PDEs, Politics and Tug-of-War

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I will begin the lecture series by reviewing several basic results tug of war, the infinity Laplacian, optimal Lipschitz extensions, and selection games (which include random turn hex as a special case). This part of the series will be related to the earlier mini-course given by Peres, Antunovic, and Somersville, but I will make sure the presentation is self-contained. I will then discuss a number of other directions this theory can go. I will describe a recent work with Naor on optimal Lipchitz extensions of tree-valued functions and a game called "politics" in which players adopt "targets" that they are allowed to change throughout the course of a game in order to maximize their apparent strength. The game produces a notion of infinite-harmonicity for tree-valued maps.

I will discuss work with Charlie Smart on Lipschitz extension theory for functions that take values in higher dimensional Euclidean spaces. The theory of maps from the plane to itself is surprisingly interesting and combines conformal maps and infinity harmonic functions in unexpected ways.

I will also discuss a recent work with Levine on Stange a certain type of multi-player selection games that have elegant solutions, although their random turn variants are not as well understood.