

**National Earthquake Hazards Reduction Program (NEHRP)
Advisory Committee on Earthquake Hazards Reduction (ACEHR)
August 23-24, 2022 Virtual Meeting Summary**

Attendees (listed alphabetically by category)

ACEHR Members

Lucy Arendt, Chair	St. Norbert College
Gregory Beroza**	ACEHR ex-officio
Ann Bostrom**	University of Washington
Jeffrey Briggs	Missouri State Emergency Management Agency
Robert Carey	Utah Division of Emergency Management
David Cocke	Structural Focus
Gregory Deierlein	Stanford University
Susan Dowty	International Code Council
Robert Ezelle	Washington Military Department
Thomas Heausler	Consulting Structural Engineer
Tara Hutchinson	University of California, San Diego
Anne Meltzer	Lehigh University
Danielle Mieler	City of Alameda
Ellen Rathje	University of Texas, Austin
Jonathan Stewart*	University of California, Los Angeles
Douglas Wiens	Washington University in St. Louis

NEHRP Agency Representatives

Luciana Astiz	National Science Foundation
Michael Blanpied*	United States Geological Survey
William Blanton	Federal Emergency Management Agency
Tina Faecke	National Institute of Standards and Technology
John “Jay” Harris	National Institute of Standards and Technology
Gavin Hayes	United States Geological Survey
Michael Mahoney	Federal Emergency Management Agency
Steven McCabe	National Institute of Standards and Technology
Jacqueline Meszaros	National Science Foundation
Sissy Nikolaou	National Institute of Standards and Technology
Siamak Sattar*	National Institute of Standards and Technology

Others

Jason Averill	National Institute of Standards and Technology
Christine Beyzaei	National Institute of Standards and Technology
Tanya Brown-Giammanco*	National Institute of Standards and Technology
Joannie Chin*	National Institute of Standards and Technology
Jazalyn Dukes*	National Institute of Standards and Technology
Juan Carlos Esquivel	JCE Structural Engineering Group
Jesse Rozelle**	Federal Emergency Management Agency
Katherine Johnson	National Institute of Standards and Technology
Laurie Locascio*	National Institute of Standards and Technology Director
Carmen Martinez	National Institute of Standards and Technology
Cartier Murrill	National Institute of Standards and Technology
Linda Rowan	Congressional Research Service
Adam Zsarnoczay**	NHERI SimCenter

*Attended Tuesday only **Attended Wednesday only

I. Welcome

As Designated Federal Officer (DFO) for ACEHR (or Committee), Ms. Tina Faecke called the meeting to order at 1:00 pm EDT, took roll call for the Committee members, and confirmed the quorum requirement was satisfied. She announced the meeting will be recorded and then introduced the NIST Director, Dr. Laurie Locascio, who thanked the Committee for their engagement and active participation and emphasized the importance of the Committee's assessment. Locascio expressed her appreciation to Gregory Deierlein and Robert Ezelle who will be completing their terms prior to the next ACEHR meeting.

After her introductory remarks, Dr. Locascio handed the meeting over to ACEHR Chair, Dr. Lucy Arendt, who reviewed the meeting agenda with the Committee and welcomed three new members (Rathje, Hutchison, and Briggs). Upon Arendt's request, the Committee had no initial comments or questions.

II. NEHRP (or Program) Update

Dr. John Harris, Acting NEHRP Director, provided a brief update on the status of the NEHRP Strategic and Management Plans, the Interagency Coordinating Committee (ICC) meeting plans, and the U.S. Government Accountability Office (GAO) Assessment Report on NEHRP. Links for the GAO-22-105016 and the GAO 21-129 assessment reports are provided within the meeting agenda. Harris' update is available at https://nehrp.gov/pdf/1%20-%20Program%20Overview%20pres%20to%20post_ACEHR_8-23-22.pdf.

Discussion:

The Committee asked about the difference between the ICC and the Program Coordination Working Group (PCWG). The ICC consists of the directors of the four NEHRP agencies (NIST, FEMA, NSF, and USGS), the Office of Science and Technology Policy (OSTP), and the Office of Management and Budget (OMB). The NIST Director chairs the ICC. The PCWG consists of working-level leaders from the four NEHRP agencies. The ICC oversees the Program whereas the PCWG manages the Program and implements the direction from the ICC.

Did the ICC ever meet with ACEHR? Faecke noted the ACEHR meeting is an open public meeting; however, the ICC meeting is not. The PCWG members always attend the ACEHR meetings and then brief their agency directors. A previous ACEHR Chair (Chris Poland) was allowed to attend one ICC meeting but only for his briefing to the ICC.

How can the Committee follow the progress of the updated NEHRP Strategic Plan and development of the Management Plan? Public comments and the NEHRP agency resolutions for the Strategic Plan will be posted on the NEHRP website. The members will receive progress updates on both documents during each ACEHR meeting and the Committee will receive a copy of each published report via email. Subject-matter expert reviews may be solicited from several Committee members between ACEHR meetings. Arendt encouraged the Committee members to review the Strategic Plan and GAO reports prior to the next ACEHR meeting.

III. NEHRP Activity Updates by Strategic Plan Goals

Harris provided an overview of the reporting process for the major NEHRP activities since the March 2-3, 2022 ACEHR meeting based on the updated goals. Harris' overview is available at

https://nehrp.gov/pdf/2%20-%20Program%20Activity%20Update%20pres%20to%20post_ACEHR_8-23-22.pdf. A list of new activities or ongoing activities with noteworthy outcome/impact since the March 2022 ACEHR meeting are linked within the meeting agenda below each agency update presentation link. These activities are categorized by the strategic goals/objectives they support as well as if they support a focus area or ACEHR recommendations. Each agency will highlight one or two projects from their list. Time was allocated for open dialogue after the agency updates.

USGS Updates - Dr. Gavin Hayes, Senior Science Advisor for Earthquake and Geologic Hazards, provided the USGS update. Hayes provided an overview of the Global Seismographic Network (GSN) and described the potential increase for Subduction Zone Science (SZS). His presentation is available at https://nehrp.gov/pdf/3%20-%20USGS%20Program%20Update%20pres%20to%20post_ACEHR_8-23-22_REV.pdf. USGS has a fact sheet on reducing risk where tectonic plates collide at <https://pubs.er.usgs.gov/publication/fs20173024> and the related full report (Circular 1428) is available at <https://pubs.er.usgs.gov/publication/cir1428>.

Discussion:

The Committee asked if the GSN data is distributed via the Incorporated Research Institutions for Seismology (IRIS). The status of the GSN stations may be found at https://earthquake.usgs.gov/monitoring/operations/network.php?virtual_network=GSN. A follow-up question was raised asking if the GSN sites have had site characterization studies conducted and if that information is publicly available. Hayes will research the GSN site characterization and provide the information to Arendt.

The Committee inquired about coordination efforts between USGS and NSF on the GSN and SZS activities. Hayes reported that USGS and NSF have regular coordination meetings on these topics. In June 2022, USGS and NSF signed a Memorandum of Understanding (MOU) covering coordination of activities in specific areas of cooperation. The [MOU](#) shall remain in effect for five years unless terminated earlier by both agencies.

Has the delay in upgrading the GSN instruments resulting from COVID and the restrictions on international travel influenced the performance of the network in terms of its ability to detect earthquakes? Hayes responded, yes, anecdotally. Not being able to perform upgrades means USGS doesn't have the ability to improve the performance of stations and also means some of those stations will go down and USGS can't bring them back up in some instances. Local groups help manage and operate many of the GSN stations, but for some that are hard to access that is not practical. As a result, some stations will be out of action until upgraded which will affect USGS's ability to monitor earthquakes but practically speaking those will be the smallest earthquakes (large earthquakes are recorded globally). USGS's ability to detect significant earthquakes won't be impacted but outages may impact USGS's ability to characterize earthquakes in terms of source processes of the event. From a hazard monitoring perspective hopefully the delays are minimally impactful. However, the longer the upgrades are delayed, the greater the chance of increased impacts.

A question was raised to what degree are the GSN instruments co-owned or co-financed with other countries. Hayes reported the GSN are co-operated, but generally not co-financed. You may see some affiliated GSN stations listed, but those are rare compared to the network as a

whole. For the most part, local partners cooperate with USGS to help manage some stations and perform upgrades unless they require instrumentation which the USGS staff must perform.

NSF Updates - NSF updates were given by Dr. Luciana Astiz, Program Director, Earth Science Division, Geoscience Directorate and Dr. Jacqueline Meszaros, Science and Technology Advisor, Natural Hazards, Disasters and Resilience, Division of Civil, Mechanical and Manufacturing Innovation, Directorate for Engineering. A pie chart was presented displaying the NEHRP-related projects awarded by Directorate since the last ACEHR meeting in addition to a bar graph showing the awards by NEHRP goals and objectives.

A five-year NSF-funded seafloor geodesy project that will establish open and accessible seafloor deformation data offshore Alaska and Cascadia was funded (visit <https://www.seafloorgeodesy.org/>). Eight more projects were awarded to fund subduction zone science in addition to detailed studies of recent earthquakes.

Meszaros emphasized foundational work beyond the two Directorates most deeply involved with NEHRP, highlighting the fact that earthquake understanding and resilience research communities have broader impacts on societal well-being.

A total of 20 joint NSF/NIST Disaster Resilience Research Grant (DRRG) awards were announced on May 4, 2022. Proposals for the next DRRG solicitation are due August 19, 2022. Visit <https://www.nist.gov/news-events/events/2022/09/2022-disaster-resilience-symposium> for information and to register for the 2022 disaster resilience symposium in September, featuring the 2018 NIST and 2020 NIST/NSF DRRG recipients.

A reinauguration ceremony of the UCSD Shaketable was held June 30, 2022. NSF's update is available at [https://nehrrp.gov/pdf/4%20-%20NSF%20Program%20Update%20pres%20to%20post ACEHR 8-23-22 REV.pdf](https://nehrrp.gov/pdf/4%20-%20NSF%20Program%20Update%20pres%20to%20post%20ACEHR%208-23-22%20REV.pdf).

Discussion:

NSF funding related to NEHRP is very focused in GEO during this reporting period, with much fewer grants associated with the other components of NEHRP. How did this come about in terms of emphasis on GEO as opposed to the other Directorates? Lots of programs have different award deadlines, depending on the funding cycle of each Directorate. Many awards are ongoing with continuing grants that are not reflected in NSF's update. Astiz shared a link (<https://drive.google.com/file/d/1m5ZmLYk50Iv2SWT1rkDYMyAYzqiB1qZb/view?usp=sharing>) to the list of NEHRP-related NSF awards since March 2022.

The Committee expressed their frustration in preparing their biennial report based on incremental updates presented. It was suggested that NSF craft their presentation for a holistic view instead of incremental. The Committee appreciates NSF's challenge of funding projects, and while investigators provide annual reports, they do not have the same accountability as the other NEHRP agencies in terms of outcomes. NSF could consider taking stock of what are the aggregate accomplishments, the knowledge gained, and the impacts in relation to ACEHR. Specifically, look at the broader impacts of what the PIs have done. Astiz emphasized that NSF is moving to understand and report against the updated NEHRP strategic plan goals. Astiz performs a grant award search on earthquake and seismic to develop the NEHRP-related award

list provided to the Committee. Hopefully the NEHRP Management Plan can address how NEHRP will report progress from a more holistic view.

NSF provides massive investments in infrastructure (NHERI, UNAVCO, IRIS) that can be broadly used but that doesn't appear in NSF's six-month incremental ACHER update on NSF's awarded activities and grants.

There has been a long collaboration between USGS and NSF on GSN which is unusual for NSF since they don't usually fund monitoring networks over a long period of time. What is NSF's commitment to maintain that collaboration? Astiz reported the National Science Board approved funding for IRIS and UNAVCO until September 30, 2025. Also, NSF and USGS just signed an MOU to support coordination activities including GSN—see update by USGS.

FEMA Updates - Mr. William Blanton, FEMA's Earthquake and Wind Programs Branch Chief, noted staff changes at FEMA. Mr. Michael Mahoney, senior geophysicist in FEMA's Earthquake and Wind Programs Branch, will retire on October 21. Mr. Andrew Herseth, structural engineer with 20 years of building science experience, will fill Mahoney's vacancy.

Blanton also provided the FEMA NEHRP State Assistance Grant Program updates. Under the Individual State Earthquake Assistance funding opportunity, non-competitive grants were awarded to 22 states and territories totaling \$2.1 million (M) out of the total budget of \$8.5M. Under the Multi-State and National Earthquake Assistance funding opportunity, competitive grants were awarded to six nonprofit organizations and institutions of higher education totaling \$1,389,000. The 18-month grant period of performance for both types began on August 1, 2022 and goes through January 31, 2024.

Mahoney provided the NEHRP technical team update, highlighting the FEMA workshop on functional recovery in mid-August, a project on design in very high seismic areas, the FEMA/Applied Technology Council (ATC) Seismic Code Support Committee activities, and the status of FEMA's seismic design guideline products. The FEMA update is available at https://nehrp.gov/pdf/5%20-%20FEMA%20Program%20Update%20pres%20to%20post_ACEHR_8-23-22.pdf

Discussion:

Regarding FEMA's \$400K budget cut, the Committee inquired why FEMA decided to end the lifelines project instead of another activity. Mahoney reported the lifelines project budget was the same amount as the budget cut. The Committee will keep this project cut on their radar.

NIST Updates - An update for the Earthquake Engineering Group (EEG) at NIST was provided by Dr. Siamak Sattar, Acting EEG Leader, Materials and Structural Systems Division. He highlighted two projects: retrofit of existing buildings and assessment and evaluation of existing buildings. Sattar's presentation is available at https://nehrp.gov/pdf/6%20-%20NIST%20Program%20Update%20pres%20to%20post_ACEHR_8-23-22.pdf.

Discussion:

Mahoney said FEMA is looking at improvements to the American Society of Civil Engineers (ASCE) 41 and Sattar mentioned ASCE 41 as well; seems there is a need for collaboration on these projects. Early on when FEMA started ATC-140, FEMA included NIST in that process.

Dialog is continued among the agencies, including NSF. Sattar coordinates with other ASCE 41 members and offers to test their hypothesis. Sattar and others are also involved in the American Concrete Institute (ACI). There is also an American Institute of Steel Construction (AISC) Committee which should be included. Harris reported that the ASCE 41 committee recently approved that the chapters dealing with concrete and structural steel will reference the respective AISC and ACI standards in lieu of reprinting them in ASCE 41. FEMA tries to identify a professor on each project as a conduit and they are open to suggestions for helping young researchers to be part of the projects.

IV. Closing Remarks

Arendt suggested the Committee continue their discussion on NSF's reporting methods tomorrow after we conclude the agency presentations.

Arendt thanked everyone for their engagement, participation, and commitment.

V. Adjournment for the Day

Faecke officially adjourned the meeting at 4:00 pm EDT.

ACEHR MEETING SUMMARY – Day Two August 24, 2022 (1:00-4:00 pm, EDT)

I. Call to Order and Opening Remarks

Committee DFO Faecke called the meeting to order at 1:00 pm EDT, took roll call for the Committee members, and confirmed the quorum requirement was satisfied. She reminded everyone the meeting will be recorded.

Arendt reviewed the agenda for the day. She also recognized Ezelle for his valuable contributions and active participation, as he completes his first three-year term on ACEHR in November.

II. Public Input Period

Committee DFO Faecke reported that no one from the public registered to speak.

III. NHERI SimCenter

Dr. Gregory Deierlein, SimCenter Co-Director and Dr. Adam Zsarnoczay, SimCenter Associate Director for Research Outreach, presented an overview of the *Natural Hazards Engineering Research Infrastructure (NHERI) SimCenter Computational Framework for Simulating Impacts of Natural Hazards*. Their presentation is available at https://nehrrp.gov/pdf/7%20-%20Deierlein-NHERI%20pres%20to%20post_8-24-22_REV.pdf

Discussion:

A question was raised by the Committee for improved post-disaster reconnaissance between social scientists and engineers. DesignSafe posts detailed simulation damage models which is a natural way for the social scientists to integrate with the engineers. By standardizing the data, social scientists can work with the engineers to build longer workflows from hazard to recovery. It was suggested to spin up a model quickly as the reconnaissance teams are getting ready to

collect data which could feed back into the models. CONVERGE is focused on sustainability and national-scale impact that also addresses societal challenges as well. The SimCenter creates and facilitates the infrastructure, but doesn't perform the research.

Does the SimCenter collaborate with international partners (e.g. New Zealand, Japan, Mexico, Turkey)? Deierlein mentioned they have interacted with QuakeCoRE, New Zealand Centre for Earthquake Resilience. The SimCenter also ties into the OpenQuake Platform, by the GEM Foundation, which has worldwide information, allowing international folks access to data and tools for integrated assessment of earthquake risk. A faculty member at the University of California, Los Angeles, collaborates with Turkey on a project.

IV. FEMA National Hazards Risk Assessment Program (NHRAP)

Mr. Jesse Rozelle, NHRAP/Hazus Program Manager and the Federal Emergency Management Agency, presented an overview of FEMA's Hazus Earthquake Model, including data updates, methodology improvements, earthquake average annualized loss study updates, and risk communication. The Hazus inventory data is scheduled to be released in November 2022. His presentation is available at https://nehrrp.gov/pdf/8%20-%20Jesse-FEMA_Hazus_pres_to_post_Aug2022.pdf.

Discussion:

A question was raised by the Committee whether Hazus taps into any commercial databases, such as Google Street View. Rozelle said although Google Street View is a great resource for looking at the building and filling in the attribute gaps; however, Hazus doesn't currently leverage it. FEMA's goal with the Hazus model is to publicly release all details about their technical methods and all core inventory data sets used in the model without any use restrictions, depending on the dataset you are looking at and the vendor you are talking to.

Are there any plans for modeling concurrent hazards? Rozelle said to model compound hazard impacts from hurricane, wind, and flood and also earthquake and tsunami damages is a significant challenge and he would like to improve the way they calculate the compounding impacts from those. The SimCenter hasn't focused on concurrent hazards, but you could string together hazards (earthquakes and tsunami) but the tricky things are the interactive affects which require new data and models. The SimCenter reacts to what the research community needs and relies on them to fill the parameter gaps.

The Committee is excited about Hazus moving into the cloud and wanted to know the timeframe. Rozelle said they anticipate their first release by the end of 2024, including basic functionality. Rathje offered to brainstorm with Rozelle during their planning process in FY 2023 on possible integration efforts into DesignSafe.

Carey reported as a result of using the Hazus-MH model report of damage to develop the FEMA Region VIII and State of Utah catastrophic earthquake response plan, the recovery part of what Hazus provided was not what industry told them. Is there an effort to mimic what industry tells us? Rozelle responded the infrastructure loss component of Hazus are some of the oldest methods (1990's). If there is research or anything FEMA can capture to replace those outdated methods, please send them to Rozelle. Envision Utah was working on a project for the Governor's Office on forecasting a hazard if building codes were improved and used Hazus to

show different results of a building set for a current disaster compared to a disaster 50 years later. This is one effective example of using Hazus to push government to build beyond life safety and to build to occupancy levels. Rozelle mentioned a new FEMA pilot project called Mitigation Project Designer where you can bring in structure-level information or for a suite of structures and run different scenarios of structures to show the cost benefits.

How does FEMA address privacy/security issues on modeling infrastructure components? For Hazus, we leverage HIFLD Open Data. Another limitation of Hazus from an infrastructure perspective is the cascading impacts and how the results are being viewed; currently our methods don't have that integrate of cascading impact link. Anyone can use datasets offline through Hazus if they don't want to share the data in the cloud.

V. 2023 Committee Report Discussion

Arendt reminded the Committee that their report ties into the scope of activities and objectives of the ACEHR charter. What do we want to say? How do we want to say it? What process do we want to use to create the report?

Arendt encouraged the new members to review the topics and tone of the previous ACEHR reports available on the NEHRP website at <https://nehrrp.gov/committees/reports.htm>. Recommendations from the Committee need to be actionable given the resources available since they must be formally responded to; therefore, we need to be aware of what we say and how we say it. Arendt also asked the Committee to think about what process to use in creating their report.

Rathje asked about the GAO recommendations and how NEHRP plans to respond. Arendt asked how the latest GAO report ties to the FY22-29 NEHRP Strategic Plan. Astiz responded that each NEHRP agency met with GAO over a two-year period and then wrote their first report ([GAO 21-129](#)) predominantly focused on USGS early earthquake warning but their second report ([GAO 22-105016](#)) was more broadly focused on NEHRP. Harris noted as the NEHRP Management Plan rolls out, five of the seven GAO recommendations will be addressed. Meszaros added that each recommendation leads to something constructive and the PCWG will be holding conversations to discuss and integrate their responses. The action plans/responses from the agencies will be posted and tracked by GAO on their website.

Arendt proposed that time be set aside during the next ACEHR meeting for the Committee to discuss what topics/themes/subjects should be addressed in their report. In advance of that meeting, she asked the members to review and become familiar with the previous ACEHR reports as well as the two GAO reports.

VI. Closing Remarks

Arendt expressed her appreciation for the NEHRP agency representative updates and for the two special presentations. She also recognized Deierlein for his valuable contributions and active participation, as he completes his second three-year term on ACEHR the first week of October. Faecke will poll the members to determine the best meeting dates and times for 2023.

VII. Adjournment

Faecke thanked everyone for their participation and adjourned the meeting at 4:00 pm.