

Proposal for an Honors Thesis  
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### **Redistricting and Gerrymandering:**

The political question of redistricting is of the highest importance, as it both provides the foundation for representative government and has great potential for abuse in the form of the gerrymander. The Supreme Court has stipulated that congressional districts must be contiguous, and with mathematics one can evaluate the compactness of a district as well -- intending to make districts as regular as possible.

There are four dominant measures for the compactness of a district: area-perimeter ratios, relationships to circumscribed or inscribed circles, comparisons to regular polygons, and dispersion from a central point. Gerrymanders are typically non-convex districts, as they tend to over-include or disenfranchise isolated populations. Thus, measures of compactness are required to evaluate to what extent a district is regular or irregular -- or how severe of a gerrymander it is.

Thus, my project intends to draw on the established literature of both mathematics and political science to evaluate these various measures of compactness, and compare them to the political aims of a representative government. It will require extensive research in both fields, and below I have outlined a conditional research plan for the next several months.

### **Timeline for Project Completion:**

Summer 2011:

Working with Professor Saxe, I will compile a complete reading list. It will consist of journal articles and other material (web, text) from which I will learn the current measures of compactness. I will begin reading these texts to gather an understanding of the established literature on redistricting, as well as acclimating myself to the political science discourse on the issue. We will also come up with a short list of specific research questions that I will address during the fall semester.

Fall Semester 2011:

I will be enrolled in POLI 400 Senior Seminar, where I delve into the political science side of districting and gerrymandering. I will work with Professor Patrick Schmidt to explore the theory behind political representation, as well as U.S. case law related to federal mandates on the construction of districts. I hope to establish the goals of district construction from a political science perspective. I will continue reading literature about measures of compactness, and by the end of September or October, I will have developed a research question, at which point I will be able to begin writing.

January 2012:

Having developed a question, I will set out a more comprehensive research plan and begin writing the final thesis.

### **References:**

C.P Chambers, A.D. Miller. A Measure of Bizarreness. *Quarterly Journal of Political Science*, 5: 27–44, 2010.

J. K. Hodge, E. Marshall, G. Patterson. Gerrymandering and convexity. *College Mathematics Journal* 41(4): 312-324, September 2010.