
Engineering

Position #22; Remy Lequesne

Mentor name: Remy Lequesne, Civil, Environmental, and Architectural Engineering

Job/project title: Engineering Research on Reinforced Concrete Structures

Project description:

Our laboratory is interested in how reinforced concrete (RC) structures respond to a variety of loads. We study ways to make RC structures safer and more efficient. Much of our work is experimental, which means we build structural components (pieces of buildings like beams and walls) and then load them until failure. By studying the failure, we learn a lot about how to improve the design.

An idea for a project you could take the lead on is a focused study of the effect of reinforcing steel type on the behavior of reinforced concrete in tension. It would involve conducting several small tension tests and, depending on the results, may lead to changes in what types of steel are allowed in practice.

I'm open to other ideas also if you have other interests.

Potential student tasks and responsibilities: As a member of our team, you would be mostly working in the laboratory with other undergraduate and graduate students. Your responsibilities would include helping to build the formwork, tie reinforcement, and cast concrete, as well as setting up for and helping test the specimens. You could attend our group meetings and help interpret the results.

Student qualifications and characteristics: We are looking for students thinking about studying Civil or Architectural Engineering or that have an interest in structural engineering. Given the type of research we do, experience with construction or tools is great - but absolutely not required. We teach you what you need to know to contribute while also being safe.

Position #23; Joshua Roundy

Mentor name: Joshua Roundy, Civil Engineering

Job/project title: Research in Hydrologic Modeling

Project description:

Meaningful predictions of the amount of water in rivers and streams is necessary to ensure societies resilience to extreme events such as droughts and floods. Extreme events from the past, present and future can be quantified using hydrologic models. These models rely on mathematical formulas to mimic the key processes that drive the movement of water over the land surface. The goal of our research is to improve society's resilience to extreme events through prediction of the water cycle.

Potential student tasks and responsibilities: The student will participate in research that is focused on analyzing existing hydrologic models to assess the ability of models to make meaningful predictions of drought and flood events. This includes analyzing the weaknesses and strengths of the models as well as improving upon existing modeling methods through data analysis.

Student qualifications and characteristics: This position requires an interest in the natural environment and applied mathematics and necessitates the use of computer programming. Although previous experience with programming would be beneficial, the student does not need to have previous programming experience.

Position #24; *Elaina Sutley*

Mentor name: Elaina Sutley, Civil, Environmental and Architectural Engineering

Job/project title: Disaster Resilience Glossary

Project description:

The National Institute of Standards and Technology, through allocations from the Department of Commerce, funded a \$20,000,000 Center of Excellence for Risk-Based Community Resilience Planning. The Center's primary output will be a web-based application that researchers and communities can use to upload detailed city-specific data (on buildings, transportation, water, power, communication networks, and population data) and run natural hazard simulations (earthquakes, tornadoes, hurricanes, tsunamis) to measure their current resilience to these hazards. The web-based application, called IN-CORE, will allow users to explore structural and non-structural mitigation and other types of decisions that could improve their resilience score. IN-CORE needs a User's Manual, and as part of that User's Manual, it needs a glossary. This Emerging Scholar's research project will focus on the development of a disaster resilience glossary for the IN-CORE User's Manual. Emerging Scholars will have the opportunity to collaborate with students and faculty at partnering institutions, including Iowa State University and the University of Colorado in Boulder, through this work.

Potential student tasks and responsibilities: The Emerging Scholar will: (1) read literature to understand the context in which specific terms are used; (2) synthesize literature to develop a definition, or extract an explicit definition from the literature, while documenting a full citation; (3) present their research at the Undergraduate Research Symposium. Depending on progress, the student might have the opportunity to present their work in Fort Collins, Colorado at a Center of Excellence project meeting or in Broomfield, Colorado at the Natural Hazards Workshop.

Student qualifications and characteristics: Preferred qualifications: interest and passion for disaster resilience, positive attitude, basic knowledge in Microsoft Excel, and availability for one-hour weekly or bi-weekly meetings. All majors are welcome!

Position #60; John Symons

Mentor name: John Symons, Philosophy

Job/project title: Science of Security Project

Project description:

Do you like listening to podcasts? Are you interested in learning about cybersecurity policy and theory? Do you put tape over your laptop camera? This is the job for you! Come join the science of security project team and you will gain exposure to the fascinating and exciting foundational research at the University of Kansas on cyber-defense strategies and challenges.

Potential student tasks and responsibilities: Your task will be to work with a faculty mentor (Professor John Symons) and a graduate student researcher to track new developments in cybersecurity. You will listen to podcasts or read news articles online, record your findings on a spreadsheet, and meet once every two weeks with the team to talk about what you've learned.

Student qualifications and characteristics: No prior experience is necessary.