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<td>Monday, April 29, 2019</td>
<td><strong>Financial/Actuarial Mathematics</strong> -- Jan Obloj (Oxford)</td>
<td>Information (data-driven) approach to (robust) pricing and hedging -- 1096 East Hall</td>
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<td>4:00pm-5:00pm</td>
<td><strong>Geometry &amp; Physics</strong> -- Yaim Cooper (IAS)</td>
<td>Severi degrees via representation theory -- 3096 East Hall</td>
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<td><strong>Teaching Mathematics</strong> -- Discussion ()</td>
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Financial/Actuarial Mathematics  
Monday, April 29, 2019, 4:00pm-5:00pm  
1096 East Hall  
Jan Obloj (Oxford)  

*Information (data-driven) approach to (robust) pricing and hedging*

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.

Geometry & Physics  
Monday, April 29, 2019, 4:00pm-6:00pm  
3096 East Hall  
Yaim Cooper (IAS)  

*Severi degrees via representation theory*

The Severi degrees of $\mathbb{P}^1 \times \mathbb{P}^1$ can be computed in terms of an explicit operator on the Fock space $\mathcal{F}[\mathbb{A}_1 \times \mathbb{A}_1]$. We will discuss this and variations on this theme. We will explain how to use this approach to compute the relative Gromov-Witten theory of other surfaces, such as Hirzebruch surfaces and $\mathbb{E}_1 \times \mathbb{P}^1$. We will also discuss operators for calculating descendants. Joint with R. Pandharipande.

Teaching Mathematics  
Tuesday, April 30, 2019, 12:00am-1:30pm  
4866 East Hall  
Discussion ()  

*LCIT Discussion*

A discussion session of our Learning Community on Inclusive Teaching.