Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Statistical Mechanics of US Supreme Court[1] EDWARD LEE, University of Wisconsin-Madison, CHASE BROEDERSZ, WILLIAM BIALEK, Princeton University, BIOPHYSICS THEORY GROUP TEAM — We build simple models for the distribution of voting patterns in a group, using the Supreme Court of the United States as an example. The least structured, or maximum entropy, model that is consistent with the observed pairwise correlations among justices' votes is equivalent to an Ising spin glass. While all correlations (perhaps surprisingly) are positive, the effective pairwise interactions in the spin glass model have both signs, recovering some of our intuition that justices on opposite sides of the ideological spectrum should have a negative influence on one another. Despite the competing interactions, a strong tendency toward unanimity emerges from the model, and this agrees quantitatively with the data. The model shows that voting patterns are organized in a relatively simple "energy landscape," correctly predicts the extent to which each justice is correlated with the majority, and gives us a measure of the influence that justices exert on one another. These results suggest that simple models, grounded in statistical physics, can capture essential features of collective decision making quantitatively, even in a complex political context.

[1]Funded by National Science Foundation Grants PHY-0957573 and CCF-0939370, WM Keck Foundation, Lewis-Sigler Fellowship, Burroughs Wellcome Fund, and Winston Foundation.

Edward Lee
University of Wisconsin-Madison

Date submitted: 22 Oct 2013 Electronic form version 1.4