**Capstone Project 1**: Correlation between water injection and seismic in Oklahoma

**Description of problem**: In the past decades, there is a rapid increase of seismic activities in the state of Oklahoma. According to Wikipedia, the frequency of 3+ magnitude earthquakes per year increased from an average of 2 in 1978 to hundreds per year in 2014-2017 period. The scientific studies reveal that the increase of earthquakes is likely to be related to human activities, such as water injection. This main purpose of this project is to utilize the water injection data and seismic data to find correlation to indicate whether water injection is causing earthquakes.

**People who will be interested**: government of Oklahoma, citizens in Oklahoma, oil companies, Environmental organization, scientist.

**Data**:

Water injection in Oklahoma from 2006 to 2017

<https://hub.arcgis.com/datasets/b65cecc6631147eabb175350b0dbe02f/data?page=3&selectedAttribute=Y2016M07>

Seismic in Oklahoma from 2000 to 2018

<https://hub.arcgis.com/datasets/tga::oklahoma-earthquakes-01-01-2000-07-12-2018?selectedAttribute=mag>

**Method**: In this project, we will utilize regression model to find the correlation between water injection and earthquakes. We will typically select a certain location or multiple locations in Oklahoma, where active water injection and earthquakes occurs. Then we collect cumulative water injection (per month, per several months, etc.) and earthquakes data for the past decade. To figure out whether there is a strong correlation between water injection and earthquakes. If there is strong correlation, which parameter of water injection gives the best correlation. The water injection per month, or per several months.

**Deliverables**: Python code, a final slide, and a report document