Role and choice: **Faculty – poster presentation**
Title: **Why Regional Flood Frequency Analysis Isn't Like Diamonds on the Soles of Your Shoes**
Author: C. Jason Tinant, (OLC)

Affiliation: Math and Science Department, Oglala Lakota College (OLC) 490 Piya Wiconi Road, Kyle, SD 57752

Abstract:
Flood frequency analysis (FFA) estimates the magnitude and frequency of floods by fitting a continuous probability distribution to the annual maximum instantaneous peak discharge of station a record. The magnitude of a flood event of a particular magnitude provides the basis for designating areas of high flood risk, e.g. the 100-year flood plain. An underlying challenge in FFA is that short record periods may produce inaccurate flood magnitude estimates, especially for large flood events. Updated Federal guidance requires station-specific skewness of the annual flood series is combined with regional skewness to obtain a more stable and representative flood magnitude estimate. However, neither Federal nor State guidance provides a mechanism for calculating a robust regional skewness coefficient. The purpose of the study is to identify clusters of similar gaging stations from which to calculate regional skewness coefficients for stream discharge gages on Tribal lands in the Great Plains ecoregion. EDA of the available gage data in the Great Plains ecoregion did not identify clear boundary conditions from which to subset the data. The available gage data consists of an initial set of ~11,000 gages, with ~1,100 gages without flow regulation or withdrawals and containing g.t. 20 years of peak flow data. Analysis of available numerical and spatial data identified an initial set of 32 explanatory variables representing: location, topography, and precipitation and temperature normals from 1990 to 2020. After variable selection to remove multicollinearity and comparison among exploratory models to increase predictive accuracy, the final explanatory data set consisted of longitude, slope, mean January temperature, and spring and winter precipitation normals. Future work will expand the explanatory variable dataset to potentially include watershed area and categorical data developed from ecoregion type, followed by classification to identify clusters of gages from which to calculate regional skew coefficients.