

1145-AH-3024 **Mira Bernstein*** (mirabernstein@gmail.com). *In defense of democracy: mathematical tools for fighting gerrymandering.*

Gerrymandering is the practice of drawing boundaries of electoral districts in a way that unfairly benefits or hurts a particular group of voters. Common targets of gerrymandering include supporters of a political party (*partisan gerrymandering*) or members of a racial minority (*racial gerrymandering*). In the US, these two types of gerrymandering have very different legal status, so the mathematical tools required to combat them are completely different as well.

In this talk, I will describe statistical approaches to fighting both types of gerrymandering. In the case of partisan gerrymandering, the main difficulty lies in articulating a quantitative standard of partisan fairness and finding ways to measure deviations from this standard. In contrast, for racial gerrymandering, the legal standard is relatively clear; the challenge is to show that race is a relevant variable at all. Racial gerrymandering can only occur if voters of different races tend to vote differently, which is extremely difficult to prove when we have no way of knowing how *any* individual voted. I will describe existing statistical tools for detecting racially-polarized voting and conclude with my own work on increasing the power of these techniques by combining data from multiple elections. (Received September 26, 2018)