### Wednesday, September 05, 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Details</th>
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<tbody>
<tr>
<td>4:00pm-5:00pm</td>
<td><strong>Financial/Actuarial Mathematics</strong> -- Ruoyu Wu (UM)</td>
<td><em>Weakly Interacting Particle Systems on Graphs: from Dense to Sparse</em> -- 1360 East Hall</td>
</tr>
</tbody>
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### Thursday, September 06, 2018

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<tbody>
<tr>
<td>4:00pm-5:00pm</td>
<td><strong>Student Algebraic Geometry</strong> -- ()</td>
<td>Organizational meeting -- 3866 East Hall</td>
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### Friday, September 07, 2018

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>3:00pm-3:00pm</td>
<td><strong>Applied Interdisciplinary Mathematics (AIM)</strong> -- Alex Gorodetsky (University of Michigan, Aerospace Engineering)</td>
<td><em>Low-rank tensor approaches for adaptive function approximation: algorithms and examples</em> -- 1084 East Hall</td>
</tr>
<tr>
<td>4:00pm-5:00pm</td>
<td><strong>Student AIM Seminar</strong> -- Rishi Sonthalia (University of Michigan)</td>
<td><em>TBA</em> -- 1084 East Hall</td>
</tr>
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</table>
# Abstracts for the week of September 2nd, 2018 - September 8th, 2018

## Financial/Actuarial Mathematics

**Wednesday, September 05, 2018, 4:00pm-5:00pm**

1360 East Hall

Ruoyu Wu (UM)

*Weakly Interacting Particle Systems on Graphs: from Dense to Sparse*

We consider the asymptotic behaviors of weakly interacting particle systems on graphs, which could be dense or sparse, random or deterministic. The system consists of a large number of nodes in which the state of each node is governed by a stochastic process that has a mean-field type interaction with the neighboring nodes. In the dense graph case, we show that the limiting system is given by the classic McKean-Vlasov equation. A law of large numbers result, propagation of chaos property, and central limit theorem are established.

In the sparse case, we obtain an autonomous characterization of the local dynamics of the neighborhood of a typical node for the limiting system, when the limiting graph is a D-regular tree or a Galton-Watson tree. The proofs rely on a certain Markov random field structure of the dynamics on countably infinite graphs, which may be of independent interest.

This is based on various joint works with Shankar Bhamidi, Amarjit Budhiraja, Daniel Lacker, Debankur Mukherjee, and Kavita Ramanan.

## Student Algebraic Geometry

**Thursday, September 06, 2018, 4:00pm-5:00pm**

3866 East Hall

*Organizational meeting*

We'll plan the talks for the rest of the semester! Anyone with any interest in algebraic geometry is encouraged to attend.
Applied Interdisciplinary Mathematics (AIM)
Friday, September 07, 2018, 3:00pm-3:00pm
1084 East Hall
Alex Gorodetsky (University of Michigan, Aerospace Engineering)
Low-rank tensor approaches for adaptive function approximation: algorithms and examples

In this talk, we present an adaptive method for approximating high-dimensional low-rank functions. Taking advantage of low-rank structure in approximation problems has been shown to prove advantageous for scaling numerical algorithms and computation to higher dimensions by mitigating the curse-of-dimensionality. The method we describe is an extension of the tensor-train cross approximation algorithm to the continuous case of multivariate functions that enables both global and local adaptivity. Our approach relies on a new adaptive algorithm for computing the CUR/skeleton decomposition of bivariate functions. We then extend this technique to the multidimensional case of the function-train decomposition. We demonstrate the benefits of our approach compared with the standard methodology that computes low-rank approximations by decomposing coefficients of tensor-product basis functions. We finish by demonstrating a wide range of applications that include machine learning, uncertainty quantification, stochastic optimal control, and Bayesian filtering.

Student AIM Seminar
Friday, September 07, 2018, 4:00pm-5:00pm
1084 East Hall
Rishi Sonthalia (University of Michigan)
TBA