Moon Duchin*, Tufts University, Boston, MA. Political Geometry: Voting districts, "compactness," and ideas about fairness.

The U.S. Constitution calls for a census every ten years, followed by freshly drawn congressional districts to evenly divide up the population of each state. How the lines are drawn has a profound impact on how the elections turn out, especially with increasingly fine-grained voter data available. We call a district gerrymandered if the lines are drawn to rig an outcome, whether to dilute the voting power of minorities, to overrepresent one political party, to create safe seats for incumbents, or anything else. Bizarrely-shaped districts are widely recognized as a red flag for gerrymandering, so a traditional districting principle is that the shapes should be "compact"—since that typically is left undefined, it’s hard to enforce or to study. I will discuss "compactness" from the point of view of metric geometry, and I’ll overview opportunities for mathematical interventions and constraints in the highly contested process of electoral redistricting. To do this requires a rich mix of law, civil rights, geometry, political science, and supercomputing. (Received August 05, 2017)