

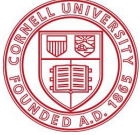


University of Nevada, Reno

NEES Research Program Funds Grand Challenge on Ceiling-Piping-Partition Systems



National Science Foundation



Cornell University



Consortium of Universities for Research in Earthquake Engineering



North Carolina A&T University



North Carolina State University



University at Buffalo

The State University of New York



University of California San Diego



University of North Carolina at Chapel Hill

The George E. Brown, Jr., Network for Earthquake Engineering Simulation (NEES) research program of the National Science Foundation has awarded to the University of Nevada, Reno (UNR) a \$3.6 million Grand Challenge grant to study the seismic performance of ceiling-piping-partition nonstructural systems. Nonstructural systems represent 75% of the value of buildings in the US exposed to earthquakes and have been estimated by FEMA to account for even slightly more than that in estimated future earthquake losses of the nation. Among the various nonstructural systems, ceiling-piping-partition systems are widely used in many kinds of buildings and represent a major portion of nonstructural earthquake vulnerability. The project, *Simulation of the Seismic Performance of Nonstructural Systems*, was awarded after a nationwide competition among universities to conduct a NEES Grand Challenge project, and it will extend for five years.

Ceiling-piping-partition systems consist of several components and subsystems, have complex three-dimensional geometries and complicated boundary conditions because of their multiple attachment points to the main structure, and are spread over large areas in all directions. Their seismic response, their interaction with the structural system they are suspended from or attached to, and their failure mechanisms are not well understood. Moreover, their damage levels and fragilities are poorly defined due to the lack of system-level experimental studies and modeling capability.

This Grand Challenge project will integrate multidisciplinary system-level studies that will develop, for the first time, a simulation capability and implementation process for enhancing the seismic performance of the ceiling-piping-partition system. A comprehensive experimental program is proposed that will use the University of Nevada, Reno (UNR) and the University at Buffalo (UB) NEES Equipment Sites to conduct subsystem and system-level full-scale experiments. Integrated with this experimental effort will be a numerical simulation program that will develop experimentally verified analytical models; establish system and subsystem fragility functions; and, develop visualization tools that will provide engineering educators and practitioners with sketch-based modeling capabilities. Public policy investigations at the building and metropolitan level scales are designed to support the implementation of the research results.

The project pioneers an integrated education, outreach, dissemination and implementation program including involvement in project research tasks of undergraduate students from underrepresented groups and programs (AGEP, NC A&T).

The project will be directed by E. “Manos” Maragakis from UNR, who is the Principal Investigator. The Co-Principal Investigators are André Filiatrault, from UB; Steve French, from the Georgia Institute of Technology; Tara Hutchinson, from the University of California, San Diego; and Bob Reitherman, Executive Director of the Consortium of Universities for Research in Earthquake Engineering (CUREE). Bill Holmes, Vice President of Rutherford and Chekene, will lead the Practice Committee, a group of engineers and industry representatives that will provide input to the project’s research and implementation tasks. CUREE will serve as the project manager to assist the PI with the overall management of the project and will coordinate the project education plan. Other participating Universities include Cornell, North Carolina State University, North Carolina A&T University, and University of North Carolina at Chapel Hill. Several industrial and international partners will participate in various phases of the project. For more information contact Manos Maragakis (775-784-6937, maragaki@ce.unr.edu).