"The GEO Metric and Other Mathematical Metrics to Detect Gerrymandering"

ABSTRACT: Gerrymandering is a term that seems to be on everyone's lips in recent years; it loosely refers to the drawing of district maps to disenfranchise some group of voters, and/or benefit another group of voters. Litigation on redistricting maps has shown both the power as well as weaknesses in using mathematical metrics intended to detect gerrymandering. In this talk, I'll briefly discuss some of the geometry-based metrics that have been historically used to detect gerrymandering. I'll then focus on some of the research that has evaluated more recently-developed metrics which exclusively use election outcome data. Finally, I'll discuss a new metric: the Geography and Election Outcome (GEO) metric, which uses both map data and election outcome data to detect a potentially gerrymandered map. This metric incorporates the distribution of voters within the state, as well as their voting preferences (which is all the information a nefarious mapmaker would need to draw a gerrymander). The GEO metric does not require detailed Census-block level data to be computed; it simply needs the dual graph of the districting map as well as the partisan lean (an 'election outcome') for each of the corresponding districts. The GEO metric is deterministic and works extremely well in detecting true gerrymanders without flagging maps that are not gerrymanded.