



# STRUCTURAL ENGINEERING AND APPLIED MECHANICS

## RESEARCH CLUSTER

The **structural engineering and applied mechanics (STAM) group** performs multi-disciplinary research in the areas of structural engineering, structural mechanics, advanced design, structural vibrations, and finite element modeling and analysis. Our faculty has expertise in both structural engineering, involving the design of buildings, bridges, and other structures, as well as applied mechanics, which forms the basis of all structural analysis and design.

The STAM group's research activities are funded by numerous federal and state government agencies, regional organizations and industry, including the following: the National Science Foundation (NSF), the U.S. DOT Federal Highway Administration (FHWA), the U.S. DOT Federal Railroad Administration (FRA), the Department of Defense (DOD), the Department of Homeland Security (DHS), the Office of Naval Research (ONR), the National Institutes of Health (NIH), the U.S. Economic Development Administration, the National Cooperative Highway Research Program (NCHRP), the National Aeronautics and Space Administration (NASA), the Connecticut Department of Transportation (ConnDOT), the New England Transportation Consortium (NETC), the Hamilton Sundstrand Space Systems International, the Honeybee Robotics Spacecraft Mechanisms Corporation, Bentley Systems, Inc., the NASA/Connecticut Space Grant Consortium, the Japan Society for the Promotion of Science (JSPS Short Term Fellowship), and the University of Connecticut.



## MAJOR RECENT STRUCTURAL ENGINEERING AND APPLIED MECHANICS PROJECTS

- The National Cooperative Highway Research Program (NCHRP) is sponsoring "Evaluating the Effectiveness of Vibration-Mitigation Devices for Structural Supports of Signs, Luminaires, and Traffic Signals." Funding: \$400,000, PI: Richard Christenson
- The Office of Naval Research (ONR) is sponsoring "Exploring Uncertainty in Real-Time Hybrid Substructuring of Marine Systems," Funding: \$619,575, PI: Richard Christenson
- The Office of Naval Research (ONR) through Defense University Research Instrumentation Program (DURIP) is sponsoring "Six-Degree-of-Freedom Shake Table and Instrumentation for Real-Time Hybrid Substructuring (RTHS) Investigations of Complex Multi-Path Marine Systems." Funding: \$473,073, PI: Richard Christenson
- The Federal Highway Administration (FHWA) through Connecticut Department of Transportation is sponsoring "Advancing the State of Bridge Weigh-In-Motion for the Connecticut Transportation Network." Funding: \$302,199, PI: Richard Christenson Co-PIs: Sarira Motaref and Shinae Jang
- The National Science Foundation is sponsoring "SAVI/Collaborative Research: Pacific Rim Earthquake Engineering Mitigation Protective Technologies International Virtual Environment." Funding: \$170,115 PI: Richard Christenson
- The National Science Foundation is sponsoring "NEESR Planning/Collaborative Research: Toward Experimental Verification of Controllable Damping Strategies for Base Isolated Buildings." Funding: \$249,550, PI: Richard Christenson
- The U.S. Economic Development Administration is sponsoring "Connecticut Manufacturing Simulation Center." Funding: \$2.1 million (match amount: \$1.1 million). Director: Jeongho Kim
- The National Institutes of Health is sponsoring the research project "Viscoelastic Modeling Aided Experimental Optimization toward Fracture-Resistant Porcelain-Veneered Zirconia and Lithium Disilicate Restorations". Funding: \$633,000 PI: Jeongho Kim
- The US DOT Federal Railroad Administration (FRA)/Transportation Research Board (TRB), National Academy of Sciences (NAS) Washington, D.C. is sponsoring the Rail Safety IDEA project "Dynamic Impact Factors on Existing Long-Span Truss Railroad Bridges." Funding \$100,000. PI: Ramesh B Malla
- The National Science Foundation is sponsoring "CAREER: Understanding polymer adsorption kinetics and dispersion mechanisms of pozzolanic nano-sized particles in cementitious materials" Funding: \$500,000 PI: Kay Wille
- The National Science Foundation is sponsoring "CAREER: Promoting Engineering Innovation through Increased Neurodiversity by Encouraging the Participation of Students with ADHD." Funding: \$520,000 PI: Arash Esmaili Zaghi
- The National Science Foundation is sponsoring "PFI: AIR-TT: A Hybrid Metal/Glass Composite System for Multihazard Resilient Bridge Columns," Funding: \$246,000 PI: Arash Esmaili Zaghi
- The National Science Foundation is sponsoring "REU Site: Research Experience in Cyber and Civil Infrastructure Security for Students with ADHD: Fostering Innovation," Funding: \$420,000 PI: Arash Esmaili Zaghi
- The Federal Highway Administration through the Connecticut Department of Transportation and is sponsoring "Repair of Steel Beam/ Girder Ends with Ultra High-Strength Concrete (Phase II)." Funding: \$677,000 PI: Arash Esmaili Zaghi, Co-PI: Kay Wille
- The National Science Foundation is sponsoring "Collaborative Research: Fatigue Damage Prognosis for Slender Coastal Bridges". Funding: \$283,672, PI: Wei Zhang.
- The National Oceanic and Atmospheric Administration/Connecticut Sea Grant and Connecticut Institute for Resilience & Climate Adaption (CIRCA) is sponsoring "Resilient Coastal Communities under Wind and Flood Hazards: Understanding Trade-offs in Residential Building Designs". Funding: \$200,000 PI: Wei Zhang.

## THE STRUCTURAL ENGINEERING AND APPLIED MECHANICS TEAM



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### ARASH E. ZAGHI

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### WEI ZHANG

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Damage modeling, fatigue and corrosion, Fluid-structure interactions, wind/wave induced vibrations, Random vibrations and vibration control, Vehicle-bridge-wind-wave dynamics Life-cycle structural reliability and risk analysis  
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