2026-2027 Twinning Program Projects

PROJECT: Influence of megathrust geometry on Cascadia earthquake ruptures

Project Director:
Elizabeth Madden
San Jose State University (San Jose, CA)

Twin Mentor:
Megan Anderson, Ashley Streig
Washington Geological Survey

Project Summary:
Earthquakes pose a significant threat to lives and livelihoods in the Pacific Northwest of the United States. However, the last large earthquake along the Cascadia subduction zone occurred in 1700, before modern instrumentation. This project is focused on mitigating seismic hazard in the region by (1) comparing physics-based models of potential Cascadia rupture scenarios on faults with different three-dimensional geometries and (2) summer field work in Washington state using gravimetry to identify the three-dimensional geometries of faults.

Role and probable activities for a student researcher in this project:
During the academic year, the student researcher will join a team that is running dynamic rupture models of Cascadia earthquakes on a high-performance computing platform. The student will gain experience in all steps of the model workflow from building several structural models with different fault geometries, gathering information to set the initial model conditions, trouble-shooting the model runs and analyzing the output. During this process, the student will learn about earthquake physics and acquire command line interface and programming skills. Over the summer, the student will participate in fieldwork, gravimeter data processing, and map view interpretation of the gravity data to determine fault geometries with a team of scientists at the Washington Geological Survey. Together, these activities provide broad experience in geological and geophysical research focused on earthquakes and earthquake hazard.

Preferred Skills
This position requires interest in learning the programming skills that are part of executing the earthquake models, willingness to travel to the summer field sites and participate in data collection (including driving on forest roads and occasional light hiking), and the ability to work both independently on tasks as well as a part of a research team.