### Monday, November 19, 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Type</th>
<th>Speaker</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:00am-4:00am</td>
<td>Student Dynamics</td>
<td>Samantha Pinella (University of Michigan)</td>
<td>1060 East Hall</td>
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<tr>
<td>4:00pm-5:00pm</td>
<td>Complex Analysis, Dynamics and Geometry</td>
<td>Araceli Bonifant (URI)</td>
<td>3088 East Hall</td>
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<tr>
<td></td>
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<td><strong>External rays for some families of cubic polynomial maps</strong></td>
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<td>Student Combinatorics</td>
<td>Jonathan Gerhard (University of Michigan)</td>
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<td>Integrable Systems and Random Matrix Theory</td>
<td>Deniz Bilman (University of Michigan)</td>
<td>1866 East Hall</td>
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<td><strong>A robust inverse scattering transform for arbitrary singularities</strong></td>
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<td>4:00pm-6:00pm</td>
<td>Geometry &amp; Physics</td>
<td>Du Pei (Aarhus)</td>
<td>4096 East Hall</td>
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<td></td>
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<td><strong>Wild Higgs Bundles and Modular Categories</strong></td>
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<td>Student Geometry/Topology</td>
<td>Mark Greenfield (University of Michigan)</td>
<td>1866 East Hall</td>
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<tr>
<td>4:00pm-5:00pm</td>
<td>Colloquium Series</td>
<td>Jennifer Balakrishnan (Boston University)</td>
<td>1360 East Hall</td>
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<td><strong>Rational points on the cursed curve</strong></td>
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Student Dynamics
Monday, November 19, 2018, 3:00am-4:00am
1060 East Hall
Samantha Pinella (University of Michigan)
*TBA*

Complex Analysis, Dynamics and Geometry
Monday, November 19, 2018, 4:00pm-5:00pm
3088 East Hall
Araceli Bonifant (URI)
*External rays for some families of cubic polynomial maps*

We study the parameter space $\mathcal{S}_p$ for cubic polynomials with a marked critical point of period $p$. We will show that for every escape region $\mathcal{E} \subset \mathcal{S}_p$, and every rational parameter angle $\phi$, the parameter ray $\mathfrak{R}_\mathcal{E}(\phi)$ lands at some uniquely defined point in the boundary of the escape region $\partial \mathcal{E}$. This point is necessarily either critically finite or parabolic. Joint work with John Milnor.

Student Combinatorics
Monday, November 19, 2018, 4:00pm-5:00pm
3866 East Hall
Jonathan Gerhard (University of Michigan)
*TBA*
Integrable Systems and Random Matrix Theory  
Monday, November 19, 2018, 4:00pm-5:00pm  
1866 East Hall  
Deniz Bilman (University of Michigan)  
A robust inverse scattering transform for arbitrary singularities  
We propose a modification of the standard inverse scattering transform for the focusing nonlinear Schrödinger equation (also other equations by natural generalization) formulated with nonzero boundary conditions at infinity. The purpose is to deal with arbitrary-order poles and potentially severe spectral singularities in a simple and unified way. As an application, we use the modified transform to place the Peregrine solution and related higher-order "rogue wave" solutions in an inverse-scattering context for the first time. This allows one to directly study properties of these solutions such as their dynamical or structural stability, or their asymptotic behavior in the limit of high order. The modified transform method also allows rogue waves to be generated on top of other structures by elementary Darboux transformations, rather than the generalized Darboux transformations in the literature or other related limit processes.

Geometry & Physics  
Monday, November 19, 2018, 4:00pm-6:00pm  
4096 East Hall  
Du Pei (Aarhus)  
Wild Higgs Bundles and Modular Categories  
We propose a new link between the moduli spaces of wild Higgs bundles and quantum invariants of 3-manifolds. The construction goes through a class of four-dimensional quantum field theories known as Argyres-Douglas theories. Every such theory realizes a wild Hitchin space as its Coulomb branch and defines a VOA on the Higgs branch. The latter can be used to construct a non-unitary modular tensor category, which leads to 3d TQFTs that are generically semisimple but non-unitary. This is based on joint work with Mykola Dedushenko, Sergei Gukov, Hiraku Nakajima and Ke Ye.

Student Geometry/Topology  
Tuesday, November 20, 2018, 3:00pm-4:00pm  
1866 East Hall  
Mark Greenfield (University of Michigan)  
TBA
The split Cartan modular curve of level 13, also known as the "cursed curve," is a genus 3 curve defined over the rationals. By Faltings' proof of Mordell's conjecture, we know that it has finitely many rational points. However, Faltings' proof does not give an algorithm for finding these points. We discuss how to determine rational points on this curve using "quadratic Chabauty," part of Kim's nonabelian Chabauty program. This is joint work with Netan Dogra, Steffen Mueller, Jan Tuitman, and Jan Vonk.