

NSF Awards \$1.3 million to COE Professors Researching Earthquake Simulation on Buildings

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The National Science Foundation (NSF) has awarded \$1,360,000 to three professors in the College of Engineering at SJSU: Dr. Kurt McMullin, Civil and Environmental Engineering; Dr. Winncy Du, Mechanical and Aerospace Engineering; and Dr. Thuy Le, Electrical Engineering. These three faculty are part of a research team that also includes Dr. Bozidar Stojadinovic from UC Berkeley and engineering consultant, Kathleen Rai, Principal of SensiBuild.

The project, NEESR-SG: Experimental Determination of Performance of Drift-Sensitive Nonstructural Systems under Seismic Loading, will study the effects of earthquake loading. Loading is defined by civil engineers as the inertial forces that are created when the mass of the walls and floor are accelerating back and forth during an earthquake. The researchers will examine earthquake loading on the performance of non-structural building components, such as precast concrete façades, windows, and plumbing components. The results of this study will also provide research data for other kinds of extreme loading that can occur to buildings, such as blasts from bombs and severe winds.

Additional goals of the project include the following: working towards improving the computer modeling tools currently used in existing commercial software; producing a case study on the re-use and recycling of materials; studying repair cost analysis of a prototype nine-story steel frame building; and evaluating the use of damage-sensor systems on experimental assemblies. Finally, the researchers want to incorporate their project results with a cyberinfrastructure component. In other words, the researchers test data, stored in the Network for Earthquake Engineering Simulation (NEES) Repository, can be accessed and used by practicing design engineers directly in their engineering calculations, allowing individuals to have the most up-to-date and current research results.

Tests of full-scale building shells will be conducted in 2009 at the (NEES) test facilities at U.C. Berkeley. The researchers goal is to provide critical data to assist agencies that help establish construction codes, industry advisory boards, and individuals involved in the construction and engineering of buildings.

The principal investigator, Dr. McMullin, specializes in building façade systems, experimental testing, building design, and inquiry-based education. He will coordinate the project and the NEES's EOT (Engineering, Outreach, and Training) as well as serve as the industry-personnel trainer.

Dr. Du will be the leader for damage sensor research. Her field of expertise is mechatronics, sensors and circuitry testing, and signal processing and system integration. She is the lead investigator for damage sensor research.

Dr. Le, whose expertise is computer systems and networks, will be the lead researcher for the cyber infrastructure tool component sub-project, analyst of data format, and coordinator of NEESit (information technology).