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<tr>
<th>Day</th>
<th>Time</th>
<th>Location</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>TUESDAY, 3rd</td>
<td>8:10-9:30AM, SURGE 268</td>
<td></td>
<td>ALGEBRAIC GEOMETRY (Dr. Ziv Ran)</td>
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<tr>
<td></td>
<td>11:10-12:00PM, SURGE 268</td>
<td></td>
<td>TOPOLOGY (Dr. Helen Wong, Carleton College)</td>
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<td></td>
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<td>“Representations of the Kauffman Skein Algebra”</td>
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<td>12:40-2:00PM, SURGE 284</td>
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<td>LIE THEORY (Dr. Greenstein / Dr. Gan)</td>
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<td>3:40-4:30PM, SURGE 268</td>
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<td>ANALYSIS (Dr. Dana Clahane, Fullerton College)</td>
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<td>“Composition operators from the logarithmic Bloch spaces to weighted Bloch spaces”</td>
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<td>3:40-5:00PM, SURGE 284</td>
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<td>COLLOQUIUM – Dr. Changfeng Gui, University of Connecticut</td>
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<td>“Symmetries of Solutions to Nonlinear PDEs”</td>
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<td>WEDNESDAY, 4th</td>
<td>10:10-11:00AM, SURGE 268</td>
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<td>COMBINATORIAL NUMBER THEORY (Dr. Mei-Chu Chang, UCR)</td>
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<td>“Isomorphism classes of hyperelliptic curves over finite fields”</td>
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<td>11:10-12:00PM, SURGE 268</td>
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<td>TOPICS IN COMMUTATIVE ALGEBRA (Dr. Lin / McCullough / Henriques)</td>
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<td>12:10-1:00PM, SURGE 268</td>
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<td>PDE &amp; APPLIED MAThMATICS (Dr. Juhi Jang)</td>
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<td>1:10-2:00PM, SURGE 268</td>
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<td>OPERATOR ALGEBRAS &amp; RELATED TOPICS (Dominick Scaletta, UCR)</td>
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<td>“1+1 D TQFT’s and Frobenius Algebras”</td>
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<td>3:40-5:00PM, SURGE 284</td>
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<td>COLLOQUIUM – Dr. Jaya Iyer, Institute of Mathematical Sciences</td>
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<td>“Algebraic cycles in Algebraic Geometry”</td>
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<td>THURSDAY, 5th</td>
<td>8:10-9:30AM, SURGE 268</td>
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<td>ALGEBRAIC GEOMETRY (Dr. Ziv Ran)</td>
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<td>11:10-12:30PM, SURGE 268</td>
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<td>FRACTAL RESEARCH GROUP (Dr. Stephen Muir)</td>
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<td>12:40-2:00PM, SURGE 284</td>
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<td>LIE THEORY (Dr. Greenstein / Dr. Gan)</td>
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<td>3:40-5:00PM, SURGE 268</td>
<td></td>
<td>MATHEMATICAL PHYSICS &amp; DYNAMICAL SYSTEMS (Dr. Stephen Muir)</td>
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<td></td>
<td>4:10-5:00PM, SURGE 284</td>
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<td>MATH CLUB (Michael Menke, UCR)</td>
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<td>“Invariant Variational Problems in sub-Riemannian Geometry”</td>
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<td>FRIDAY, 6th</td>
<td>11:10-12:00PM, SURGE 268</td>
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<td>DIFFERENTIAL GEOMETRY (Dr. Bun Wong)</td>
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<td><em><strong>No Meeting This Week</strong></em></td>
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<td>1:10-2:00PM, SURGE 284</td>
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<td>GRADUATE STUDENT SEMINAR – Curtis Pro, UCR</td>
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<td>“Vertical Warping and Ricci Curvature”</td>
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<td></td>
<td>3:10-4:00PM, SURGE 268</td>
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<td>COMMUTATIVE ALGEBRA (Dr. David Rush)</td>
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“Representations of the Kauffman Skein Algebra”

Abstract:

The following describes joint work with Francis Bonahon. The Kauffman skein algebra of a surface not only lies at the core of quantum topology, but bears deep meaning in the language of hyperbolic geometry. We’ll describe how to construct representations of the Kauffman skein algebra and construct some invariants to help tell them apart. The latter we do by constructing invariants of the representations using Chebyshev polynomials and relying on numerous “miraculous cancellations”.

Tuesday, April 3rd, 2012
Surge 268
11:10am-12:00pm
Abstract:
Because the Bloch space of the disk is the dual of the Bergman spaces, among many other reasons, there has been growing interest in studying linear operators between spaces of analytic functions in the case that either the domain of the operator, or the target of the operator, is a linear space whose functions satisfy a Bloch-type growth condition. In this talk, we will consider the composition operator induced by an analytic function on the open unit disk and mapping a family of so-called logarithmic Bloch spaces to Bloch spaces defined by a weight, which is a positive, continuous function on the disk. These "log Bloch spaces" are examples of Bloch-Orlicz spaces. We will discuss what is known about composition operators between these spaces and generally weighted Bloch spaces, and state some new results, which include characterization of the analytic self-maps of the disk that induce bounded composition operators between these two types of spaces, which share norm equivalences that we will describe, even in higher dimensions. In this case, we also compute the essential norm of the composition operator, and as a consequence, we characterize the analytic self-maps of the disk that induce compact composition operators between these spaces. (Joint work with R. E. Castillo (Colombia), J. F. Farias-Lopez (Venezuela), and J. C. Ramos-Fernandez (Venezuela).

Tuesday, April 3rd, 2012
Surge 268
3:40pm-4:30pm
“Symmetries of Solutions to Nonlinear PDEs”

Abstract:
In this talk, I will discuss various symmetries associated with solutions of nonlinear partial differential equations in the entire space. Such entire solutions usually arise in the blow-up of singularities, and are important in understanding solutions in general. The symmetries of solutions, such as radial symmetry, transitional symmetry, axial symmetry or symmetries with respect to discrete group actions, are characteristic to the type of singularities, and are useful in classifying all entire solutions or singularities.

Symmetries of solutions to certain nonlinear PDEs are closely related to the symmetries of geometric objects such as minimal surfaces or mean curvature solitons. A typical example is the De Giorgi conjecture which relates solutions of nonlinear Allen-Cahn equation to minimal surfaces. I will present a survey of results on the De Giorgi conjecture and some recent results on symmetries of traveling wave solutions, saddle solutions and their relations to geometry.

Tuesday, April 3rd, 2012
Surge 284
4:10-5:00pm
Tea Time at 3:40pm
“Algebraic cycles in Algebraic Geometry”

Abstract:

Topological spaces are equipped with a singular (co)homology theory. If the space carries additional structures, for example it is a smooth manifold or a complex manifold, then the cohomology theory is enriched with additional structures. Algebraic varieties are spaces defined by polynomial equations. In this talk, we will discuss ‘algebraic’ cohomology theory for smooth algebraic varieties, and ways to find interesting classes via primary and secondary invariants of vector bundles.

Wednesday, April 4th, 2012
Surge 284
4:10-5:00pm
Tea Time at 3:40pm
Abstract:

Sub-Riemannian Geometry is a generalization of Riemannian Geometry. We describe how this geometry can arise from contact structures on 3-dimensional Euclidean space and a special space known as the Roto-Translation Group. A large part of current research focuses on finding analogous definitions for quantities such as curvature and minimal surface. We will try and adapt familiar techniques from Riemannian Geometry to accomplish some of these goals.

Snacks and drinks will be served

http://mathdept.ucr.edu/ugrad/ugrad-mathclub.html
Abstract:

This talk will be an attempt to string together explanations of Riemannian geometry, fundamental questions of Riemannian geometry, Riemannian submersions, Sectional curvature, Ricci curvature and some recent work involving all of the above in a way that (is hoped) can be understood with only having a rudimentary understanding of math 10B.
**UNIVERSITY OF CALIFORNIA, RIVERSIDE**  
Department of Mathematics

**Calendar of Events For the Week of April 9th – 13th, 2012**

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<tr>
<td>8:10-9:30AM, SURGE 268</td>
<td><strong>ALGEBRAIC GEOMETRY</strong> (Dr. Ziv Ran)</td>
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<tr>
<td>11:10-12:00PM, SURGE 268</td>
<td><strong>TOPOLOGY</strong> (Michael Menke, UCR)</td>
<td>“Gauge theory and the recent advances of Edward Witten”</td>
</tr>
<tr>
<td>12:40-2:00PM, SURGE 284</td>
<td><strong>LIE THEORY</strong> (Mathew Lunde, UCR)</td>
<td>“Prime Representations of Affine Algebras”</td>
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<tr>
<td>3:40-4:30PM, SURGE 268</td>
<td><strong>ANALYSIS</strong> (Dr. M. M. Rao, UCR)</td>
<td>“Integration with vector measures”</td>
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<th><strong>WEDNESDAY, 11\textsuperscript{th}</strong></th>
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<tr>
<td>10:10-11:00AM, SURGE 268</td>
<td><strong>COMBINATORIAL NUMBER THEORY</strong> (Dr. Mei-Chu Chang, UCR)</td>
<td>“Isomorphism classes of hyperelliptic curves over finite fields” cont’d</td>
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<tr>
<td>11:10-12:00PM, SURGE 268</td>
<td><strong>TOPICS IN COMMUTATIVE ALGEBRA</strong> (Dr. Lin / McCullough / Henriques)</td>
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<tr>
<td>12:10-1:00PM, SURGE 268</td>
<td><strong>PDE &amp; APPLIED MATHEMATICS</strong> (Dr. Qi Zhang, UCR)</td>
<td>“Reading on regularity of elliptic and parabolic equations”</td>
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<tr>
<td>1:10-2:00PM, SURGE 268</td>
<td><strong>OPERATOR ALGEBRAS &amp; RELATED TOPICS</strong> (Dominick Scaletta, UCR)</td>
<td>“Modular Tensor Categories”</td>
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<tr>
<td>3:40-5:00PM, SURGE 284</td>
<td><strong>COLLOQUIUM</strong> – Dr. Christian Heasemeyer, UCLA</td>
<td>“Algebraic K-theory and geometry of singularities”</td>
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<th><strong>THURSDAY, 12\textsuperscript{th}</strong></th>
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<td>8:10-9:30AM, SURGE 268</td>
<td><strong>ALGEBRAIC GEOMETRY</strong> (Dr. Ziv Ran)</td>
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<tr>
<td>11:10-12:30PM, SURGE 268</td>
<td><strong>FRAC TAL RESEARCH GROUP</strong> (Robert Niemeyer, UCR)</td>
<td>“Billiard Flows on Self-Similar Sierpinski Carpet Billiard Tables”</td>
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<td>12:40-2:00PM, SURGE 284</td>
<td><strong>LIE THEORY</strong> (Dr. Greenstein / Dr. Gan)</td>
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<tr>
<td>3:40-5:00PM, SURGE 268</td>
<td><strong>MATHEMATICAL PHYSICS &amp; DYNAMICAL SYSTEMS</strong> (Dr. Stephen Muir, UCR)</td>
<td>“Gibbs Measures in Physics and Dynamics (part 1)”</td>
</tr>
<tr>
<td>4:10-5:00PM, SURGE 284</td>
<td><strong>MATH CLUB</strong> (Emad Totari, UCR)</td>
<td>GRE Information Session</td>
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<th><strong>FRIDAY, 13\textsuperscript{th}</strong></th>
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<td>11:10-12:00PM, SURGE 268</td>
<td><strong>DIFFERENTIAL GEOMETRY</strong> (Dr. Bun Wong)</td>
<td><em><strong>Organizational Meeting</strong></em></td>
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<tr>
<td>1:10-2:00PM, SURGE 284</td>
<td><strong>GRADUATE STUDENT SEMINAR</strong></td>
<td>“Quantum groups and crystal bases”</td>
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<tr>
<td>3:10-4:00PM, SURGE 268</td>
<td><strong>COMMUTATIVE ALGEBRA</strong> (Dr. David Rush)</td>
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Abstract:

The study of the structure of irreducible representations of a quantum affine algebra can be reduced to the so called prime representations, those which cannot be written as a tensor product of two non-trivial simple representations. In their recent paper, Prime Representations from a Homological perspective, V. Chari, A. Moura and C. Young work to understand these prime representations via self extensions. Namely, they conjecture that an irreducible finite dimensional representation $V$ is prime if and only if the space of self extensions has dimension 1. I will be presenting some of the results of this paper that prove the conjecture for the $sl_2$ case, and give partial evidence in the case for general $g$. 
Dr. Christian Haesemeyer  
(UCLA)

“Algebraic K-theory and geometry of singularities”

Abstract:

I will discuss algebraic K-theory, a non-linear and highly complicated invariant of algebraic-geometric objects and how it relates to more linear (and more computable) invariants like algebraic differential forms in the case of singularities.

Wednesday, April 11th, 2012  
Surge 284  
4:10-5:00pm  
Tea Time at 3:40pm
Thursday, April 12th, 4:10 - 5:00 p.m. in Surge 284:

Emad Totari, UCR

GRE Information Session

Abstract:

interested in going to Graduate School for a Masters or Doctorate degree? Confused about how to prepare for the Graduate Record Examination (GRE)? come join us to learn everything you need to help you prepare for the GRE.

Snacks and drinks will be served

http://mathdept.ucr.edu/ugrad/ugrad-mathclub.html
Abstract:

I will describe the quantized universal enveloping algebra $U_q(sl_2)$ and present the basics of its finite-dimensional representation theory. Next I will introduce the so-called crystal bases of Kashiwara and Lusztig, motivated by an example of the irreducible decomposition of the tensor product of two simple modules. A digraph with colored edges can be associated to a crystal base. The talk will conclude with an example of how algebraic information is encoded in this graph.

Friday, April 13th, 2012
Surge 284
1:10pm-2:00pm
Calendar of Events For the Week of April 16th – 20th, 2012

TUESDAY, 17th
8:10-9:30AM, SURGE 268  ALGEBRAIC GEOMETRY (Dr. Ziv Ran)

11:10-12:00PM, SURGE 268  TOPOLOGY (Dr. Elena Pavelescu, Occidental College)
“Legendrian graphs with all cycles unknots of maximal Thurston-Bennequin number”

12:40-2:00PM, SURGE 284  LIE THEORY (Dr. Irfan Bagci, UCR)
“Whittaker Categories and Whittaker Modules for Lie Superalgebras”

3:40-4:30PM, SURGE 268  ANALYSIS (Dr. James Stafney, UCR)
“Spherical Harmonics and the Legendre Differential Equations”

WEDNESDAY, 18th
10:10-11:00AM, SURGE 268  COMBINATORIAL NUMBER THEORY (Dr. Mei-Chu Chang, UCR)
“Isomorphism classes of hyperelliptic curves over finite fields” cont’d

11:10-12:00PM, SURGE 268  TOPICS IN COMMUTATIVE ALGEBRA (Dr. Lin / McCullough / Henriques)

12:10-1:00PM, SURGE 268  PDE & APPLIED MATHEMATICS (Dr. Qi Zhang, UCR)
“Reading on regularity of elliptic and parabolic equations” cont’d

1:10-2:00PM, SURGE 268  OPERATOR ALGEBRAS & RELATED TOPICS (Dominick Scaletta, UCR)
“Modular Tensor Categories 2: More on MTC’s and The Quantum Double of a Finite Group”

THURSDAY, 19th
8:10-9:30AM, SURGE 268  ALGEBRAIC GEOMETRY (Dr. Ziv Ran)

11:10-12:30PM, SURGE 268  FRACTAL RESEARCH GROUP (Dr. Stephen Muir, UCR)
“Packing Measure for Continued Fraction Systems”

12:40-2:00PM, SURGE 284  LIE THEORY (Dr. Greenstein / Dr. Gan)

3:40-5:00PM, SURGE 268  MATHEMATICAL PHYSICS & DYNAMICAL SYSTEMS (Dr. Stephen Muir, UCR)
“Gibbs Measures in Physics and Dynamics (part 2)”

4:10-5:00PM, SURGE 284  MATH CLUB (Dr. Jim Kelliher, UCR)
“Math in the Real World”

FRIDAY, 20th
11:10-12:00PM, SURGE 268  DIFFERENTIAL GEOMETRY (Dr. Bun Wong, UCR)
“On smooth convex domains with non-compact automorphism group”
(Joint work with Dr. Lina Lee and Brad Thomas)

1:10-2:00PM, SURGE 284  GRADUATE STUDENT SEMINAR (Mathew Lunde, UCR)
“Loop and Quantum Loop Algebras”

3:10-4:00PM, SURGE 268  COMMUTATIVE ALGEBRA (Dr. Ines Henriques, UCR)
“Brauer-Thrall type theorem for totally reflexive modules”
“Legendrian graphs will all cycles unknots of maximal Thurston-Bennequin number”

Abstract:
A Legendrian graph in a contact structure is a graph embedded in such a way that its edges are everywhere tangent to the contact planes. In this talk we look at Legendrian graphs in $\mathbb{R}^3$ with the standard contact structure. We extend the invariant Thurston-Bennequin number (tb) from Legendrian knots to Legendrian graphs. We prove that a graph can be Legendrian realized with all its cycles Legendrian unknots with $tb=-1$ if and only if it does not contain $K_4$ as a minor. This talk is based on joint work with Danielle O'Donnol.

Tuesday, April 17th, 2012
Surge 268
11:10am-12:00pm
Abstract:

B. Kostant introduced a class of modules for finite dimensional complex semisimple Lie algebras. He called them Whittaker modules because of their connection with the Whittaker equations that arise in the study of the associated Lie group. Since then, a number of others have further developed the idea of Whittaker modules for Lie algebras. Recently, in a joint work with K. Christodouloupolou and E. Wiesner, we have adapted some of these ideas to the setting of Lie superalgebras.
Abstract:

Back in the day when I was in the business world and made a lot of money I wore several hats: software designer, consultant, manager, and amateur mathematician. I will speak of a few of the kinds of problems I faced that required mathematical thinking or techniques and how I went about solving them.

Thursday, April 19th, 4:10 - 5:00 p.m. in Surge 284:

Dr. Jim Kelliher, UCR

“Math in the Real World”

Snacks and drinks will be served

http://mathdept.ucr.edu/ugrad/ugrad-mathclub.html
Mathew Lunde
(UCR)

“Loop and Quantum Loop Algebras”

Abstract:

I will be discussing the loop algebra and quantum loop algebra of a simple Lie algebra. We will discuss properties of and differences between these algebras, how to recover the original loop algebra from the quantum loop algebra by taking a "limit" and some representation theory.

Friday, April 20th, 2012
Surge 284
1:10pm-2:00pm
Abstract:

Over non-Gorenstein local rings the category of totally reflexive modules is known to be representation infinite, provided that it contains a non-free module. In joint work with L.W. Christensen and H. Rahmati.

Friday, April 20th, 2012
Surge 268
3:10pm-4:00pm
TUESDAY, 24th
8:10-9:30AM, SURGE 268
ALGEBRAIC GEOMETRY (Dr. Ziv Ran)

11:10-12:00PM, SURGE 268
TOPOLOGY (Dr. Michael Yoshizawa, UC Santa Barbara)
“Generating Examples of High Distance Heegaard Splittings”

12:40-2:00PM, SURGE 284
LIE THEORY (Matthew Highfield, UCR)
“Twisted Graded Hecke Algebras”

3:40-4:30PM, SURGE 268
ANALYSIS (Dr. James Stafney, UCR)
“Spherical Harmonics and the Legendre Differential Equations cont’d”

3:40-5:00PM, SURGE 284
COLLOQUIUM – Dr. Chiu-Yen Kao, Ohio State & Claremont McKenna
“An efficient rearrangement algorithm for shape optimization problem involving principal eigenvalue in population dynamics”

WEDNESDAY, 25th
10:10-11:00AM, SURGE 268
COMBINATORIAL NUMBER THEORY (Dr. Mei-Chu Chang, UCR)
“Isomorphism classes of hyperelliptic curves over finite fields” cont’d

11:10-12:00PM, SURGE 268
TOPICS IN COMMUTATIVE ALGEBRA (Dr. Lin / McCullough / Henriques)

12:10-1:00PM, SURGE 268
PDE & APPLIED MATHEMATICS (Dr. Juhi Jang)

1:10-2:00PM, SURGE 268
OPERATOR ALGEBRAS & RELATED TOPICS (Dr. Feng Xu)

THURSDAY, 26th
8:10-9:30AM, SURGE 268
ALGEBRAIC GEOMETRY (Dr. Ziv Ran)

11:10-12:30PM, SURGE 268
FRACTAL RESEARCH GROUP (Dr. Stephen Muir, UCR)
“Packing Measure for Continued Fraction Systems (cont’d)”

12:40-2:00PM, SURGE 284
LIE THEORY (Dr. Greenstein / Dr. Gan)

3:40-5:00PM, SURGE 268
MATHEMATICAL PHYSICS & DYNAMICAL SYSTEMS (John Quinn, UCR)
“Toward Geometric Understanding of Critical Phenomena”

4:10-5:00PM, SURGE 284
MATH CLUB (Parker Williams, UCR)
“A few immediate results about graphs results via spectra”

FRIDAY, 27th
11:10-12:00PM, SURGE 268
DIFFERENTIAL GEOMETRY (Curtis Pro, UCR)
“Riemannian submersions need not preserve positive Ricci curvature”

1:10-2:00PM, SURGE 284
GRADUATE STUDENT SEMINAR – Oliver Thistlethwaite, UCR
“Fibre bundles”

3:10-4:00PM, SURGE 268
COMMUTATIVE ALGEBRA (Dr. Ines Henriques, UCR)
“Brauer-Thrall type theorem for totally reflexive modules (cont’d)”
“Generating Examples of High Distance Heegaard Splittings”

Abstract:
Given a closed orientable 3-manifold M, a surface S in M is a Heegaard surface if it separates the manifold into two handlebodies of equal genus. This decomposition is called a Heegaard splitting of M. The distance of this splitting is the length of the shortest path in the curve complex of S between the disk complexes of the two handlebodies. In 2004, Evans developed an iterative process to construct a manifold that admits a Heegaard splitting with arbitrarily high distance. We first provide an introduction to Hempel distance and then improve on Evans' results.
Abstract:

I will give an overview of the 2007 paper by S. Witherspoon, "Twisted Graded Hecke Algebras." Given a finite group $G$ acting on a finite dimensional complex vector space $V$ and a 2-cocycle $\alpha$, we may form the twisted crossed product algebra $TV\#^\alpha G$. The main theorem gives conditions for a PBW basis for certain quotients of this algebra. A twisted graded Hecke algebra is one that satisfies these conditions. One can think of these algebras as certain deformations of $SV\#^\alpha G$. I will describe several examples, including symplectic reflection algebras and the case $G \cong \langle \mathbb{Z}/m\mathbb{Z} \rangle^n$.
“An efficient rearrangement algorithm for shape optimization problem involving principal eigenvalue in population dynamics”

Abstract:
In this talk, an efficient rearrangement algorithm is introduced to the minimization of the positive principal eigenvalue under the constraint that the absolute value of the weight is bounded and the total weight is a fixed negative constant. Biologically, this minimization problem is motivated by the question of determining the optimal spatial arrangement of favorable and unfavorable regions for a species to survive. The method proposed is based on Rayleigh quotient formulation of eigenvalues and rearrangement algorithms which can handle topology changes automatically. Using the efficient rearrangement strategy, the new proposed method is more efficient than classical level set approaches based on shape and/or topological derivatives. The optimal results are explored theoretically and numerically under different geometries and boundary conditions.

Tuesday, April 24th, 2012
Surge 284
4:10-5:00pm
Tea Time at 3:40pm
Abstract:

Algebraic graph theory can roughly be thought of as using algebraic techniques to obtain information about graphs. We will work the translation of algebraic properties into properties about graphs. We will look largely at results that involve understanding the spectrum of a linear transformation and if time permits some surprising asymmetric results in the sense some techniques work on some families of graphs and not others.

Snacks and drinks will be served.

http://mathdept.ucr.edu/ugrad/ugrad-mathclub.html
Abstract:

Almost every math grad student at UCR has already encountered fibre bundles in some form. Anyone who has taken the 205 sequence surely has fond memories of covering spaces and the Hopf fibration. We will discuss the more general construction of a fibre bundle as well as some applications to manifold theory.

Friday, April 27th, 2012
Surge 284
1:10pm-2:00pm
“Brauer-Thrall type theorem for totally reflexive modules (continued)”

Abstract:

Over non-Gorenstein local rings the category of totally reflexive modules is known to be representation infinite, provided that it contains a non-free module. In joint work with L.W. Christensen and H. Rahmati, we establish Brauer-Thrall modeled results for totally reflexive modules over Artinian, non-Gorenstein, graded algebras.

Friday, April 27\textsuperscript{th}, 2012
Surge 268
3:10pm-4:00pm
UNIVERSITY OF CALIFORNIA, RIVERSIDE
Department of Mathematics

Calendar of Events For the Week of April 30th – May 4th, 2012

TUESDAY, 1st
8:10-9:30AM, SURGE 268  ALGEBRAIC GEOMETRY (Dr. Ziv Ran)

11:10-12:00PM, SURGE 268  TOPOLOGY (Dr. Luca Di Cerbo, Duke University)
   “Seiberg-Witten equations on manifolds with cusps”

1:00-2:00PM, SURGE 284  LIE THEORY (Dr. Adriano de Moura, UNICAMP, Brazil)

3:40-4:30PM, SURGE 268  ANALYSIS (Dr. Yuichiro Kakihara, UCR)
   “Orthogonally scattered measures and Radon-Nikodym derivatives”

WEDNESDAY, 2nd
10:10-11:00AM, SURGE 268  COMBINATORIAL NUMBER THEORY (Dr. Mei-Chu Chang, UCR)
   “Isomorphism classes of hyperelliptic curves over finite fields” cont’d

11:10-12:00PM, SURGE 268  TOPICS IN COMMUTATIVE ALGEBRA (Dr. Lin / McCullough / Henriques)

12:10-1:00PM, SURGE 268  PDE & APPLIED MATHEMATICS (Dr. Juhi Jang)

1:10-2:00PM, SURGE 268  OPERATOR ALGEBRAS & RELATED TOPICS (Dr. Feng Xu)

3:40-5:00PM, SURGE 284  COLLOQUIUM – Dr. Ralph Cohen, Stanford University
   “The topology of loops and strings in a manifold”

THURSDAY, 3rd
8:10-9:30AM, SURGE 268  ALGEBRAIC GEOMETRY (Dr. Ziv Ran)

11:10-12:30PM, SURGE 268  FRACTAL RESEARCH GROUP (Michael Maroun, UCR)
   “1-D Singular Potentials, Symanzik Scaling and the Imaginary Resolvent”

1:00-2:00PM, SURGE 284  LIE THEORY (Dr. Adriano Moura, UNICAMP, Brazil)
   “Extensions of finite-dimensional representations of quantum affine
   algebras and prime representations”

3:40-5:00PM, SURGE 268  MATHEMATICAL PHYSICS & DYNAMICAL SYSTEMS
   (Dr. Mitsuo Kobayashi, CSU Pomona)
   “The Perfect Numbers and Their Imperfect Neighbors”

4:10-5:00PM, SURGE 284  MATH CLUB (Dr. Julie Bergner, UCR)
   “Movie Night: The Colors of Infinity”

FRIDAY, 4th
11:10-12:00PM, SURGE 268  DIFFERENTIAL GEOMETRY (Dr. Owen Dearricott, UCLA)
   “n-Sasakian reduction”

1:10-2:00PM, SURGE 284  GRADUATE STUDENT SEMINAR (Nishu Lal, UCR)
   “Fractals and Dimensions”

3:10-4:00PM, SURGE 268  COMMUTATIVE ALGEBRA (Dr. Kuei-Nuan Lin, UCR)
   “Rees Algebras as Divisors”
Abstract:

In this talk, I will present some results concerning the Seiberg-Witten equations on finite volume complex 4-manifolds with cusps. These results extend and complete previous work of O. Biquard and Y. Rollin. Finally, using a Seiberg-Witten scalar curvature estimate I will present the finite volume generalization of some well-known theorems of C. LeBrun.
In this talk I will describe some of the constructions of the `string topology' of a manifold. These are homological operations on spaces of loops and paths in a manifold. The study of these operations was initiated by Chas and Sullivan, and have since been explored by many authors. I will describe methods for probing deeper into the structure of these loop and path spaces by studying similar structures on chain complexes and on spectra. This will lead to a variety of open questions, such as how this structure fits into the classification of topological field theories described by Costello, Lurie, and others, understanding duality phenomena in this setting, and connections to symplectic topology.
“Volumes of Hyperbolic Orbifolds”

Abstract:
Given an abelian category, one of the natural questions to be addressed is that of understanding the space of extensions between its simple objects. For the category of finite-dimensional representations of an affine Kac-Moody algebra, this question has been answered in the last few years. The quantum version of this category is far more complicated and the answer to this question remains open. We shall discuss some ideas towards the answer with the help of the concept of q-characters and show, via examples, that the quantum answer is different from the classical one in an essential way. An interesting feature of the category of finite-dimensional representations of a quantum affine is that it has simple objects which are not prime, i.e., which are isomorphic to a tensor product of two nontrivial simple objects. It is then natural to try to classify the prime ones. Although this classification is also unknown, the amount of known examples of prime modules has been growing. In the main part of this talk we shall present results from a joint paper with V. Chari and C. Young relating the study of prime representations to that of the space of extensions between simple modules. In particular, we show that, if the underlying simple Lie algebra is sl(2), then a simple representation is prime if and only if the space of its self extensions is one-dimensional. It is tempting to conjecture that this is true in general and we construct a large class of prime representations satisfying this homological property.

Tuesday, May 3rd, 2012
Surge 284
1:00pm-2:00pm
Abstract:

In classical Greek mathematics, a number was considered perfect if it is exactly the sum of its proper examples. Besides the number 6 (=1+2+3), they knew of only three other examples, but assumed many properties about them based on this limited data. Most of these properties are still unsolved, and are considered the oldest problems in mathematics. We will begin by reviewing what little is known about the perfect numbers, and then turn our attention to current research on the complement set of non-perfect numbers.
Thursday, May 3rd, 4:10 - 5:00 p.m. in Surge 284:

Movie Night:

“The Colors of Infinity”

Come watch an interesting documentary on fractals!

Snacks and refreshments will be provided! We hope to see you all there!

http://mathdept.ucr.edu/ugrad/ugrad-mathclub.html
Abstract:

An n-Sasakian manifold is a Riemannian manifold foliated with n-dimensional equidistant leaves such that the Riemann tensor is that of a curvature one space form on any triple of vectors containing a vector tangent to the leaf.

Morioanu and Semmelmann recently gave classification of homogeneous n-Sasakian manifolds.

In this talk we will discuss a reduction procedure that arrives at new n-Sasakain manifolds from old by exploiting symmetries of the structure.

We then will discuss two inhomogeneous families of examples that come from reduction of Morioanu and Semmelmann's examples and discuss their cohomology.

Friday, May 4\textsuperscript{th}, 2012
Surge 268
11:10am-12:00pm
I will give a brief introduction to fractal geometry. Fractals can be generated using iterated Function Systems. In particular, we will discuss the special class of self-similar fractals and the notion of fractal dimensions.
Abstract:

We would like to understand the defining equations of Rees algebra of truncation of complete intersections of length 2. We start with the work of Kristen-Polini-Ulrich which dealing with the case in a polynomial ring with two variables. They identify the defining ideal of Rees algebra as the divisor of a normal domain. Then we talk about the joint work with Polini which we extend to the case of any number of variables.
**UNIVERSITY OF CALIFORNIA, RIVERSIDE**  
**Department of Mathematics**

**Calendar of Events For the Week of May 7\(^{th}\) – 11\(^{th}\), 2012**

**TUESDAY, 8\(^{th}\)**
- **8:10-9:30AM, SURGE 268**  
  **ALGEBRAIC GEOMETRY** (Dr. Ziv Ran)

- **11:10-12:00PM, SURGE 268**  
  **TOPOLOGY** (Dr. Daniel Murfet, UCLA)  
  “The 2-category of matrix factorisations”

- **1:00-2:00PM, SURGE 284**  
  **LIE THEORY** (Dr. Jonathan Kujawa, University of Oklahoma)  
  “Computing complexity”

- **3:40-4:30PM, SURGE 268**  
  **ANALYSIS** (Dr. James Stafney, UCR)  
  “Group Representations and Spherical Harmonics”

**WEDNESDAY, 9\(^{th}\)**
- **10:10-11:00AM, SURGE 268**  
  **COMBINATORIAL NUMBER THEORY** (Dr. Chang / Dr. Costello)

- **11:10-12:00PM, SURGE 268**  
  **TOPICS IN COMMUTATIVE ALGEBRA** (Dr. Lin / McCullough / Henriques)

- **12:10-1:00PM, SURGE 268**  
  **PDE & APPLIED MATHEMATICS** (Dr. Juhi Jang)

- **1:10-2:00PM, SURGE 268**  
  **OPERATOR ALGEBRAS & RELATED TOPICS** (Andrew Monnot, UCR)  
  “C*-algebras: Representations and States”

- **3:40-5:00PM, SURGE 284**  
  **COLLOQUIUM** – Dr. Vladimir Markovic, Caltech  
  “Recent developments in geometry and topology of hyperbolic 3-manifolds”

**THURSDAY, 10\(^{th}\)**
- **8:10-9:30AM, SURGE 268**  
  **ALGEBRAIC GEOMETRY** (Dr. Ziv Ran)

- **11:10-12:30PM, SURGE 268**  
  **FRACTAL RESEARCH GROUP**  
  Anyastassia Seboldt, UCR - “Optimal Epsilon-Covering of Shape Space”  
  Scott Roby, UCR – “Lattice Self-Similar Strings and Self-Similar Multifractals”

- **1:00-2:00PM, SURGE 284**  
  **LIE THEORY** (John Dusel, UCR)  
  “Folding $SB(\infty)$”

- **3:40-5:00PM, SURGE 268**  
  **MATHEMATICAL PHYSICS & DYNAMICAL SYSTEMS** (Dr. David Carfi, University of Messina)  
  “Competitive Dynamics in Game Theory and Applications”

- **4:10-5:00PM, SURGE 284**  
  **MATH CLUB** (Dr. Julie Bergner)  
  “Knotted Cobordisms”

**FRIDAY, 11\(^{th}\)**
- **11:00-1:00PM, SURGE 268**  
  **DISSERTATION DEFENSE** – Adam Katz, UCR  
  “PBW Bases for Dioperads”

- **1:10-2:00PM, SURGE 284**  
  **GRADUATE STUDENT SEMINAR**

- **3:10-4:00PM, SURGE 268**  
  **COMMUTATIVE ALGEBRA** (Dr. Jason McCullough)  
  “Bounds on Regularity in Terms of Syzygy Degrees”
Abstract:

I will explain how 2-categories naturally arise in the study of two-dimensional topological field theories with defect lines. An interesting example, related to topological Landau-Ginzburg models, is the 2-category whose objects are isolated hypersurface singularities and whose 1-morphisms are matrix factorisations. I will discuss the rich structure of this bicategory worked out in recent joint work with Nils Carqueville.
Abstract:

Complexity is an established invariant of modules in non-semisimple settings. For a given module $M$ it is defined as the rate of growth of the minimal projective resolution of $M$. Hence, in a sense, it is a measure of how far the module is from being projective. I'll introduce the complexity and its geometric interpretation in the setting of finite groups as an example. I'll also give the results of the recent calculation of the complexity of the simple modules for the complex Lie superalgebra $\mathfrak{gl}(m|n)$ (along with an intriguing geometric interpretation). I'll explain all the necessary background as we go, so all are welcome. Our work is joint with Brian Boe and Dan Nakano.
I'll review relevant background material on C*-algebras and then proceed to discuss aspects related to their representations including states, the GNS construction, the primitive ideal space, weights, and traces.

Wednesday, May 9th, 2012
Surge 268
1:10pm-2:00pm
Abstract:

We will discuss a realization of the crystal $B(\infty)$ adapted for the action of an admissible diagram automorphism, with the aim of describing a natural subcrystal for folded Cartan datum.
Cobordisms can be thought of as manifolds between manifolds. We will look into some interesting topics of knotted cobordisms, knotted manifolds, and manifolds with knotted boundaries. We will discuss the category of cobordisms with embeddings in 3 dimensional Euclidean space.

Snacks and refreshments will be provided!

We hope to see you all there!

http://mathdept.ucr.edu/ugrad/ugrad-mathclub.html
DEPARTMENT OF MATHEMATICS

Dissertation Defense

Adam Katz

UC Riverside

“PBW Bases for Dioperads”

Friday, May 11th, 2012
Surge 268
11:00am-1:00pm
Abstract:

This is part 2 of the talk I started last week. There is a doubly exponential bound on the regularity of an ideal in terms of the degrees of the generators due to Galligo, Giusti and Caviglia-Sbarra. Examples by Mayr-Meyer show that this bound is nearly best possible. Engheta later asked if a polynomial bound on regularity was possible given more syzygy degrees. We show that this is true if given half of the syzygies. Other bounds and related questions if time permits.

Friday, May 11th, 2012
Surge 268
3:10pm-4:00pm
UNIVERSITY OF CALIFORNIA, RIVERSIDE
Department of Mathematics

Calendar of Events For the Week of May 14th – 18th, 2012

TUESDAY, 15th
11:10-12:00PM, SURGE 268  TOPOLOGY (Dr. Julie Bergner, UCR)
   “Generalized classifying space constructions”
12:40-2:00PM, SURGE 284  LIE THEORY (Dr. Deniz Kuz, Universität zu Köln)
   “Demazure and Weyl modules for twisted current algebras”
2:10-3:30PM, SURGE 284  ALGEBRAIC GEOMETRY (Dr. Mario Maican, Romanian Academy of Science)
   “The classification of semi-stable plane sheaves supported on quatric, quintic or sextic curves”
3:40-4:30PM, SURGE 268  ANALYSIS (Dr. James Stafney, UCR)
   “Group Representations and Spherical Harmonics” cont’d

WEDNESDAY, 16th
10:10-11:00AM, SURGE 268  COMBINATORIAL NUMBER THEORY (Dr. Chang / Dr. Costello)
11:10-12:00PM, SURGE 268  TOPICS IN COMMUTATIVE ALGEBRA (Dr. Ines Henriques, UCR)
   “Normal Polytopes”
12:10-1:00PM, SURGE 268  PDE & APPLIED MATHEMATICS (Dr. Jihoon Lee, Sungkyunkwan Univ.)
   “Global existence of Navier-Stokes-Vlasov-Fokker-Planck system”
1:10-2:00PM, SURGE 268  OPERATOR ALGEBRAS & RELATED TOPICS (Dr. Feng Xu)
3:40-5:00PM, SURGE 284  COLLOQUIUM – Dr. Alexander Duncan, UCLA
   “Essential Dimension”

THURSDAY, 17th
8:10-9:30AM, SURGE 268  ALGEBRAIC GEOMETRY (Dr. Ziv Ran)
11:10-12:30PM, SURGE 268  FRACTAL RESEARCH GROUP (John Quinn, UCR)
   “Transform Methods and Energy of Measures”
12:40-2:00PM, SURGE 284  LIE THEORY (Dr. Jonas Hartwig, Stanford University)
   “Quantized enveloping algebras, Galois orders and applications”
3:40-5:00PM, SURGE 268  MATHEMATICAL PHYSICS & DYNAMICAL SYSTEMS (Nishu Lal, UCR)
   “Towards Understanding the Decimation Method of Fractals”
4:10-5:00PM, SURGE 284  MATH CLUB (Dennis Gumaer, UCR)
   “LaTex Information Session”

FRIDAY, 18th
11:10-12:00PM, SURGE 268  DIFFERENTIAL GEOMETRY (Dennis Gumaer, UCR)
   “Jacobi field splitting”
1:10-2:00PM, SURGE 268  GRADUATE STUDENT SEMINAR
   TBA
3:10-4:00PM, SURGE 268  COMMUTATIVE ALGEBRA (Dr. David Rush)
DEPARTMENT OF MATHEMATICS

Algebraic Geometry

Dr. Mario Maican
(Romanian Academy of Science)

“The classification of semi-stable plane sheaves supported on quartic, quintic or sextic curves”

Abstract:

We find locally free resolutions of length 1 for all Gieseker semi-stable sheaves on the complex projective plane having Hilbert polynomial $P(m)=rm+c$, where $r=4, 5, 6$. The corresponding moduli spaces are thus naturally stratified according to the type of resolution. The strata are quotients modulo certain algebraic groups and have concrete geometric descriptions.

Tuesday, May 15th, 2012
Surge 284
2:10pm-3:30pm
Abstract:

The construction for classifying spaces of groups can be extended to give classifying spaces of categories. However, two classifying spaces can be equivalent even if the categories they came from were not. In this talk, we’ll look at two different ways of refining the definition of classifying space to correct this problem, leading to two of the approaches to (∞,1)-categories.

Tuesday, May 15th, 2012
Surge 268
11:10am-12:00pm
Abstract:

We study finite-dimensional representations of twisted current algebras, especially Demazure and (twisted) Weyl modules. First we identify these Weyl modules with corresponding affine Demazure modules, then we give an explicit construction from untwisted Weyl modules which generalize the fusion.
Abstract:

In this talk, we consider spray models of macro/micro interaction. This model is described by compressible and incompressible Navier-Stokes equations coupled with the Fokker-Planck equations. We consider the global existence of smooth solution in various assumptions.
Abstract:

Informally, the essential dimension of an algebraic object is the minimal number of parameters required to describe it. In this talk, I will discuss the essential dimension of finite groups and its connections to the simplification of polynomials, inverse Galois theory, and algebraic variants of Hilbert's 13th problem.

Wednesday, May 16th, 2012
Surge 284
4:10-5:00pm
Tea Time at 3:40pm
“Quantized enveloping algebras, Galois orders and applications”

Abstract:

I will talk about recent joint work with V. Futorny in which we prove that the quantized enveloping algebra $U_q(\mathfrak{gl}_n)$ has the structure of a Galois order, a certain subring of invariants in a skew group algebra. As an application we describe explicitly the structure of the division ring of fractions of $U_q(\mathfrak{gl}_n)$, in particular obtaining a new proof of the quantum Gelfand-Kirillov conjecture for $\mathfrak{gl}_n$. Secondly we prove that the Gelfand-Tsetlin subalgebra of $U_q(\mathfrak{gl}_n)$ is maximal commutative, and obtain a parametrization of irreducible Gelfand-Tsetlin modules over $U_q(\mathfrak{gl}_n)$.

Thursday, May 17th, 2012
Surge 284
1:00-2:00pm
This talk will cover the very basics of LaTeX usage. We will start with a download site of the necessary files. By the end of the talk you should be ready to type your homework in LaTeX for a cleaner and more professional display of your work.

Snacks and refreshments will be provided! We hope to see you all there!

Thursday, May 17\textsuperscript{th}, 4:10 - 5:00 p.m. in Surge 284:

Dennis Gumaer, UCR

“LaTeX Information Session”

http://mathdept.ucr.edu/ugrad/ugrad-mathclub.html
Abstract:

We will discuss the tools necessary to prove the Jacobi field splitting theorem. This includes results regarding Jacobi fields and the horizontal Riccati equation. A proof of the Jacobi field splitting theorem and proof of a new splitting theorem with different curvature conditions will follow.

Friday, May 18th, 2012
Surge 268
11:10am-12:00pm
### Calendar of Events For the Week of May 21st – 25th, 2012

<table>
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<tr>
<th>Date</th>
<th>Time</th>
<th>Location</th>
<th>Event Title</th>
<th>Speaker(s)</th>
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<td><strong>TUESDAY, 22nd</strong></td>
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<td>ALGEBRAIC GEOMETRY</td>
<td>(Dr. Ziv Ran)</td>
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<td>8:10-9:30AM</td>
<td>SURGE 268</td>
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<td>11:10-12:00PM</td>
<td>SURGE 268</td>
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<td>TOPOLOGY</td>
<td>(Dr. Julie Bergner, UCR)</td>
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<td>“Generalized classifying space constructions, cont’d”</td>
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<td>1:00-2:00PM</td>
<td>SURGE 284</td>
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<td>LIE THEORY</td>
<td>(Dr. Alexander Bouayad, Université Paris VII, France)</td>
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<td>“Generalized quantum enveloping algebras and Langlands interpolating quantum groups”</td>
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<td>3:40-4:30PM</td>
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<td>ANALYSIS</td>
<td>(Dr. James Stafney, UCR)</td>
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<td>“Group Representations and Spherical Harmonics” cont’d</td>
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<td><strong>WEDNESDAY, 23rd</strong></td>
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<td>COMBINATORIAL NUMBER THEORY</td>
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<td>TOPICS IN COMMUTATIVE ALGEBRA</td>
<td>(Dr. Ines Henriques, UCR)</td>
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<td>“Normal and Very Ample Polytopes”</td>
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<td>12:10-1:00PM</td>
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<td>PDE &amp; APPLIED MATHEMATICS</td>
<td>(Dr. Juhi Jang)</td>
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<td>1:10-2:00PM</td>
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<td>OPERATOR ALGEBRAS &amp; RELATED TOPICS</td>
<td>(Andrew Monnot, UCR)</td>
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<td>“C*-algebras 2”</td>
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<td>3:40-5:00PM</td>
<td>SURGE 284</td>
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<td>COLLOQUIUM</td>
<td>*<strong>No Colloquium This Week</strong></td>
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<td><strong>THURSDAY, 24th</strong></td>
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<td>ALGEBRAIC GEOMETRY</td>
<td>(Dr. Ziv Ran)</td>
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<td>11:10-12:30PM</td>
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<td>FRACTAL RESEARCH GROUP</td>
<td>(Rolando De Santiago, Cal Poly Pomona)</td>
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<td>“Zeta Functions of Recurrence Strings”</td>
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<td>1:00-2:00PM</td>
<td>SURGE 284</td>
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<td>LIE THEORY</td>
<td>(Dr. Sachin Sharma, Institute of Mathematical Sciences, Chennai, India)</td>
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<td>“The t-analog of the basic string function for twisted affine Kac-Moody algebras”</td>
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<td>3:40-5:00PM</td>
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<td>MATHEMATICAL PHYSICS &amp; DYNAMICAL SYSTEMS</td>
<td>(Michael Maroun, UCR)</td>
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<td>“The Free Imaginary Resolvent and the Modified Feynman Integral for the Dirac Equation”</td>
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<td>4:10-5:00PM</td>
<td>SURGE 284</td>
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<td>MATH CLUB</td>
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<td>Feedback (Pizza) Session</td>
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<td><strong>FRIDAY, 25th</strong></td>
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<td>DIFFERENTIAL GEOMETRY</td>
<td>(Dr. Zhang-Dan Guan, UCR)</td>
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<td>11:10-12:00PM</td>
<td>SURGE 268</td>
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<td>“Positive Lemma, Math 46 and generalized extremal solitons”</td>
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<td>1:10-2:00PM</td>
<td>SURGE 284</td>
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<td>GRADUATE STUDENT SEMINAR</td>
<td>– Daniel Majchererek, UCR</td>
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<td>“Generalizing Commutative Ring Theory With Multiplicative Lattices”</td>
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<td>3:10-4:00PM</td>
<td>SURGE 268</td>
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<td>COMMUTATIVE ALGEBRA</td>
<td>(Dr. Lance Miller, University of Utah)</td>
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<td>“Hilbert-Kunz functions of rank 1 matrices”</td>
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</table>
Abstract:

The construction for classifying spaces of groups can be extended to give classifying spaces of categories. However, two classifying spaces can be equivalent even if the categories they came from were not. In this talk, we’ll look at two different ways of refining the definition of classifying space to correct this problem, leading to two of the approaches to (∞,1)-categories.
Abstract:

We will define and study deformations along several parameters of the enveloping algebra of a semisimple finite dimensional Lie algebra, called the Generalized Quantum Enveloping (GQE) algebras. We will see how GQE algebras can be used to define Langlands Interpolating Quantum (LIQ) groups and solve conjectures motivated by the geometric Langlands program. These conjectures have been suggested by E. Frenkel and D. Hernandez in an original work on different LIQ groups.
Abstract:

This week I'll cover the GNS construction for weights, mention the existence of a faithful representation of a C*-algebra, and talk about direct integrals of Hilbert spaces and actions on these.

Wednesday, May 23rd, 2012
Surge 268
1:10-2:00pm
“The \( t \)-analog of the basic string function for twisted affine Kac-Moody algebras”

Abstract:

The Kostant partition function can be used to determine the weight multiplicities associated to irreducible representations of Kac-Moody algebras. Its \( t \)-analog was used by Lusztig to define a \( t \)-analog of weight multiplicity. We study Lusztig’s \( t \)-weight multiplicities associated to the level one representation of twisted affine Kac-Moody algebras. We will derive a closed form expression for the corresponding \( t \)-string function using constant term identities of Macdonald and Cherednik. We describe how generalized exponents of certain representations of the underlying finite dimensional simple Lie algebra enter the picture.
We want your input! If you've been a participant in the Math Club this year, we'd like to know what you liked and didn't like. If you haven't been involved so far, we'd like to know what might make the math club more interesting to you. At this week's meeting, you'll have a chance to share your opinions and ideas so that we can begin to plan for next year. If you want to be a student leader for the club next year, we want to know that too.

Thursday, May 24th, 4:10 - 5:00 p.m. in Surge 284:

Feedback Session

Grad Student Volunteers:
  • Nishu Lal

Undergrad Student Volunteers:
  • Emad Totari
  • Amanda Hoisington

Pizza and Drinks Served

http://mathdept.ucr.edu/ugrad/ugrad-mathclub.html
A multiplicative lattice is simply a partially ordered algebraic structure with some additional restrictions and properties. It is oftentimes useful to work with such structures instead of standard rings as results concerning lattices tend to be generalized results in ring theory, and so obtaining a theorem in terms of lattices may yield specific results concerning commutative rings or graded rings (or modules). We will discuss some basic properties and concepts of multiplicative lattices such as meets, joins, and principality, give some classic examples, and generalize ring theory concepts in a lattice sense. Special kinds of multiplicative lattices will also be considered.

Friday, May 25th, 2012
Surge 284
1:10-2:00pm
Abstract:

E. Kunz in 1976 introduced a positive characteristic variant of Hilbert-Samuel theory where powers of an ideal are replaced by Frobenius powers. Unfortunately he erroneously concluded the corresponding limit defining the multiplicity does not exist! P. Monsky later showed the error in Kunz's conclusion and how the associated multiplicity, called the Hilbert-Kunz multiplicity, is deeply related to singularity theory and tight closure. This multiplicity is the first coefficient of a function called the Hilbert-Kunz function, which is not in general polynomial like. This talk will introduce Hilbert-Kunz theory and discuss some work on computing the Hilbert-Kunz functions of determinantal varieties via Grobner basis. This is joint work with I. Swanson.
UNIVERSITY OF CALIFORNIA, RIVERSIDE  
Department of Mathematics

Calendar of Events For the Week of May 28th – June 1st, 2012

**TUESDAY, 29th**
8:10-9:30AM, SURGE 268  ALGEBRAIC GEOMETRY (Dr. Ziv Ran)

11:10-12:00PM, SURGE 268  TOPOLOGY (Jason McCarty, University of Virginia)  
“A Spectral Sequence for the Homology of $\Omega^\infty X$”

12:40-2:00PM, SURGE 284  DISSERTATION DEFENSE (Matthew Bennett, UCR)  
“On Tilting modules for the current algebra associated to a simple Lie algebra”

3:40-4:30PM, SURGE 268  ANALYSIS (Dr. Victor Shaprio, UCR)  
“The symmetric group in nonlinear analysis”

**WEDNESDAY, 30th**
10:10-11:00AM, SURGE 268  COMBINATORIAL NUMBER THEORY (Dr. Chang / Dr. Costello)

11:10-12:00PM, SURGE 268  TOPICS IN COMMUTATIVE ALGEBRA (Dr. Lin / McCullough / Henriques)

12:10-1:00PM, SURGE 268  PDE & APPLIED MATHEMATICS (Dr. Jim Kelliher, UCR)  
“On Green’s functions and the Euler equations”

1:10-2:00PM, SURGE 268  OPERATOR ALGEBRAS & RELATED TOPICS (Andrew Monnot, UCR)  
“C*-algebras 3”

**THURSDAY, 31st**
8:10-9:30AM, SURGE 268  ALGEBRAIC GEOMETRY (Dr. Ziv Ran)

11:10-12:30PM, SURGE 268  FRACTAL RESEARCH GROUP (Dr. John Rock)  
“Multifractal Analysis of Self-Similar Measures via Scaling Regularity and Scaling Zeta Functions”

12:40-2:00PM, SURGE 284  *LIE THEORY (John Dusel, UCR)  
*Oral Exam

2:00-3:00PM, SURGE 284  DISSERTATION DEFENSE (Curtis Pro, UCR)  
“Topics on Riemannian submersions and diffeomorphism stability”

3:40-5:00PM, SURGE 268  MATHEMATICAL PHYSICS & DYNAMICAL SYSTEMS (Dr. Scot Childress)  
“The Physics of Fractal Strings”

4:10-5:00PM, SURGE 284  MATH CLUB (Dr. Alethea Barbaro, UCLA)  
“From flocking to phase transitions: the mathematics of social dynamics”

**FRIDAY, 1st**
11:10-12:00PM, SURGE 268  DIFFERENTIAL GEOMETRY (Dr. Jeffrey Streets, UC Irvine)  
“The gradient flow of the $L^2$ curvature energy”

1:10-2:00PM, SURGE 284  GRADUATE STUDENT SEMINAR  
TBA

3:00-4:30PM, SURGE 284  DISSERTATION DEFENSE (Nathan Manning, UCR)  
“Global Weyl modules for twisted and untwisted loop algebras”

3:10-4:00PM, SURGE 268  COMMUTATIVE ALGEBRA (Dr. David Rush)
Abstract:

I will discuss joint work with N. Kuhn about a Goodwillie tower spectral sequence converging to $H^*(\Omega^\infty X)$, the mod 2 homology of the zeroth space of a connected spectrum $X$. Dyer-Lashof operations on the spectral sequence lead to "universal" differentials that hold for all spectra. These then lead to an algebraic version of the spectral sequence, whose pages can be completely described in terms of the derived functors of "destabilization" studied by W. Singer and others. The two spectral sequences coincide until the first non-universal, or "rogue," differential. Using this identification, the spectral sequence for various spectra can be completely understood, including all Eilenberg-MacLane spectra. I will finish by discussing some examples of non-connected spectra where the spectral sequence unexpectedly converges to the right answer, or nearly so.

Tuesday, May 29th, 2012
Surge 268
11:10am-12:00pm
DEPARTMENT OF MATHEMATICS

Dissertation Defense

Matthew Bennett
(UC Riverside)

“On Tilting modules for the current algebra associated to a simple Lie Algebra”

Tuesday, May 29th, 2012
Surge 284
12:40pm-2:00pm
Abstract:

I will review the proof of the existence of a pure state on a C*-algebra, briefly mention the Gelfand-Naimark theorem and universal representation of a C*-algebra, and then discuss direct integrals. If time permits, I will begin on group C*-algebras and actions of groups on Hilbert spaces (strongly continuous unitary representations).
DEPARTMENT OF MATHEMATICS

Dissertation Defense

Curtis Pro
(UC Riverside)

“Topics on Riemannian submersions and diffeomorphism stability”

Thursday, May 31st, 2012
Surge 284
2:00pm-3:00pm
Agent-based models are an increasingly important tool for mathematicians working in interdisciplinary mathematics, since they are highly flexible and accessible to researchers in fields as diverse as physics, biology, criminology, and computer science. This technique has been used to model organisms as diverse as fish, insects, birds, and even people, and the models often exhibit interesting behaviors such as flocking and phase transitions. Recently, these models have spawned an active area of research in mathematics by the derivation and analysis of associated kinetic and hydrodynamic PDEs. Studying these models at a kinetic level opens new mathematical perspectives into the dynamics of such systems, raising new and interesting mathematical questions. Here, we will present some agent-based models for social systems, and examine the PDEs arising from these models.

Drinks and snacks will be served!

http://mathdept.ucr.edu/ugrad/ugrad-mathclub.html
Abstract:
The L^2 norm of the Riemannian curvature tensor is a natural intrinsic analogue of the Yang-Mills energy in purely Riemannian geometry. To understand the structure of this functional, it is natural to consider the gradient flow. I will give an overview of the analytic theory behind this flow, and discuss some long time existence results in low dimensions.

Finally I will mention some natural conjectures for this flow and their consequences.

Friday, June 1\textsuperscript{st}, 2012
Surge 268
11:10am-12:00pm
Dissertation Defense

Nathan Manning
(UC Riverside)

“Global Weyl modules for twisted and untwisted loop algebras”

Friday, June 1\textsuperscript{st}, 2012
Surge 284
3:00pm-4:30pm
UNIVERSITY OF CALIFORNIA, RIVERSIDE
Department of Mathematics

Calendar of Events For the Week of June 4th – 8th, 2012

**MONDAY, 4th**
2:00-4:30PM
DISSERTATION DEFENSE – Barbara Herzog, UCR
“Sub-Index for the Critical Points of the Riemannian Distance Function”

**TUESDAY, 5th**
8:10-9:30AM, SURGE 268
ALGEBRAIC GEOMETRY (Dr. Ziv Ran)

11:10-12:00PM, SURGE 268
TOPOLOGY (Dr. Julie Bergner)

12:40-2:00PM, SURGE 284
LIE THEORY (Dr. Greenstein / Dr. Gan)

2:10-4:00PM, SURGE 284
DISSERTATION DEFENSE – Kwangwoo Lee, UCR
“Transfer theorems on Tautological modules of Hilbert Schemes of nodal curves and de Jonquieres’ formulas”

3:40-4:30PM, SURGE 268
ANALYSIS (Dr. James Stafney, UCR)
“Spherical Harmonics and the Weyl Character Formula”

**WEDNESDAY, 6th**
10:10-11:00AM, SURGE 268
COMBINATORIAL NUMBER THEORY (Dr. Chang / Dr. Costello)

11:10-12:00PM, SURGE 268
TOPICS IN COMMUTATIVE ALGEBRA (Dr. Lin / McCullough / Henriques)

12:10-1:00PM, SURGE 268
PDE & APPLIED MATHEMATICS (Dr. Juhi Jang)

1:10-2:00PM, SURGE 268
OPERATOR ALGEBRAS & RELATED TOPICS (Dr. Feng Xu)

2:00-4:00PM, SURGE 268
DISSERTATION DEFENSE – Michael Sill, UCR
“Average Distance Functions and their Applications”

**THURSDAY, 7th**
8:10-9:30AM, SURGE 268
ALGEBRAIC GEOMETRY (Dr. Ziv Ran)

11:10-12:30PM, SURGE 268
FRACTAL RESEARCH GROUP (Dr. Hafedh Herichi)
“On the Apollonian Integral Packing, its Arithmetic and Geometric Properties and Self-Similar Tilings”

2:00-4:00PM, SURGE 284
DISSERTATION DEFENSE – Brad Thomas, UCR
“Boundary Characterization of a Smooth Domain with Non-Compact Automorphism Group”

12:40-2:00PM, SURGE 284
LIE THEORY (Dr. Greenstein / Dr. Gan)

3:40-5:00PM, SURGE 268
MATHEMATICAL PHYSICS & DYNAMICAL SYSTEMS (Robert Niemeyer, UCR)
“Billiards and Drums”

4:10-5:00PM, SURGE 284
MATH CLUB (Dr. Julie Bergner)

**FRIDAY, 8th**
11:10-12:00PM, SURGE 268
DIFFERENTIAL GEOMETRY
***No Meeting***

1:10-2:00PM, SURGE 284
GRADUATE STUDENT SEMINAR – Barbara Herzog, UCR
TBA

3:10-4:00PM, SURGE 268
COMMUTATIVE ALGEBRA (Dr. David Rush)
DEPARTMENT OF MATHEMATICS

Dissertation Defense

Kwangwoo Lee
(UC Riverside)

“Transfer theorems on Tautological modules of Hilbert Schemes of nodal curves and de Jonquieres' formulas”

Tuesday, June 5th, 2012
Surge 284
2:10pm-4:00pm
DEPARTMENT OF MATHEMATICS

Dissertation Defense

Michael Sill
(UC Riverside)

“Average Distance Functions and their Applications”

Wednesday, June 6th, 2012
Surge 268
2:00pm-4:00pm
DEPARTMENT OF MATHEMATICS

Dissertation Defense

Brad Thomas
(UC Riverside)

“Boundary Characterization of a Smooth Domain with Non-Compact Automorphism Group”

Thursday, June 7th, 2012
Surge 284
2:00pm-4:00pm
DEPARTMENT OF MATHEMATICS

Dissertation Defense

Juan Zaragoza
(UC Riverside)

“Orthogonal Partial Conformal Change”

Monday, June 11th, 2012
Surge 284
11:00am-1:00pm
DEPARTMENT OF MATHEMATICS

Dissertation Defense

Chris Carlson
(UC Riverside)

“Foliations, contact structures and finite groups actions”

Wednesday, June 13th, 2012
Surge 284
1:00-3:00pm