.m. | 4:00 p.m. | Registration and Information Desk Open | Main Lobby |
| 6:30 a.m. | 7:30 a.m. | Continental Breakfast | Outside Ballroom |
| 7:30 a.m. | 8:30 a.m. | Opening Session—Welcome <i>James R. “Duke” Aiona, Jr., Lieutenant Governor, State of Hawaii</i> <i>G. Kemble Bennett, Vice-Chancellor and Dean, Texas A&M University</i> <i>Mun Y. Choi, Dean, University of Connecticut</i> <i>Thomas W. Peterson, Assistant Director for Engineering, National Science Foundation</i> | Ballroom A-C |
| 8:30 a.m. | 9:30 a.m. | Keynote Speakers <i>Bernard Amadei, Professor of Civil Engineering, University of Colorado at Boulder</i> <i>Alan Epstein, Vice President for Technology and Environment, Pratt & Whitney</i> | Ballroom A-C |
| 9:30 a.m. | 10:00 a.m. | Morning Break | Main Lobby |
| 9:30 a.m. | 10:00 a.m. | NEES Opening Plenary Session: NEES in a Multi-Hazard World <i>John Wallace, University of California, Los Angeles (moderator)</i> <i>Anne Kiremidjian, Stanford University</i> | Ballroom A-C |

The world that exists today has changed significantly from the one present during the formative stages of the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) in the late 1990’s. Up to the events of 9-11, large scale hazard mitigation studies focused primarily on earthquake and wind hazards. The investment in NEES equipment and the Network was centered on the earthquake question. We now know that the world has other significant hazards that include those that are man-made in addition to natural hazards. Performance under the various kinds of loading that exist remains a critical issue facing designers. However, our knowledge of performance under loads other than earthquake, such as wind, blast, hurricanes and associated storm surge and other lateral and gravity loadings, is limited. In this world of hazards we face, the role of NEES and its research infrastructure has become even more important. The use of the NEES facilities and the new approach to research that NEES has spawned will be an increasingly important factor in the development of new knowledge to mitigate the effects of a wide range of hazards, including earthquake(s). This session will examine the role of NEES and the earthquake engineering community in researching the effects of a multi-hazard environment on engineered systems, and how these effects can be mitigated.

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| 9:30 a.m. | 11:00 a.m. | Poster Session #1 | Exhibit Hall III |
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| Begin Time | End Time | Event | Location |
|------------|------------|---|------------------------------|
| 10:00 a.m. | 11:00 a.m. | <p>NEES Plenary Session 1: NEES Success Stories and Innovations <i>Steven McCabe, NEESinc (moderator)</i> <i>Andre Filiatrault, University at Buffalo</i> <i>Robert Fleischman, University of Arizona</i> <i>Alicia Lyman-Holt, Oregon State University</i> <i>Benson Shing, University of California, San Diego</i></p> <p>The George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) is nearing the end of the first five years of operations. Much has been accomplished in a relatively short time, especially in light of the large effort and focus required for the start up phase of an expansive and widely-distributed experimental environment. As the 'NEES experiment' settles into mature operations, it is an opportune time to highlight just a few of the major accomplishments and successes of the network, most of which would not have been possible without the vision, commitment, and support of the earthquake engineering community and NSF. This session provides a highlight reel of significant contributions to the advancement of earthquake engineering research, cyberinfrastructure, and education that would not have been possible without NEES.</p> | Ballroom A-C |
| 11:00 a.m. | 12:30 p.m. | Lunch | Ala Halawai Concourse |
| 12:30 p.m. | 7:00 p.m. | Scheduled Technical Tours (see page 32 for descriptions) | |
| 12:30 p.m. | 2:00 p.m. | <p>Parallel Sessions</p> <p>Experiences with International Collaboration <i>M.P. Singh, NSF</i></p> <p>One of the best means to advance engineering knowledge and practice is international research collaboration through which complementary financial and intellectual resources and research data and experience are leveraged. This session will feature invited speakers who have successfully initiated and formed lasting international alliances in science, engineering, and education with different countries around the globe. The speakers will highlight various modes of international collaboration and discuss the issues, barriers, and opportunities such collaborations present.</p> <p>› The Materials World Network: an International Scientific Success Story <i>Daniele Finotello, NSF Division of Materials Research</i></p> | Room 319 |

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| Begin Time | End Time | Event | Location |
|------------|----------|---|-----------------|
| | | <ul style="list-style-type: none"> ▸ Experiences from the US-PRC Cooperative Research on Earthquake Engineering <i>George Lee, University at Buffalo</i> ▸ International Research and Education: Some Keys to Success <i>Anne Emig, NSF Office of International Science and Engineering</i> ▸ Asia-Pacific Collaboration in Smart Structures Technology <i>Bill Spencer, University of Illinois, Urbana</i> | |
| | | <p>Ph.D. and Beyond <i>Matthew T. Carnavos, NSF</i> <i>Jeffrey W. Berman, University of Washington</i> <i>John A. Judge, The Catholic University of America</i> <i>Andrea Hodge, University of Southern California</i> <i>Keri Ryan, Utah State University</i></p> <p>Unsure where your academic studies will take you after you earn your doctorate? Both new and seasoned researchers will discuss topics such as: how to achieve your first academic position; how to begin a research program; and the merits of a postdoctoral position as part of a panel discussion on beginning a career as an academic researcher. Additionally, foreign-educated researchers will discuss how they brought their expertise to the U.S. as well as issues concerning visas, and other important documentation.</p> | Room 312 |
| | | <p>Energy, Sustainability, and CMMI <i>Sandip Tiwari, Cornell University</i> <i>James Watkins, University of Massachusetts, Amherst</i></p> <p>Sustainability as a challenge of modern times is directly connected to alternative energy generation, minimization of energy in systems during manufacturing and during their lifecycles, and minimization and reuse of materials. Manufacturing, design, implementation of enabling advances, and a global perspective are all integral elements for finding appropriate solutions. This session will include invited talks from alternative energy, design, and nanomanufacturing, with an international perspective, and will conclude with an extended audience and speaker discussion on possible paths to solutions.</p> | Room 317 |
| | | <p>Energy Manufacturing <i>Matthew Realff, Georgia Institute of Technology</i> <i>Steve Danyluk, Georgia Institute of Technology</i></p> | Room 311 |

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| Begin Time | End Time | Event | Location |
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| | | <p>This session, a sequel to a CMMI workshop, will examine the role that the manufacturing sector can play in future energy markets. In particular, it will address the possibility of the direct manufacture of energy products, such as petroleum and electricity from feedstocks such as sunlight, air, and water, and it will explore the research needed to enable the manufacturing industry to enter these markets.</p> <p>High-Performance Computing for CMMI Research Room 318 <i>Stephen G. Nash, George Mason University</i> <i>Omar Ghattas, University of Texas, Austin</i> <i>David E. Keyes, Columbia University and King Abdullah University of Science & Technology</i> <i>Peter T. Cummings, Vanderbilt University</i></p> <p>High-performance computing is enabling unprecedented opportunities for modeling and simulation of complex phenomena. To capitalize on this, NSF is making major investments in high-performance computing through NSF-wide initiatives such as Cyber-Enabled Discovery and Innovation. This session explores various aspects of high-performance computing of relevance to CMMI, demonstrating its capabilities and promise.</p> | |
| 12:30 p.m. | 2:00 p.m. | <p>NEES Plenary Session 2: NEES in a Flat World Ballroom A-C <i>Stephan Mahin, University of California, Berkeley (moderator)</i> <i>Jason Ingham, University of Auckland</i> <i>Chul-Young Kim, Myongji University</i> <i>Keh-Chyuan Tsai, National Taiwan University</i> <i>Masayoshi Nakashima, Kyoto University</i></p> <p>As NEES has developed and matured, the focus on interaction and collaboration across the network has naturally extended beyond the borders of the U.S. to the broader world. The extensive international interest in earthquake hazard mitigation provides an excellent opportunity for teamwork and partnership to solve problems and impact innumerable lives and communities. To date, NEES researchers have formally collaborated with international researchers, and large-scale international research efforts have also developed independently and provided opportunities for synergistic exchange. This session will highlight some of the international NEES collaboration as well as independent international earthquake engineering research programs that complement NEES research.</p> | |
| 2:00 p.m. | 2:15 p.m. | Afternoon Break | Ala Halawai Concourse |

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| 2:15 p.m. | 3:30 p.m. | Parallel Sessions | |
| | | Broader Impacts and Promoting Global Diversity | Room 317 |
| | | <i>Joycelyn S. Harrison, NSF</i> <i>Mary Lynn Realff, Georgia Institute of Technology</i> <i>Ted Conway, NSF</i> <i>Omnia El-Hakim, NSF</i> | |
| | | Broadening participation in engineering continues to be important in the evaluation of research proposals and center proposals in the Directorate for Engineering at NSF. In many cases, researchers do not have a good idea of how to address diversity in their grants and how to respond to requests for proposals that require this issue to be addressed. In this session, funding opportunities at NSF to support global diversity through international components of research grants will be presented. NSF's strategic goal of broadening participation of the scientific engineering workforce will be reviewed, and ways of helping NSF reach this goal through research grants will be discussed. | |
| | | Ethics in the International Context | Room 312 |
| | | <i>Adnan Akay, Bilkent University & Carnegie Mellon University</i> <i>Jane E. Fountain, University of Massachusetts, Amherst</i> <i>Rachelle Hollander, Director, Center for Engineering, Ethics, and Society, National Academy of Engineering</i> <i>Scott J. Moore, NSF, Office of Inspector General</i> | |
| | | This session will look at cultural differences across disparate societies, particularly with respect to ethics, and consider approaches to studying, doing research, and conducting business across cultural boundaries. NSF's ethical standards will be presented as a model and compared to the ethical standards of other nations. Ideas will be sought to ease the differences, particularly for students studying abroad and for academic researchers collaborating across national boundaries. | |
| | | Getting the Word Out | Room 311 |
| | | <i>Judy M. Vance, Iowa State University</i> <i>Vadim Shapiro, University of Wisconsin</i> <i>S. K. Gupta, University of Maryland</i> | |
| | | Interested in getting more media exposure for your research? So is NSF. We are constantly looking for research results to put in front of the public to keep cutting edge engineering research "in the news". This session will provide tips on how you can interact with NSF and your own university media people to raise the awareness of the | |

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excellent research that happens in your laboratory. Presenters will include successful PIs and their experience with public media, as well as media experts.

Research Opportunities at the Intersection of the Physical and Engineering Sciences and Cancer Biology **Room 318**

Anna Barker, National Cancer Institute, National Institutes of Health
Clark V. Cooper, NSF

Cancer represents a global disease burden with enormous economic and human impact. Recent progress in the molecular sciences and advanced technologies has set the stage to open a new frontier in cancer research by enabling the convergence of the physical and engineering sciences with cancer biology and oncology. The National Cancer Institute (NCI) has recently undertaken a year-long effort to explore novel and innovative approaches that will enable an understanding of the physical laws and principles that shape and govern the emergence and behavior of cancer at all scales. This session will feature presentations from experts that are leading efforts at the intersection of cancer research, physics, mathematics, and engineering and will include a review of NCI's initial effort to build new trans-disciplinary teams through the development of a collaborative network of Physical Sciences-Oncology Centers (PS-OCs). The goal of these centers is to enable exponential progress in the understanding and treatment of various cancers.

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| 2:15 p.m. | 4:15 p.m. | NEES Plenary Session 3: NEES without Borders | Ballroom A-C |
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Roberto Leon, Georgia Institute of Technology (moderator)
Andrew Charleson, Victoria University of Wellington
Glenn Rix, Georgia Institute of Technology
Keri Ryan, Utah State University
Steven Tipping, Tipping Mar + associates
Solomon Yim, Oregon State University

The wide-ranging impact of earthquakes on the lives of people is universal and not constrained to any one country or region of the world. Although NEES operates within the U.S. context, it aims to impact the international community with its research results. In the previous plenary session (NEES in a Flat World), international research collaboration and synergistic activities were highlighted, and this session (NEES without Borders) builds on the global theme by looking forward and focusing on the potential impact of NEES around the world. This impact can occur through enhanced collaboration efforts, dissemination of research results, and development of a wide spectrum of earthquake mitigation strategies and technology that address different levels of development around the world.

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| 3:30 p.m. | 6:00 p.m. | <p>U.S.-China NanoManufacturing Workshop <i>Shaochen Chen, NSF of the U.S.</i> <i>Guobiao Wang, NSF of China</i></p> <p>This workshop aims to bring the nanomanufacturing communities together from both the U.S. and China. The session will consist of presentations by the Program Director of NanoManufacturing of the U.S. NSF, the Division Director of Materials and Manufacturing of the Chinese NSF, and by leading nanomanufacturing experts from both sides. The workshop will also include a discussion session about possible international collaboration.</p> | Room 321 |
| 7:00 p.m. | 10:00 p.m. | <p>Program Director's Office Hours <i>Make appointments at the NSF Information Desk in the Main Lobby</i></p> | <p>Sheraton Waikiki: Honolulu, Kahuku, Oahu, Waialua, & Waianae Rooms</p> |

WEDNESDAY, JUNE 24, 2009

| Begin Time | End Time | Event | Location |
|------------|-----------|---|------------------------------|
| 6:30 a.m. | 6:00 p.m. | Registration and Information Desk Open | Main Lobby |
| 6:30 a.m. | 7:30 a.m. | Continental Breakfast | Ala Halawai Concourse |
| 7:30 a.m. | 9:30 a.m. | Parallel Sessions | |

Collaborative Research Efforts with Industry

Room 319

Don Senich, NSF

David Benson, University of California, San Diego

Thomas Weller, University of South Florida

Albert Shih, University of Michigan

Jennica Lowell, Kona Blue Water Farms, Inc.

Joanne Ebesu, Oceanit Laboratories, Inc.

A major objective of NSF is to improve the nation's capacity for intellectual and economic growth. It does this by supporting the discovery of new knowledge and the enhancement of a skilled workforce. One mechanism is the GOALI initiative, which aims to synergize university-industry partnerships by making funds available to support an eclectic mix of industry-university linkages. A second mechanism is the SBIR/STTR initiative aimed to harness the Small Business High Tech resources to meet national innovation goals. This session will address objectives, experiences, and opportunities in these efforts.

CAREER and Beyond

Room 312

Shaochen Chen, NSF

Jian Cao, Northwestern University

Z.J. Pei, Kansas State University

This discussion will present ideas on how you might want to organize your CAREER proposal and how you might use your CAREER award to help you move toward your career goals. Recent PECASE/CAREER awardees will discuss their success stories and share their experiences.

Engineering for the Developing World

Ballroom A-C

Bernard Amadei, University of Colorado at Boulder

In the next two decades, almost two billion additional people are expected to populate the Earth; 95% of them in developing or underdeveloped countries. This growth will create unprecedented demands for energy, food, land, water, transportation, materials, waste disposal, earth moving, health care,

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| | | <p>environmental cleanup, telecommunication, and infrastructure. The role of engineers will be critical in fulfilling those demands at various scales, ranging from remote small communities to large urban areas, and mostly in the developing world. This workshop will address the challenges and opportunities associated with practicing engineering in the developing world and the importance of integrating engineering with non-engineering disciplines when addressing the needs of developing communities.</p> | |
| | | <p>Opportunities for Interdisciplinary Research <i>Bruce M. Kramer, NSF</i> <i>Shaochen Chen, NSF</i> <i>Clark V. Cooper, NSF</i> <i>Richard J. Fragaszy, NSF</i> <i>Robert L. Smith, NSF</i></p> | Room 318 |
| | | <p>The National Science Board has expressed concern that current NSF solicitations and review procedures may have the unintended effect of making it more likely that high-risk, interdisciplinary proposals are overlooked. CMMI has a strong interest in encouraging such proposals, which are likely to serve as catalysts for new initiatives in emerging research areas in the CMMI disciplines, allowing CMMI to provide leadership for new cross-ENG and cross-NSF programs of interest to our community. This session will provide an overview of current thinking regarding interdisciplinary review in CMMI and brief overviews of opportunities for interdisciplinary research within the four CMMI clusters. These overviews will be followed by an open discussion of the desirability of, need for, and mechanisms for encouraging the submission, identification, and funding of high-quality interdisciplinary proposals.</p> | |
| | | <p>Top Advances and Emerging Areas <i>George A. Hazelrigg, NSF</i></p> | Room 311 |
| | | <p>This session will showcase a few of the top advances funded by CMMI over the past 18 months and present important emerging research areas that could receive emphasis over the coming 18 months. Presentations of top advances will be by the Principal Investigators who made them, and ideas for emerging areas will be solicited from the CMMI research communities.</p> | |
| | | <p>Top Advances: <ul style="list-style-type: none"> • Stochastic Recruitment <i>Harry Asada, Massachusetts Institute of Technology</i> </p> | |

WEDNESDAY, JUNE 24, 2009 (CONTINUED)

| Begin Time | End Time | Event | Location |
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| | | <ul style="list-style-type: none"> ▸ Development of New Integrated Tools for Predicting, Monitoring, and Controlling Movements due to Excavations <i>Richard Finno, Northwestern University</i> ▸ Nanomanufacturing of Graphene-Based Devices <i>Steven Chou, Princeton University</i> | |
| | | <p>Emerging Areas:</p> <ul style="list-style-type: none"> ▸ Bio-Inspired Sensing and Actuation Technologies Towards the Next Generation of Engineering Systems <i>Jerome Lynch, University of Michigan</i> ▸ Carbon Dioxide and Construction: Reduction, Sequestration, and Remediation <i>Kimberly Kurtis, Georgia Institute of Technology</i> | |
| | | <p>Biologically Inspired and Enhanced Materials <i>Demitris Kouris, NSF</i> <i>Pradeep Guduru, Brown University</i> <i>Rod Ruoff, University of Texas at Austin</i> <i>Taber Saif, University of Illinois at Urbana-Champaign</i></p> | Room 317 |
| | | <p>This two-hour panel presentation and discussion will focus on “biologically inspired and enhanced materials.” After their short presentations, the panelists will engage the audience in a discussion related to the state-of-the-art in mimicking biological systems. These include mechanical function of proteins as molecular motors, biomolecular assembly of cellular structures, as well as the role of cells as sensors, actuators, and signal transducers.</p> | |
| 9:30 a.m. | 10:00 a.m. | Morning Break | Ala Halawai Concourse |
| 9:30 a.m. | 11:00 a.m. | Poster Session #2 | Exhibit Hall III |
| 9:30 a.m. | 11:00 a.m. | NEES Parallel Sessions | |
| | | <p>NEES: Seismic Performance of Non-Ductile Buildings and Non-Structural Components <i>Julio Ramirez, Purdue University (moderator)</i> <i>Richard Klingner, University of Texas at Austin</i> <i>Gilberto Mosqueda, University at Buffalo</i> <i>Andreas Stavridis, University of California, San Diego</i> <i>Bozidar Stojadinovic, University of California, Berkeley</i></p> | Room 311 |

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Joseph Wieser, University of Nevada, Reno
Siva Mettupalayam, University of Colorado at Boulder

While advances are being made in seismic resistant design for new construction, there exists a sizable inventory of buildings designed and built to older standards. Furthermore, information regarding performance of non-structural systems, as well as the interaction of the lateral force resisting system with elements such as cladding or masonry infill, is lacking. Researchers are working to answer questions such as: How much ductility exists in “non-ductile” buildings? What are the costs associated with damage to, and repair of, non-structural elements? What are promising retrofit techniques?

NEES: Lifelines and Critical Infrastructure**Room 312**

Bruce Kutter, University of California, Davis (moderator)
Rachelle Howell, University of Texas at Austin
Laura Jacobs, Georgia Institute of Technology
Ben Kosbab, Georgia Institute of Technology
Terry McLaren, National Center for Supercomputing Applications
Radoslaw Michalowski, University of Michigan, Ann Arbor
Mohammad Pour-Ghaz, Purdue University

Enhancing the performance of lifelines and critical infrastructure is a central issue for protecting society and enabling quick response during and subsequent to a major seismic event. This breakout session showcases experimental and analytical research aimed at monitoring the performance of buried pipelines, network risk assessment, soil stabilization, and modeling of harbor crane structures to provide a better understanding of the level of functionality during and after future earthquakes.

NEES: Connecting the World Through Hybrid**Room 317****Simulation**

Benson Shing, University of California, San Diego (moderator)
Cheng Chen, Lehigh University
Chung-Chan Hung, University of Michigan, Ann Arbor
Gregory Pluta, University of Illinois at Urbana-Champaign
James Ricles, Lehigh University
Andreas Schellenberg, University of California, Berkeley
Catherine Whyte, University of California, Berkeley

Hybrid simulation represents one of the central focal points of NEES since it brings together the large-scale experimental capabilities of the network and advanced computational modeling techniques through innovative time-stepping

WEDNESDAY, JUNE 24, 2009 (CONTINUED)

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|------------|------------|---|------------------------------|
| | | <p>integration algorithms. Hybrid simulation allows for critical regions of a complex structural system to be modeled physically while the remainder of the system is modeled computationally. Some of the recent advances in hybrid simulation include consideration of collapse, real-time testing, integration of shake-tables and actuators, and geographically distributed components. In particular, distributed hybrid simulation offers potential for linking researchers around the world and bringing together diverse groups of people and research infrastructure to tackle highly complex problems. This session will highlight recent advances and ongoing developments in hybrid earthquake simulation.</p> <p>NEES: Emerging Frontiers in Earthquake Engineering and Multi-Hazard Experimentation <i>Andre Filiatrault, University at Buffalo (moderator)</i> <i>Michael Bartlett, University of Western Ontario</i> <i>Jonathan Bray, University of California, Berkeley</i> <i>Michel Bruneau, University at Buffalo</i> <i>Cherri Pancake, Oregon State University</i> <i>Solomon Yim, Oregon State University</i></p> <p>The NEES experimental infrastructure during FY 2005–FY 2014 consists of shake tables, geotechnical centrifuges, a nonstructural components simulator, a tsunami wave basin, large-scale testing laboratories with reaction walls and strong floors, mobile field equipment, and permanently installed field instrumentation. This session will identify new experimental facilities, methods, and instrumentation needed beyond 2014 for advancing earthquake engineering and multi-hazard research and innovation.</p> | |
| 11:00 a.m. | 12:30 p.m. | Lunch | Ala Halawai Concourse |
| 11:00 a.m. | 2:00 p.m. | NEES Equipment Site Forum (Invitation Only) | Room 325 |
| 12:00 p.m. | 12:30 p.m. | European Science Foundation (ESF) Information Session on the EUROCORES Program | Room 312 |
| 12:30 p.m. | 2:00 p.m. | Poster Session #3 | Exhibit Hall III |
| 12:30 p.m. | 2:00 p.m. | NEES Poster Session | Exhibit Hall III |

WEDNESDAY, JUNE 24, 2009 (CONTINUED)

| Begin Time | End Time | Event | Location |
|------------|-----------|---|------------------------------|
| 2:00 p.m. | 7:00 p.m. | Scheduled Technical Tours (see page 32 for descriptions) | |
| 2:00 p.m. | 2:30 p.m. | Afternoon Break | Ala Halawai Concourse |
| 2:15 p.m. | 3:30 p.m. | Parallel Sessions | |

Collaboration and Synergism Among Dynamical Systems Project: A Panel Discussion **Room 319**
Eduardo Misawa, NSF

This session, sponsored by CMMI's Dynamical Systems program, aims to facilitate research and education collaboration among the Principal Investigators (PIs) supported by the program. This session will provide an opportunity for the PIs to have a quick overview of all the projects and will conduct a discussion about enablers and obstacles to enhance research collaboration among related projects, perhaps through virtual collaboration and meetings at the PI sites.

Early Planning for Industry-University Collaboration **Room 318**
Don Senich, NSF
Anthony Boccanfuso, National Academy of Sciences
James Brown, NSF

Industrial sponsorship of university projects has played a strategic role in advancing the academic research enterprise. Recent data show a decline as a percent of overall funding. There is significant value to these partnerships and some universities have successfully navigated the myriads of challenges and made industry support a major component of funding for these efforts. Convened by the National Academies, the University Industry Demonstration Partnership seeks to enhance the value of collaborative partnerships. This session will discuss some of the initiatives taking place to advance collaborative research efforts.

International Activities Related to Disaster Reduction: **Room 317**
The International Strategy for Disaster Reduction (ISDR)
and the Pacific Tsunami Warning Center (PTWC)
Dennis Wenger, NSF
Stuart Weinstein, National Oceanic and Atmospheric Administration (NOAA)

Over the past five years considerable international activities have been undertaken to mitigate future global natural disasters. This session will focus on two topical

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| Begin Time | End Time | Event | Location |
|------------|----------|-------|----------|
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areas. First, Dr. Dennis Wenger of NSF will discuss the United Nations ISDR. Dr. Wenger serves on the ISDR Scientific and Technical Committee and will describe major efforts that are being undertaken by this global program. Second, Dr. Stuart Weinstein from NOAA will present information on the operations and plans of the PTWC.

SPECIAL SESSION:

Ballroom A-C

Engineering in the Global Context

Jimmy Hsia, University of Illinois at Urbana-Champaign (co-organizer)

Ken Chong, NSF (co-organizer)

Subra Suresh, Massachusetts Institute of Technology School of Engineering

- **Opportunities for International Cooperation through European Research and Higher Education Programs**

Laurent Bochereau, Delegation of the European Commission

- **Innovation through Global Collaboration and Competition**

Henry Yang, University of California at Santa Barbara

- **Dynamic Growth of Leading Research Universities in China**

Wei Yang, Zhejiang University, China

Leading educators and researchers in the United States and other countries present their views on engineering education, as well as global workforce training and productivity issues in a flat world.

Agent Based Modeling

Room 312

William A. Wallace, Rensselaer Polytechnic Institute

Benigno Aguirre, University of Delaware

Agent based modeling has been established within the social sciences and is increasingly being utilized in engineering and natural sciences. This session will provide an introduction and basic analysis of these models. Dr. William A. Wallace, a civil engineer from Rensselaer Polytechnic Institute, and Dr. Benigno Aguirre, a sociologist from the University of Delaware, will discuss the basic nature of agent based models and provide examples of their use. While the strengths of the models for determining complex behavior of interacting individual agents and components will be noted, the discussion will also note limitations on utilizing these models for simulating emergent phenomena.

WEDNESDAY, JUNE 24, 2009 (CONTINUED)

| Begin Time | End Time | Event | Location |
|------------|-----------|---|----------------------------|
| | | <p>Sustainability Research in Civil and Mechanical Engineering Departments <i>Richard J. Fragaszy, NSF</i> <i>Lawrence C. Bank, NSF</i></p> <p>In this session, panelists from institutions that have been at the forefront of the effort to incorporate sustainability in their teaching and research programs will present their views on how best to address the interdisciplinary research area of sustainability in civil and mechanical engineering departments. Strategies used by their institutions will be described. The question of how to coordinate research and education in sustainability across schools, departments, and groups also will be discussed.</p> | Room 311 |
| | | <p>NEES: Emerging Frontiers in Research <i>Shirley Dyke, Washington University in St. Louis (moderator)</i> <i>Ricardo Dobry, Rensselaer Polytechnic Institute</i> <i>Stephen Mahin, University of California, Berkeley</i></p> <p>Since its inception, NEES has pushed the boundaries of earthquake engineering research and established a new framework for collaboration and advancement. However, the current state-of-the-art is not an end point and continual innovation is required. Bring your ideas and join our panel for a stimulating discussion on the emerging frontiers in seismic research.</p> | Room 321 |
| 3:30 p.m. | 5:00 p.m. | <p>NEES Site Operations Manager Meeting (Invitation Only)</p> | Room 321 |
| 3:30 p.m. | 6:00 p.m. | <p>Program Director's Office Hours <i>Make appointments at the NSF Information Desk in the Main Lobby</i></p> | Rooms 313 & 316 |

WEDNESDAY, JUNE 24, 2009 (CONTINUED)

| Begin Time | End Time | Event | Location |
|------------|------------|---|--|
| 7:00 p.m. | 10:00 p.m. | Conference Banquet Luau in the Coconut Grove | Royal Hawaiian Hotel (adjacent to Sheraton Waikiki) |

“In Celebration of Aloha,” the NSF CMMI Conference Banquet will be an authentic, tropically elegant, Luau held in the Coconut Grove area of The Royal Hawaiian Hotel; adjacent to The Sheraton Waikiki Hotel. With a backdrop of Diamond Head and Waikiki Beach, your evening begins with a Hawaiian Trio playing background melodies and continues under the stars with a feast of foods from the Hawaiian Islands. The highlight of the Royal Hawaiian Luau is the spectacular Tihati’s Polynesian Revue with song and dance of the islands and other Pacific Rim locations that have influenced the unique culture found only in Hawaii; including a performance by the exciting Samoan Fireknife dancers. Come embrace the warmth of the Aloha spirit, breathe in the ocean breezes, taste the flavors of the Pacific, and participate in the entertainment heritage of this unique culture.

THURSDAY, JUNE 25, 2009

| Begin Time | End Time | Event | Location |
|------------|------------|---|-------------------------|
| 6:30 a.m. | 2:00 p.m. | Registration and Information Desk Open | Main Lobby |
| 6:30 a.m. | 7:30 a.m. | Continental Breakfast | Outside Ballroom |
| 7:30 a.m. | 9:30 a.m. | Closing Plenary Session | Ballroom A-C |
| 9:30 a.m. | 10:00 a.m. | Morning Break | Main Lobby |
| 9:30 a.m. | 11:00 a.m. | Poster Session #4 | Exhibit Hall III |
| 9:30 a.m. | 11:00 a.m. | NEES Parallel Sessions | |

NEES: Innovations in Education, Outreach and Sensor Technology Room 311

Lelli Van Den Einde, University of California, San Diego (moderator)
Winncy Du, San Jose State University
Sherif Elfass, University of Nevada, Reno
Alicia Lyman-Holt, Oregon State University
Derek Skolnik, University of California, Los Angeles
Andreas Stavridis, University of California, San Diego
Shakhzod Takhirou, University of California, Berkeley

The Education, Outreach and Sensor Technology breakout session will highlight high impact efforts by NEES sites and researchers that focus on activities and products that have served the NEES target groups of K-12, undergraduate, graduate, earthquake professionals, and engineering researchers. The education and outreach activities and products have effectively communicated seismic risk and engineering topics to their audiences in novel ways. An additional component to this session includes the presentation of new sensor technologies that enable researchers to generate unique insights into structural response which current sensors may be unable to provide.

NEES: Large-Scale Experimental Research Room 312

Charles Roeder, University of Washington (moderator)
Rigoberto Burgueno, Michigan State University
Thomas Kang, University of Oklahoma
Daniel Kuchma, University of Illinois at Urbana-Champaign
Laura Lowes, University of Washington

THURSDAY, JUNE 25, 2009 (CONTINUED)

| Begin Time | End Time | Event | Location |
|------------|----------|-------|----------|
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Eric Lumpkin, University of Washington
Yi Lang Mo, University of Houston

Large-scale experimental research is a critical component of advancing the state-of-the-art in earthquake engineering. This session highlights a variety of recent and ongoing experimental programs, including NEESR and non-NEESR projects. Steel concentrically-braced frames and reinforced concrete beam-column joints, bridge piers, and structural walls will be discussed. In addition, an innovative structural health monitoring technique for detection of seismic damage will be presented.

NEES: Simulation of Seismic Behavior and Performance

Room 317

Bozidar Stojadinovic, University of California, Berkeley (moderator)
Ashraf Ayoub, University of Houston
Shirley Dyke, Washington University in St. Louis
Benjamin Fell, California State University, Sacramento
Kit Miyamoto, Miyamoto International
Swaminathan Krishnan, California Institute of Technology

Earthquake engineers use simulation to link experimental results of real structures to an idealized model, and to extend the applicability of the model beyond what can be feasibly built and tested in a NEES laboratory. Researchers in this session present results from simulations with models containing new damping devices that improve the performance of structures, and new elements that improve our ability to model steel-braces, torsion-critical reinforced concrete elements, and soil-structure interaction of piles in liquefiable soils.

NEES: Hydrodynamic Effects and Liquefaction

Room 318

Ian Robertson, University of Hawaii at Manoa (moderator)
Jonathan Bray, University of California, Berkeley
Q. Jim Chen, Louisiana State University
Patrick Lynett, Texas A&M University
Volker Roeber, University of Hawaii at Manoa
Antonios Vytiniotis, Massachusetts Institute of Technology
Yin Lu Young, Princeton University

This session will highlight recent experimental and computational findings regarding the effects of tsunami inundation and hurricane storm surge on coastal infrastructure and buildings. Although the time scale, wave form, flow depths, and velocities are different for tsunamis and storm surge, there are many similarities in the effects each has on the built environment. This session also will cover the

THURSDAY, JUNE 25, 2009 (CONTINUED)

| Begin Time | End Time | Event | Location |
|------------|------------|--|------------------------------|
| | | effects of liquefaction induced by coastal inundation and seismic ground-shaking on foundation stability. Although the causes of the pore pressure increase that induces liquefaction are different, the resulting effects on the soil and foundations are similar. There are also similarities in the modeling tools used to simulate each event. It is hoped that this session will foster future collaboration between these research efforts, leading to a multi-hazard approach to coastal inundation modeling and infrastructure design. | |
| 11:00 a.m. | 12:30 p.m. | Lunch | Ala Halawai Concourse |
| 12:30 p.m. | 2:00 p.m. | Poster Session #5 | Exhibit Hall III |
| 12:30 p.m. | 2:00 p.m. | NEES Closing Plenary Session: Advancing Performance and Resiliency <i>Steven McCabe, NEESinc (co-moderator)</i> <i>Jack Moehle, University of California, Berkeley (co-moderator)</i> <i>Gregory Deierlein, Stanford University</i> <i>M. Saiid Saiidi, University of Nevada, Reno</i> <i>Richard Sause, Lehigh University</i> | Ballroom A-C |
| | | The field of earthquake engineering has made substantial progress in improving the performance of buildings and other structures during earthquakes. Good performance of structures and systems is critical to sustaining infrastructure and thus providing resiliency in society. Failure of components within infrastructure results in a chain reaction affecting life and safety, quality of life, and economic development. This session will have presentations that focus on innovations in seismic engineering for buildings and bridges with focus on their linkage to resiliency in society. | |
| 2:00 p.m. | 6:00 p.m. | NEES/E-Defense Meeting (Invitation Only) | Room 321 |
| 2:00 p.m. | 7:00 p.m. | Scheduled Technical Tours (see page 32 for descriptions) | |
| 2:15 p.m. | 4:45 p.m. | Program Director's Office Hours <i>Make appointments at the NSF Information Desk in the Main Lobby</i> | Rooms 313 & 316 |

FRIDAY, JUNE 26, 2009

| Begin Time | End Time | Event | Location |
|------------|-----------|---|-------------|
| 8:30 a.m. | 4:00 p.m. | Post Conference Tour – Hawaii’s Big Island: University of Hawaii at Hilo Hawaii Volcanoes National Park | Hilo |
| 9:00 a.m. | 3:30 p.m. | Post Conference Tour – Maui: Haleakala Observatories: University of Hawaii Observatory Air Force Observatory | Maui |