UNIVERSITY OF CALIFORNIA, RIVERSIDE
Department of Mathematics

Calendar of Events
For the Week September 28 - October 2, 2009

TUESDAY, September 29th

10:10-11:00AM, SURGE 268 — **OPERATOR ALGEBRAS & RELATED TOPICS** (Marta Asaeda)

12:40-2:00PM, SURGE 268 — **INTERSECTION THEORY** (Ziv Ran)
"Intersection theory and/or its prerequisites (e.g. cohomology)"

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

3:40-5:00PM, SURGE 268 — **FUNCTIONAL ANALYSIS** (James Stafney)
"Divergence free harmonic vector fields on planar domains"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Ziv Ran)

WEDNESDAY, September 30th

10:10-11:00AM, SURGE 284 — **COMBINATORIAL NUMBER THEORY** (Mei-Chu Chang)
"Sum-product and character sums"

2:10-3:00PM, SURGE 268 — **TOPICS IN PARTIAL DIFFERENTIAL EQUATIONS** (Benjamin Dodson)
"The I-method and global well-posedness for the defocusing nonlinear Schrodinger equation"

THURSDAY, October 1st

9:40-11:00AM, SURGE 268 — **GROUPOIDS SEMINAR** (Chris Walker)
"Groupoidification of Hall Algebras"

11:10-12:30PM, SURGE 268 — **FRACTAL RESEARCH GROUP** (Michel Lapidus)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

2:10-3:30PM, SURGE 268 — **TOPOLOGY** (Stefano Vidussi)
"Symplectic 4-manifolds and fibered 3-manifolds"

3:40-5:00PM, SURGE 268 — **MATHEMATICAL PHYSICS** (Michel Lapidus)

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Ziv Ran)
Organizational Meeting

FRIDAY, October 2nd

11:10-12:00PM, SURGE 277 — **DIFFERENTIAL GEOMETRY** (Bun Wong)
Organizational Meeting

12:10-1:00PM, SURGE 268 — **COBORDISM & TOPOLOGICAL THEORIES** (Julie Bergner)
"Manifolds and cobordism"

3:10-4:00PM, SURGE 268 — **COMMUTATIVE ALGEBRA** (David Rush)

UNIVERSITY OF CALIFORNIA, RIVERSIDE
Department of Mathematics

Calendar of Events
For the Week October 5th - 9th, 2009

TUESDAY October 6th,

10:10-11:00AM, SURGE 268 — **OPERATOR ALGEBRAS & RELATED TOPICS** (Marta Asaeda)

12:40-2:00PM, SURGE 268 — **INTERSECTION THEORY** (Alex Hoffnung)
Student Seminar on Chapter III of Hartshorne

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Christian Kassel- Institute de Recherche Mathematique Avancee)

3:40-5:00PM, SURGE 268 — **FUNCTIONAL ANALYSIS** (James Stafney)
"The Friedrichs Extension and the Dirichlet Laplacian"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Ziv Ran)

WEDNESDAY October 7th,

10:10-11:00AM, SURGE 284 — **COMBINATORIAL NUMBER THEORY** (Mei-Chu Chang)
"Sum-product and character sums"

2:10-3:00PM, SURGE 268 — **TOPICS IN PARTIAL DIFFERENTIAL EQUATIONS** (Jim Kelliher)
"Singular limits in fluid mechanics"

THURSDAY October 8th,

9:40-11:00AM, SURGE 268 — **GROUPOIDS SEMINAR** (Christopher Walker)
"Groupoidification of Hall Algebras"

11:10-12:30PM, SURGE 268 — **FRACTAL RESEARCH GROUP** (Michel Lapidus)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

2:10-3:30PM, SURGE 268 — **TOPOLOGY** (Stefano Vidussi)
"Symplectic 4-manifolds and fibered 3-manifolds"

3:40-5:00PM, SURGE 268 — **MATHEMATICAL PHYSICS** (Michel Lapidus)

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Sung-Rak Choi)
"Minimal Model Program and Superrigidity"

FRIDAY October 9th,

11:10-12:00PM, SURGE 284 — **DIFFERENTIAL GEOMETRY** (Fred Wilhelm)
"Principles for deforming non-negative curvature"

12:10-1:00PM, SURGE 268 — **COBORDISM AND TOPOLOGICAL FIELD THEORIES** (Julie Bergner)
"Topological Field Theories"

3:10-4:00PM, SURGE 268 — **COMMUTATIVE ALGEBRA** (David Rush)
TBA

UNIVERSITY OF CALIFORNIA, RIVERSIDE
Department of Mathematics

Calendar of Events
For the Week October 12-16, 2009

TUESDAY, October 13th

10:10-11:00AM, SURGE 268 — **OPERATOR ALGEBRAS & RELATED TOPICS** (Marta Asaeda)

12:40-2:00PM, SURGE 268 — **INTERSECTION THEORY** (Ziv Ran)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

3:40-5:00PM, SURGE 268 — **FUNCTIONAL ANALYSIS** (M.M. Rao)
"Measures, Bimeasures and Matrix Measures-I"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Kwangwoo Lee)
"Derived functors and sheaf cohomology"

4:10-5:00PM, SURGE 284 — **COLLOQUIUM** (Ciprian Manolescu- UCLA)
"Grid diagrams and four-manifold invariants"

WEDNESDAY, October 14th

10:10-11:00AM, SURGE 268 — **COMBINATORIAL NUMBER THEORY** (Mei-Chu Chang)
"Sum-product and character sums"

2:10-3:00PM, SURGE 268 — **TOPICS IN PARTIAL DIFFERENTIAL EQUATIONS** (Qi Zhang)

4:10-5:00PM, SURGE 284 — **STUDENT SEMINAR** (Michael Maroun)
"The Role of Mathematics in Modern Physics"

THURSDAY, October 15th

9:40-11:00AM, SURGE 268 — **GROUPOIDS SEMINAR** (Aviv Censor)

11:10-12:30PM, SURGE 268 — **FRACTAL RESEARCH GROUP** (Hafedh Herichi)
"A discussion of generalized L-fractal strings"

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

2:10-3:30PM, SURGE 268 — **TOPOLOGY** (Stefano Vidussi)
"Symplectic 4-manifolds and fibered 3-manifolds"

3:40-5:00PM, SURGE 268 — **MATHEMATICAL PHYSICS** (James Kelliher)
"Prandtl's 1904 paper on boundary layers and a few things learned since then"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Sung-Rak Choi)
"Minimal model program"

FRIDAY, October 16th

11:10-12:00PM, SURGE 284 — **DIFFERENTIAL GEOMETRY** (Curtis Pro)
"Diameter rigidity"

12:10-1:00PM, SURGE 268 — **COBORDISM & TOPOLOGICAL THEORIES** (Chris Carlson)
"Topological field theories in low dimensions"

3:10-4:00PM, SURGE 268 — **COMMUTATIVE ALGEBRA** (Jason McCullough)
"Invariant Theory and Homological Conjectures"

Mathematical Physics Semianr

James Kelliher (UCR)

Thursday, October 15, 2009
3:40-5:00PM
SURGE 268

Title: Prandtl's 1904 paper on boundary layers and a few things learned since then.

Abstract: We will give a brief description of Ludwig Prandtl's seminal 1904 paper in which he heuristically derived the equations that govern the behavior of a nearly inviscid fluid in the boundary layer, such as that for air surrounding an aircraft's wing. Rigorously validating (or invalidating) Prandtl's equations is one of the Holy Grail's of mathematical fluid mechanics: I will describe a few of the things that are known about it from a mathematician's point of view.

Commutative Algebra Seminar

Jason McCullough (UCR)

Friday, October 16, 2009
3:10-4:00PM
SURGE 268

Title: Invariant Theory and Homological Conjectures

Abstract: This will be a 2-week talk. I will discuss the Strong Direct Summand Conjecture, which is the following statement: "Let R be a regular local ring and let A be a module finite extension. Let x be a regular parameter of R and let Q be a height one prime of A lying over xR. Then the injection from xR to Q splits as a map of R-modules." This conjecture implies many other homological conjectures, all of which are still open in the mixed characteristic case. It also implies that certain rings of invariants are Cohen-Macaulay. I will discuss the history of the problem and some partial results during these talks.

UNIVERSITY OF CALIFORNIA, RIVERSIDE
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Calendar of Events
For the Week October 19-23, 2009

TUESDAY, October 20th

10:10-11:00AM, SURGE 268 — **OPERATOR ALGEBRAS & RELATED TOPICS** (Marta Asaeda)

12:40-2:00PM, SURGE 268 — **INTERSECTION THEORY** (Ziv Ran)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

3:40-5:00PM, SURGE 268 — **FUNCTIONAL ANALYSIS** (M.M. Rao)
"Measures, Bimeasures and Matrix Measures-II"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (C. Lee)
"Cohomology of affine schemes"

WEDNESDAY, October 21st

10:10-11:00AM, SURGE 268 — **COMBINATORIAL NUMBER THEORY** (Mei-Chu Chang)
"Sum-product and character sums"

2:10-3:00PM, SURGE 268 — **TOPICS IN PARTIAL DIFFERENTIAL EQUATIONS** (M. Muraleetharan)
"Curvature bound for curve shortening flow via distance comparison"

THURSDAY, October 22nd

9:40-11:00AM, SURGE 268 — **GROUPOIDS SEMINAR**
"Towards Topological Degroupoidification" (Aviv Censor)
"A Categorification of Hall Algebras" (Chris Walker)

11:10-12:30PM, SURGE 268 — **FRACTAL RESEARCH GROUP** (Hafedh Herichi)
"A Discussion on Generalized L-Fractal String Properties"

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

2:10-3:30PM, SURGE 268 — **TOPOLOGY** (Stefano Vidussi)
"Symplectic 4-manifolds and fibered 3-manifolds"

3:40-5:00PM, SURGE 268 — **MATHEMATICAL PHYSICS** (James Kelliher)
"Prandtl's 1904 paper on boundary layers and a few things learned since then- II"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Karen Chandler)
"Multiple points in higher dimension"

FRIDAY, October 23rd

11:10-12:00PM, SURGE 284 — **DIFFERENTIAL GEOMETRY** (Owen Dearicott)
"n-Sasakian manifold"

12:10-1:00PM, SURGE 268 — **COBORDISM & TOPOLOGICAL THEORIES** (John Huerta)
"Short history of the interaction between quantum field theory and topology"

3:10-4:00PM, SURGE 268 — **COMMUTATIVE ALGEBRA** (David Rush)

Groupoids Seminar

Thursday, October 22, 2009

9:40-11:00am

Surge 268

Speaker 1: **Aviv Censor**
Title: **Towards Topological Degroupoidification**

Abstract: The groupoidification program led by J. Baez and J. Dolan has been successfully applied to several structures, such as Hall algebras and Feynman diagrams. In order to expand the scope of groupoidification, with operator algebras in mind, we take first steps in extending the theory from the realm of discrete groupoids to the topological setting. In particular we extend the notion of groupoid cardinality, by defining how to measure a topological groupoid. We also show how to assign measures to continuous groupoid homomorphisms. We demonstrate our results on groupoids corresponding to open covers, which have been proven useful in the study of continuous trace C*-algebras. This is a preliminary report on joint work with Daniele Grandini and Christopher Walker.

Speaker 2: **Christopher Walker**
Title: A **Categorification of Hall Algebras**

Abstract: In 1990 Ringel first proved that given any simply-laced Dynkin diagram, the Hall algebra of this diagram is isomorphic to the positive part of Uq (g), where g is the lie algebra associated to the same Dynkin diagram. Hall algebras turn out to be one of the most natural applications of the Baez/Dolan program of "groupoidification". In this talk we will describe the pieces of groupoidification necessary for this example, and then show how to apply the process to Hall algebras.

UNIVERSITY OF CALIFORNIA, RIVERSIDE
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Calendar of Events
For the Week October 26-30, 2009

TUESDAY, October 27th

10:10-11:00AM, SURGE 268 — **OPERATOR ALGEBRAS & RELATED TOPICS** (Marta Asaeda)

12:40-2:00PM, SURGE 268 — **INTERSECTION THEORY** (Ziv Ran)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

3:40-5:00PM, SURGE 268 — **FUNCTIONAL ANALYSIS** (James Stafney)
"Hilbert and the Dirichlet principle"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Chris Rogers)
"Grothendieck's cohomological dimension theorem"

WEDNESDAY, October 28th

10:10-11:00AM, SURGE 268 — **COMBINATORIAL NUMBER THEORY** (Mei-Chu Chang)
"Sum-product and character sums"

2:10-3:00PM, SURGE 268 — **TOPICS IN PARTIAL DIFFERENTIAL EQUATIONS** (M. Muraleetharan)
"Curvature bound for curve shortening flow via distance comparison" (Part 2)

THURSDAY, October 29th

9:40-11:00AM, SURGE 268 — **GROUPOIDS SEMINAR** (Daniele Grandini)
"Measured Groupoids"

11:10-12:30PM, SURGE 268 — **FRACTAL RESEARCH GROUP** (Jonathan Sarhad)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

2:10-3:30PM, SURGE 268 — **TOPOLOGY** (Stefano Vidussi)
"Symplectic 4-manifolds and fibered 3-manifolds"

3:40-5:00PM, SURGE 268 — **MATHEMATICAL PHYSICS** (Michael Maroun)
"The Challenges Presented by the 2-Body and 3-Body Schrodinger Problems in the Feynman Integral Formalism"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Karen Chandler)
"Multiple points in higher dimensions (cont.)"

FRIDAY, October 30th

11:10-12:00PM, SURGE 284 — **DIFFERENTIAL GEOMETRY** (Y.S. Poon)
"Weak mirror symmetry of complex symplectic algebras"

12:10-1:00PM, SURGE 268 — **COBORDISM & TOPOLOGICAL THEORIES** (Julie Bergner)
"2-Extended Topological Field Theories"

3:10-4:00PM, SURGE 268 — **COMMUTATIVE ALGEBRA** (David Rush)
TBA

UNIVERSITY OF CALIFORNIA, RIVERSIDE
Department of Mathematics

Calendar of Events
For the Week November 2-6, 2009

TUESDAY, November 3rd

10:10-11:00AM, SURGE 268 — **OPERATOR ALGEBRAS & RELATED TOPICS** (Marta Asaeda)

12:40-2:00PM, SURGE 268 — **INTERSECTION THEORY** (Ziv Ran)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

3:40-5:00PM, SURGE 268 — **FUNCTIONAL ANALYSIS** (Victor Shapiro)
"On Green's Theorem"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Chris Rogers)
"Grothendieck's cohomological dimension theorem: a categorical perspective"

WEDNESDAY, November 4th

10:10-11:00AM, SURGE 268 — **COMBINATORIAL NUMBER THEORY** (Mei-Chu Chang)
"Sum-product and character sums"

2:10-3:00PM, SURGE 268 — **TOPICS IN PARTIAL DIFFERENTIAL EQUATIONS** (Qi Zhang)
"Reading on Ricci flow"

4:10-5:00PM, SURGE 284 — **COLLOQUIUM** (Mikhail Khovanov- Columbia University)
"Categorification of Hopf algebras and quantum groups"

THURSDAY, November 5th

9:40-11:00AM, SURGE 268 — **GROUPOIDS SEMINAR** (Daniele Grandini)
"Measured Groupoids (cont.)"

11:10-12:30PM, SURGE 268 — **FRACTAL RESEARCH GROUP** (Jun Kigami- Kyoto University, Japan, visiting UCR)
"Analysis on Fractals"

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

2:10-3:30PM, SURGE 268 — **TOPOLOGY** (Stefano Vidussi)
"Symplectic 4-manifolds and fibered 3-manifolds"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Kwangwoo Lee)
"Vector bundles on symmetric products of smooth curves"

4:10-5:00PM, SURGE 284 — **COLLOQUIUM & MPDS SEMINAR** (Jun Kigami -Kyoto University, Japan, visiting UCR)
"Transient random walk on a tree, its trace on the Cantor set as the Martin boundary and associated heat kernel"

FRIDAY, November 6th

11:10-12:00PM, SURGE 284 — **DIFFERENTIAL GEOMETRY** (Bun Wong)
"On domains with big automorphism groups"

12:10-1:00PM, SURGE 268 — **COBORDISM & TOPOLOGICAL FIELD THEORIES** (Julie Bergner)
"2-Extended topological field theories and 2-categories"

3:10-4:00PM, SURGE 268 — **COMMUTATIVE ALGEBRA** (David Rush)
TBA

Colloquium

Mikhail Khovanov (Columbia University)

Wednesday, November 4, 2009

Surge 284

"Categorification of Hopf algebras and quantum groups"

Abstract: Induction and restriction functors corresponding to inclusions of symmetric groups give rise to a bialgebra structure on the sum of Grothendieck groups of their representation categories. We'll describe a similar construction where induction and restriction give rise to the bialgebra isomorphic to the universal enveloping algebra of the Lie algebra of upper-triangular matrices.

Colloquium

Jun Kigami (Kyoto University)

Thursday, November 5, 2009

Surge 284

"Transient random walk on a tree, its trace on the Cantor set as the Martin boundary and associated heat kernel"

UNIVERSITY OF CALIFORNIA, RIVERSIDE
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Calendar of Events
For the Week November 9-13, 2009

TUESDAY, November 10th

10:10-11:00AM, SURGE 268 — **OPERATOR ALGEBRAS & RELATED TOPICS** (Marta Asaeda)

11:00-12:00AM, SURGE 284 — **TOPOLOGY SEMINAR** (Marcy Robertson - University of Illinois, Chicago)

12:40-2:00PM, SURGE 268 — **INTERSECTION THEORY** (Ziv Ran)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

3:40-5:00PM, SURGE 268 — **FUNCTIONAL ANALYSIS** (Victor Shapiro)
"Fourier series and Green's Theorem"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Chris Rogers)
"Grothendieck's cohomological dimension theorem (cont.)"

WEDNESDAY, November 11th

Veteran's Day- No Classes

THURSDAY, November 12th

9:40-11:00AM, SURGE 268 — **GROUPOIDS SEMINAR** (Yael Fregier- University of Luxembourg)
"Crossed Modules of Hopf Algebras"

11:10-12:30PM, SURGE 268 — **FRACTAL RESEARCH GROUP**
(Dr. Steffen Winter-University of Karlsruhe, Germany)
"Curvature measures and their extensions to fractal sets"

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Fedor Malikov- University of Southern California)
TBA

2:10-3:30PM, SURGE 268 — **TOPOLOGY** (Stefano Vidussi)
"Symplectic 4-manifolds and fibered 3-manifolds"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Kwangwoo Lee)
"Secant bundles on symmetric products"

4:10-5:00PM, SURGE 284 — **COLLOQUIUM** (Driss Essouabi- Universite de Saint-Etienne, France)
"Multivariable zeta functions: analytic continuation, natural boundary, special values and applications"

FRIDAY, November 13th

11:10-12:00PM, SURGE 284 — **DIFFERENTIAL GEOMETRY** (Zhuang-Dan Guan)
"Classification of compact homogeneous manifolds with pseudo-Kahlerian structures --The third proof"

12:10-1:00PM, SURGE 268 — **COBORDISM & TOPOLOGICAL FIELD THEORIES** (John Baez)
"Cobordism bicategories"

3:10-4:00PM, SURGE 268 — **COMMUTATIVE ALGEBRA** (David Rush)

UNIVERSITY OF CALIFORNIA RIVERSIDE

DEPARTMENT OF MATHEMATICS

GROUPOIDS SEMINAR

Yael Fregier

(University of Luxembourg)

"Crossed Modules of Hopf Algebras"

Abstract: Our main goal in this talk will be to translate the diagram relating groups, Lie algebras and Hopf algebras to the corresponding 2-objects, i.e. to categorify it. This will be done by interpreting 2-objects as crossed modules and showing the compatibility of the standard functors linking groups, Lie algebras and Hopf algebras with the concept of a crossed module. In particular this gives an approach to integrating Lie 2-algebras.

Thursday, November 12, 2009
Surge 268
9:40-11:00am

UNIVERSITY OF CALIFORNIA RIVERSIDE

DEPARTMENT OF MATHEMATICS

COLLOQUIUM

Driss Essouabi

(Universite de Saint-Etienne, France)

"Multivariable zeta functions: analytic continuation, natural boundary, special values and applications"

Abstract: Zeta functions are an important tool in various branches of mathematics (Number Theory, Algebraic and Arithmetic Geometry, Mathematical Physics, Noncommutative Geometry, Fractal Geometry, ..) In the first part of this talk, we will present some results and methods used to study the analytic continuation of multivariable zeta functions. We will also give some applications arising from their study. In the second part of this talk, we will report on some of our recent results in this subject. Some of them were obtained in collaboration with M. de Crisenoy, B. Lichtin, G. Bhowmik, K. Matsumoto and H. Tsumura.

Thursday, November 12, 2009

Surge 284

4:10-5:00pm

Tea Time at 3:40pm

UNIVERSITY OF CALIFORNIA, RIVERSIDE
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Calendar of Events
For the Week November 16-20, 2009

TUESDAY, November 17th

10:10-11:00AM, SURGE 268 — **OPERATOR ALGEBRAS & RELATED TOPICS** (Richard Han)
"A Planar Algebra Construction of the Haagerup Subfactor"

12:40-2:00PM, SURGE 268 — **INTERSECTION THEORY** (Ziv Ran)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

3:40-5:00PM, SURGE 268 — **FUNCTIONAL ANALYSIS** (Victor Shapiro)
"On the regularity of solutions to the stationary Navier-Stokes equations"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Kwangwoo Lee)
"Cohomology of affine schemes"

WEDNESDAY, November 18th

10:10-11:00AM, SURGE 268 — **COMBINATORIAL NUMBER THEORY** (Mei-Chu Chang)
"Sum-product and character sums"

2:10-3:00PM, SURGE 268 — **TOPICS IN PARTIAL DIFFERENTIAL EQUATIONS** (Qi Zhang)
"Reading on Ricci flow, continued"

4:10-5:00PM, SURGE 284 — **COLLOQUIUM** (JianZhong Wu- UCR Dept. of Chemical & Envir. Engineering)
"On the regularity of solutions to the stationary Navier-Stokes equations"

THURSDAY, November 19th

9:40-11:00AM, SURGE 268 — **GROUPOIDS SEMINAR** (Aviv Censor)
"Can topological & measure-theoretic degroupoidification be made easy?"

11:10-12:30PM, SURGE 268 — **FRACTAL RESEARCH GROUP** (Michael Maroun)
"Operator-Valued Distributions and QFT"

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

2:10-3:30PM, SURGE 268 — **TOPOLOGY** (Stefano Vidussi)
"Symplectic 4-manifolds and fibered 3-manifolds"

3:40-5:00PM, SURGE 268 — **MATHEMATICAL PHYSICS** (Hafedh Herichi)
"Properties of the prime factor operator for generalized fractal strings"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Kwangwoo Lee)
"Secant bundles on symmetric products (cont.)"

FRIDAY, November 20th

11:10-12:00PM, SURGE 284 — **DIFFERENTIAL GEOMETRY** (M. Muraleetharan)
"A direct proof of curvature flow of curves"

12:10-1:00PM, SURGE 268 — **COBORDISM & TOPOLOGICAL FIELD THEORIES** (Julie Bergner)
"Framings, dualizable objects, and the statement of the cobordism hypothesis"

3:10-4:00PM, SURGE 268 — **COMMUTATIVE ALGEBRA** (David Rush)

UNIVERSITY OF CALIFORNIA RIVERSIDE

DEPARTMENT OF MATHEMATICS

COLLOQUIUM

JianZhong Wu

(UCR Dept. of Chemical & Environmental Engineering)

"On the regularity of solutions to the stationary Navier-Stokes equations"

Abstract: Statistical mechanics plays a central role in predicting the microscopic structure and thermophysical properties of condensed matter and has widespread applications not only in physical sciences but also in computational biology and engineering. In this talk, I will discuss a unified density functional theory (DFT) for complex fluids that aims to account for thermodynamic nonideality due to inter- and intra- molecular interactions in a non-mean-field fashion. The novel free-energy functionals are developed on the basis of a fundamental measure theory for molecular excluded volume effects and recent advancements in liquid-state theories for long-range interactions. In comparison with simulation results, the DFT provides accurate representations of both microscopic structure and thermodynamic properties for a wide variety of complex molecular systems in bulk or at inhomogeneous conditions. Unlike molecular simulations, DFT provides direct information on the free energy from which all thermodynamic properties can be derived. In this talk, I will also discuss the connections of the density functional theory with conventional phenomenological methods in statistical mechanics. Illustrative examples will be given on applications of the DFT to colloids, polymer mixtures and biological systems.

Wednesday, November 18, 2009

Surge 284

4:10-5:00pm

Tea Time at 3:40pm

Density functional theory for complex molecular systems

Jianzhong Wu

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Email:jwu@engr.ucr.edu

Statistical mechanics plays a central role in predicting the microscopic structure and thermophysical properties of condensed matter and has widespread applications not only in physical sciences but also in computational biology and engineering. In this talk, I will discuss a unified density functional theory (DFT) for complex fluids that aims to account for thermodynamic nonideality due to inter- and intra- molecular interactions in a non-mean-field fashion. The novel free-energy functionals are developed on the basis of a fundamental measure theory for molecular excluded volume effects and recent advancements in liquid-state theories for long-range interactions. In comparison with simulation results, the DFT provides accurate representations of both microscopic structure and thermodynamic properties for a wide variety of complex molecular systems in bulk or at inhomogeneous conditions. Unlike molecular simulations, DFT provides direct information on the free energy from which all thermodynamic properties can be derived. In this talk, I will also discuss the connections of the density functional theory with conventional phenomenological methods in statistical mechanics. Illustrative examples will be given on applications of the DFT to colloids, polymer mixtures and biological systems.

UNIVERSITY OF CALIFORNIA, RIVERSIDE
Department of Mathematics

Calendar of Events
For the Week November 23-27, 2009

TUESDAY, November 24th

10:10-11:00AM, SURGE 268 — **OPERATOR ALGEBRAS & RELATED TOPICS** (Marta Asaeda)

12:40-2:00PM, SURGE 268 — **INTERSECTION THEORY** (Ziv Ran)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

3:40-5:00PM, SURGE 268 — **FUNCTIONAL ANALYSIS** (LeBaron Ferguson)

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (A. Caldararu- University of Wisconsin, Madison)
"The Duflo conjecture and the Ext algebra of branes"

WEDNESDAY, November 25th

10:10-11:00AM, SURGE 268 — **COMBINATORIAL NUMBER THEORY** (Mei-Chu Chang)
"Sum-product and character sums"

2:10-3:00PM, SURGE 268 — **TOPICS IN PARTIAL DIFFERENTIAL EQUATIONS** (Edward Burkard)
"Tensors and Curvature"

THURSDAY, November 26th

No Classes- Holiday

FRIDAY, November 27th

No Classes- Holiday

Algebraic Geometry

Dr. Andrei Caldararu
(University of Wisconsin, Madison)

Tuesday, November 24, 2009
3:40-5:00pm

"The Duflo conjecture and the Ext algebra of branes"

Abstract: The Duflo theorem is a statement in Lie theory which allows us to compute the ring structure of the center of the universal enveloping algebra of a finite-dimensional Lie algebra. A categorical version of it was used by Maxim Kontsevich to give a spectacular proof of the so-called "Theorem on complex manifolds," which computes the multiplicative structure of Hochschild cohomology of a complex manifold in terms of the algebra of polyvector fields. In Lie theory there are also more general Duflo-type statements (mostly conjectural), which study the case of a pair (Lie algebra, Lie subalgebra). I will explain how these translate into conjectures about the multiplicative structure of the Ext-algebra of the structure sheaf of a complex submanifold of a complex manifold, and how from this interaction we can hope to gain new insights into both algebraic geometry and Lie theory. (Based on discussions with Damien Callaque.)

UNIVERSITY OF CALIFORNIA, RIVERSIDE
Department of Mathematics

Calendar of Events
For the Week November 30th – December 4th, 2009

TUESDAY, Dec 1st

10:10-11:00AM, SURGE 268 — **OPERATOR ALGEBRAS & RELATED TOPICS** (Marta Asaeda)

12:40-2:00PM, SURGE 268 — **INTERSECTION THEORY** (Ziv Ran)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (Vyjayanthi Chari)

3:40-5:00PM, SURGE 268 — **FUNCTIONAL ANALYSIS** (Z.D. Ren)
"On the Baronti Constants of Orliez Function Spacer"

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Ziv Ran)

WEDNESDAY, Dec 2nd

10:10-11:00AM, SURGE 268 — **COMBINATORIAL NUMBER THEORY** (Mei-Chu Chang)
"Sum-product and character sums"

2:10-3:00PM, SURGE 268 — **TOPICS IN PARTIAL DIFFERENTIAL EQUATIONS** (Qi Zhang)

THURSDAY, Dec 3rd

9:40-11:00AM, SURGE 268 — **GROUPOIDS SEMINAR** (Edward Burkard)
"Wedderburn's Theorem for Ringoids"

11:10-12:30PM, SURGE 268 — **FRACTAL RESEARCH GROUP** (Scott Childress)

12:40-2:00PM, SURGE 284 — **LIE THEORY** (David Jordan)

2:10-3:30PM, SURGE 268 — **TOPOLOGY** (Stefano Vidussi)
"Symplectic 4-manifolds and fibered 3-manifolds"

3:40-5:00PM, SURGE 268 — **MATHEMATICAL PHYSICS** (Elie Atalla)

3:40-5:00PM, SURGE 277 — **ALGEBRAIC GEOMETRY** (Ziv Ran)

FRIDAY, Dec 4th

11:10-12:00PM, SURGE 284 — **DIFFERENTIAL GEOMETRY** (Qi Zhang)
"On the Backward Limit of Type One Ancient Solutions"

12:10-1:00PM, SURGE 268 — **COBORDISM & TOPOLOGICAL FIELD THEORIES** (Julie Bergner)

3:10-4:00PM, SURGE 268 — **COMMUTATIVE ALGEBRA** (David Rush)
TBA