
Conferences

Joint Summer Research Conferences in the Mathematical Sciences

**Snowbird Resort
Snowbird, Utah
June 5–July 21, 2005**

The 2005 Joint Summer Research Conferences will be held at the Snowbird Resort (<http://summer.snowbird.com/pages/home/default.php>) June 5–July 21, 2005. The topics and organizers for the conferences were selected by a committee representing the AMS, the Institute of Mathematical Sciences (IMS), and the Society for Industrial and Applied Mathematics (SIAM). Committee members at the time were Bjorn Birnir, Michael Fried, William Mark Goldman, Ilse Ipsen, Tasso Kaper, Ludmil Katzarkov, Steven Lalley, Hema Srinivasan, Toby Stafford, and Kenneth Stephenson.

It is anticipated that the conferences will be partially funded by a grant from the National Science Foundation and perhaps others. Special encouragement is extended to junior scientists to apply. A special pool of funds expected from grant agencies has been earmarked for this group. Other participants who wish to apply for support funds should so indicate; however, available funds are limited, and individuals who can obtain support from other sources are encouraged to do so.

All persons who are interested in participating in one of the conferences should request an invitation by sending the following information to Summer Research Conferences Coordinator, AMS, P.O. Box 6887, Providence, RI 02940, or by email to wsd@ams.org no later than March 3, 2005.

Please type or print the following:

1. Title and dates of conference.
2. Full name.
3. Mailing address.
4. Phone numbers (including area code) for office, home, and fax.
5. Email address.
6. Your anticipated arrival/departure dates.
7. Scientific background relevant to the conference topics; please indicate if you are a student or if you received your Ph.D. on or after 7/1/98.
8. The amount of financial assistance requested (or indicate if no support is required).

All requests will be forwarded to the appropriate organizing committee for consideration. In late April applicants selected by the organizers for each conference will receive

formal invitations (including specific offers of support if applicable), a brochure of conference information, program information known to date, along with information on travel and local housing.

Questions concerning the scientific program should be addressed to the organizers. Questions of a nonscientific nature should be directed to the Summer Research Conferences coordinator at the address provided above. Please watch <http://www.ams.org/meetings/> for future developments about these conferences.

***Lectures begin on Sunday morning and run through Thursday. Check-in for housing begins on Saturday. No lectures are held on Saturday. See below for separate dates for the Summer School in Commutative Algebra.**

Quantum Topology—Contemporary Issues and Perspectives

Sunday, June 5–Thursday, June 9

Organizing Committee

Louis H. Kauffman (co-chair), University of Illinois
at Chicago

Jozef H. Przytycki (co-chair), George Washington
University

Fernando J. O. Souza (co-chair), University of Iowa

Quantum topology is the interdisciplinary study of a number of new invariants of manifolds, links, and related objects, as well as some possible frameworks for them. It has established many unexpected, exciting relations between low-dimensional topology and various areas of mathematics and theoretical physics. It was born through a few independent contributions in the early 1980s and quickly ramified into a wide variety of techniques at several levels of abstraction and generality. Quantum topology comprises algebraic, analytical, categorical, combinatorial, geometrical, and mathematical-physical approaches. Presently, a lot is yet to be learned on the topological interpretation of those new invariants.

This conference aims to: Create a forum that will be a bridge between the several trends in quantum topology, bringing together leading experts in a majority of its topics; examining the surprising recent developments in the area, including cutting-edge contributions by junior researchers; and provoking the participants to make an overall assessment of contemporary quantum topology with a bird's-eye view of the perspectives for the subject, fostering further developments and directions. In addition, this conference will ultimately promote awareness of state-of-the-art quantum topology through its proceedings, which shall contain expositions targeted at a wide audience.

This conference will cover quantum topology in the large sense regarding approach and topic. Its scope will

span invariants of links and related objects, 3-manifolds, and 4-manifolds that are construed via: categorification (Khovanov homology included), state models and state summations, functional integration, skein modules, topological modular functors and topological quantum field theories, as well as generalizations of those methods. Of equal interest are link polynomials and Vassiliev/finite-type invariants and how they fit into the spirit of quantum topology. The algebraic topology of the above invariants is a particularly important aspect to be explored.

A website for this conference will be developed at: <http://www.math.uiowa.edu/~fsouza/Snowbird2005/>.

Mathematical Modeling of Novel Optical Materials and Devices

Sunday, June 12 –Thursday, June 16

Organizing Committee

David Dobson (chair), University of Utah
Peter Kuchment, Texas A&M University
Leonid Kunyansky, University of Arizona
Shari Moskow, University of Florida
Fadil Santosa, University of Minnesota

In recent years, one has seen an avalanche of discoveries and inventions in optical technology. There is a large mathematical component in most of the research leading to these discoveries. Physicists and engineers have been involved in intensive research into this area for many years, while the growing need for mathematical advances in this area is just starting to be met and begs for active participation of mathematicians.

The goal of this conference is to bring together researchers with common interests from mathematics, physics, and engineering to facilitate further progress in this inherently multidisciplinary field.

Among the main themes of this conference are: spectral analysis of pure and doped photonic band gap (PBG) materials, and design of such materials; modeling and analysis of optical waveguides; spectral analysis of microstructured optical fibers; nonlinear optical media (in particular, analysis of nonlinear PBG materials and gap solitons); understanding loss mechanisms in PBG structures; optimal design of photonic structures; numerical analysis and simulation of photonic structures. These themes encompass a wide range of mathematical ideas from spectral theory, linear and nonlinear partial differential equations, optimization theory, numerical analysis, and many other areas.

Invited speakers who have tentatively confirmed:

D. Allan (Physics, Corning), H. Ammari (Math, École Polytechnique), A. Babin (Math, UC Irvine), G. Bao (Math, Michigan State Univ.), S. Blair (Engineering, Utah), J. Dowling (Physics, Jet Propulsion Lab), A. Figotin (Math, UC Irvine), S. Johnson (Physics, MIT), P. Kuchment (Math, Texas A&M), L. Kunyansky (Math, Minnesota), S. Molchanov (Math, Univ. of North Carolina, Charlotte), P. Monk (Math, Delaware), S. Moskow (Math, Florida), J.-C. Nedlec (Math,

École Polytechnique), A. Pankov (Math, College of William and Mary), F. Santosa (Math, Arizona), V. Shalaev (Engineering, Purdue University), M. Sigalas (Engineering, Agilent), J. Sipe (Physics, Univ. of Toronto), S. Venakides (Math, Duke University), M. Weinstein (Applied Math, Columbia University), and A. Yariv (Physics, Engineering, Caltech).

Further information about the conference is available at <http://www.math.utah.edu/~dobson/src05/>.

Quantum Graphs and Their Applications

Sunday, June 19–Thursday, June 23

Organizing Committee

Gregory Berkolaiko, Texas A&M University
Robert Carlson, University of Colorado,
Colorado Springs
Stephen Fulling, Texas A&M University
Peter Kuchment (chair), Texas A&M University

The conference will bring together a group of mathematicians and physicists to discuss problems of the newly solidifying quantum graph theory and its applications. A graph considered as a (singular) one-dimensional variety and equipped with a differential (in some cases pseudo-differential) “Hamiltonian” is said to be a quantum graph. Such objects have been arising lately in a variety of areas of mathematics, physics, and chemistry. Spectral theory of quantum graphs is also related to the older and more developed spectral theory of combinatorial graphs. One can get an idea of current developments in this field from the articles and references therein in the recent special issue of the journal *Waves in Random Media* (v. 14, no. 1, 2004). It is planned that the conference will address the following related topics: Spectral theory of quantum and combinatorial graphs; Analysis on fractals; Applications of quantum graphs to nanotechnology, optics, quantum chaos, and other areas.

Among the confirmed invited speakers are:

Michael Aizenman, Princeton Univ.; Gregory Berkolaiko, Texas A&M; Robert Carlson, U. Colorado, Colorado Springs; Fan Chung Graham, UC San Diego; Yves Colin De Verdiere, Fourier Institute; Pavel Exner, Nuclear Physics Inst. and Doppler Inst., Acad. Sci.; Mark Freidlin, U. Maryland; Lenny Friedlander, University of Arizona; Stephen Fulling, Texas A&M; Rostislav Grigorchuk, Texas A&M; Jonathan Keating, U. Bristol; Jun Kigami, Kyoto University; Vadim Kostrykin, Fraunhofer Inst.; Peter Kuchment, Texas A&M; Stanislav Molchanov, Univ. of N. Carolina, Charlotte; Petri Ola, Nevanlinna Institute; Lassi Paivarinta, Nevanlinna Institute; Boris Pavlov, Univ. of Auckland; Koby Rubinstein, Indiana Univ.; Peter Sarnak, Princeton Univ.; Holger Schanz, Max-Planck-Institute; Robert Schrader, Freie Univ.; Uzy Smilansky, Weizmann Inst.; Alexander Sobolev, U. Sussex; Michail Solomyak, Weizmann Inst.; Harold M. Stark, UC San Diego; Alexander Teplyaev, U. Connecticut; Audrey A. Terras, UC San Diego.

One can find further information about the conference at http://www.math.tamu.edu/~kuchment/src05_graphs.htm.

In order to ensure sufficient time for informal discussions and interaction, there will be no contributed talks; however, contributed poster sessions are planned.

Summer School in Commutative Algebra: Local Cohomology and Its Applications

Monday, June 20 – Thursday, June 30 (No talks Saturday, June 25)

Organizing Committee

Anurag K. Singh, Georgia Institute of Technology
Uli Walther, Purdue University

The primary goal of the summer school is to familiarize graduate students with techniques and applications of commutative algebra to other parts of mathematics. A main theme will be local cohomology theory and its interactions with algebra, geometry and analysis.

The first part of the summer school features introductory lectures by junior researchers in the field, including the organizers. These lectures will be aimed at graduate students in their early years with basic knowledge and interest in commutative algebra and algebraic geometry. We will also have discussion sessions and computer algebra tutorials in this first part.

The last part of the summer school will be a conference with talks by mathematicians working in commutative algebra and adjacent areas. The lecturers for this last part of the summer school include Markus Brodmann, Universität Zürich; Ragnar-Olaf Buchweitz, University of Toronto; Marc Chardin*, CNRS and Université Paris VI; David Eisenbud, MSRI; Phillippe Gimenez, Universidad de Valladolid; John Greenlees*, University of Sheffield; Melvin Hochster*, University of Michigan; Joe Lipman*, Purdue University; Gennady Lyubeznik, University of Minnesota; Paul Roberts, University of Utah; Rodney Sharp, University of Sheffield; Karen Smith*, University of Michigan; Ngo Viet Trung, Institute of Mathematics, Hanoi; Keiichi Watanabe*, Nihon University; Santiago Zarzuela, Universitat de Barcelona.

The introductory lectures will be delivered by Srikanth Iyengar, University of Nebraska; Graham Leuschke, Syracuse University; Anton Leykin, UIC; Claudia Miller, Syracuse University; Ezra Miller*, University of Minnesota; and the organizers.

(* = participation expected)

Graduate student participants will be reimbursed expenses for a shared double room as well as boarding, and we hope to cover a portion of the transportation costs. Support for the conference comes primarily from NSF funding for the AMS-IMS-SIAM Summer Research Conferences, with supplementary funding provided through Mathematical Sciences Research Institute (MSRI). Applicants from departments that are academic sponsors of MSRI are encouraged to mention this in their application.

For more information consult the conference webpage <http://www.math.purdue.edu/~walther/snowbird.html>.

Control Methods in PDE-Dynamical Systems

Sunday, July 3–Thursday, July 7

Organizing Committee

Fabio Ancona, University of Bologna
Irena Lasiecka, University of Virginia
Walter Littman, University of Minnesota
Roberto Triggiani, University of Virginia

This conference is intended for two distinct research communities in partial differential equations (PDE): (1) the PDE-control community, which is focused on the study of control-theoretic properties of PDEs (e.g., well-posedness, interior and boundary regularity, controllability, stabilization, and optimization); and (2) the PDE-dynamical systems community, which is focused on the long-time behavior of solutions (e.g., global attractors and their geometric, topological, and structural properties).

These communities, while pursuing different interests and using different methodologies, share a substantial body of common knowledge and background on evolutionary equations. The time is ripe and the momentum is propitious to bring them together at a joint conference. The main goal of this conference is to develop mutual stimulation and joint interactions, thereby leading to a marked advancement of the broader area of research.

For example, recent research developments in these two communities suggest that this goal will be met, for the benefit of all. As an illustration, one may cite one of the goals of PDE-control research in this area: to force otherwise unstable dynamics to acquire good stability properties locally or, when possible, globally, by the insertion of a suitable feedback dissipative controller, possibly on the boundary. Thus the exchange of information and experience between these two mathematical groups is uniquely well-suited at this stage to produce significant advances on a broad spectrum of problems of control-theoretic and long-time behavior relevance.

Dynamics to be considered encompass the following systems: (i) parabolic equations including equations of fluid dynamics with turbulent flows (such as Navier-Stokes equations); (ii) hyperbolic or Petrowski-like equations, including hyperbolic conservation laws and systems of nonlinear elasticity; (iii) systems of strongly coupled PDEs, whether they display a hyperbolic/hyperbolic coupling (such as in shell theory) or else a hyperbolic/parabolic coupling (such as in thermoelasticity and in structural acoustic chamber models).

The timeliness of the conference is reinforced by the very recent breakthrough on the well-posedness theory of conservation laws, which opens the door to the treatment of related control problems.

The organizers have secured a preliminary list of top specialists in both controlled PDE-systems and PDE-based dynamical systems.

Competitive Mathematical Models of Disease Dynamics: Emerging Paradigms and Challenges

Sunday, July 17–Thursday, July 21

Organizing Committee:

Carlos Castillo-Chavez, Arizona State University
 Dominic P. Clemence (co-chair), North Carolina A&T State University
 Abba B. Gumel (co-chair), University of Manitoba
 Trachette Jackson (co-chair), University of Michigan
 Ronald E. Mickens, Clark-Atlanta University

The study of disease dynamics raises numerous mathematical challenges, ranging from broad theoretical issues to specific practical ones relating to the design and implementation of therapeutic and public health control strategies. The proposed conference will address modeling, analytical, and computational aspects relevant to today's public health concerns. It is in particular expected to highlight some of the mathematical challenges emerging from consideration of biological, social, and medical issues. The presentations, emphasizing the connection between theory and applications, will include diseases of current public interest such as AIDS/HIV, tuberculosis, influenza, SARS, and cancer.

The goals of the conference are to provide a forum for researchers in various specialties to debate the merits of many modeling approaches and exploit insights from other areas to stimulate new ideas for addressing pressing issues, and to encourage new researchers into the field. Participants will include mathematicians; researchers in the social, biomedical, or health sciences; as well as others interested in the interface of mathematics and health issues. The proposed conference will immediately follow the IAS Park City Summer School on Mathematical Biology (organized by Mark Lewis, Jim Keener, and Mark Chaplain).

A preliminary list of confirmed participants includes the following established and young investigators: Mingxiang Chen, North Carolina A&T State University; Mohd L. Garba (MD), UNC-Chapel Hill, and Moses Cone Hospitals; Wenzhang Huang, University of Alabama-Huntsville; Monica C. Jackson, Emory University; Denise Kirschner, University of Michigan; Ramesh Krishnraj (MD), Guilford County Health Department; Suzanne Lenhart, University of Tennessee-Knoxville; Simon Levin, Princeton University; Jean M.-S. Lubuma, University of Pretoria (SA); Edward M. Lungu, University of Botswana; Patrick Nelson, University of Michigan; Gaston N'guerekata, Morgan State University; Asamoah Nkwata, Morgan State University; and Abdulaziz Yakubu, Howard University.

Further information is available from Dominic P. Clemence at clemence@ncat.edu.

Joint Mathematics Meetings 

Mathematical Sciences Employment Center

Atlanta, Georgia, Joint Meetings
 January 5-8, 2005

The Employment Center offers job interview opportunities to employers and Ph.D.-level mathematicians during the Joint Mathematics Meetings.

Employer/Applicant registration deadlines:

October 25—for Employment Center forms to appear in the Winter Lists of Employers and Applicants

December 10—advance deadline, (however, forms will not appear in Winter Lists) after which only on-site registration is possible

Program information and registration instructions for the Employment Center can be found at <http://www.ams.org/emp-reg/>. For further information call the AMS Membership and