**Term Project Abstract:**

Through machine learning, we explore spatial and temporal aftershock patterns related to three instrumentally recorded earthquakes from east and central Idaho. Bordering the eastern extent of the Snake River Plain, within the Intermountain Seismic Belt of Idaho, we compare aftershock sequences related to the Sulphur Peak, Challis, and Stanley earthquakes. An alignment of steep east-dipping aftershocks related to the 2014 ML4.8 and 2015 ML5.0 Challis earthquakes has been interpreted as a continuation of the 1983 Mw6.9 Borah Peak earthquake that ruptured the west-dipping Lost River fault. Utilizing the USGS data set for each of the three events and comparing them to the catalogs produced using a machine learning algorithm called EQTransformer will require a robust statistical analysis in order to assess the quality of the machine learning algorithm. In order to assess the quality of the machine learning catalogs the event origin time, P and S wave arrivals, and depths for each event in the USGS catalogs for all three sequences will be compared to those in the EQTransformer catalogs. The comparisons will involve determining the difference in origin times, p and s wave arrival times, and the hypocenter depths of events detected in both catalogs for each sequence. The locations and travel times for detected events is highly dependent on the velocity models used in the seismic detection so in order to determine whether the machine learning algorithm is creating a quality catalog will also require a comparison of the velocity models used for each sequence and each method of seismic detection.