Monday, April 29, 2019

4:00pm-5:00pm  **Financial/Actuarial Mathematics** -- Jan Obloj (Oxford) *Information (data-driven) approach to (robust) pricing and hedging* -- 1096 East Hall

4:00pm-6:00pm  **Geometry & Physics** -- Yaim Cooper (IAS) *Severi degrees via representation theory* -- 3096 East Hall

Tuesday, April 30, 2019

12:00am-1:30pm  **Teaching Mathematics** -- Discussion () *LCIT Discussion* -- 4866 East Hall
I introduce the robust approach to pricing and hedging which does not start with an a priori probability measure but is instead data driven. The framework is designed to interpolate between model-independent and model-specific settings and to allow to address and quantify model risk. I explain briefly how classical fundamental notions and theorems in quantitative finance extend to the robust setting. I then focus on a simple two-dimensional study case of pricing and hedging a spread option, introducing suitable numerical methods and presenting concrete examples. I use vanilla option prices, together with agent-prescribed bounds on key market characteristics, to drive the interval of no-arbitrage prices and the associated hedging strategies. The setting can be seen as a constrained variant of the classical optimal transportation problem and comes with a natural pricing-hedging duality. I discuss numerical methods based on discretization and LP implementation but subsequently focus on a deep NN optimization. At the end I will outline some of the higher-dimensional challenges for such methods as well as way to coherently combine option price data with past time series data in one estimation procedure.

The talk is based on joint works with Stephan Eckstein, Gaoyue Guo, Tongseok Lim and Johannes Wiesel.