Conferences

Joint Summer Research Conferences in the Mathematical Sciences

Snowbird Resort
Snowbird, Utah
June 4– June 29, 2006

The 2006 Joint Summer Research Conferences will be held at the Snowbird Resort (http://summer.snowbird.com/pages/home/default.php) from June 4–June 29, 2006. 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, 2006**.

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 7/1/99.
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.**

Representations of Real Reductive Lie Groups

Sunday, June 4–Thursday, June 8

Organizing Committee
James Arthur, University of Toronto
Wilfried Schmid (cochair), Harvard University
Peter Trapa (cochair), University of Utah

In the long run, many of the most important questions involving real Lie groups are those which will play a role in the theory of automorphic forms. At least for real groups, as opposed to p-adic ones, one might hope that substantial — and perhaps even complete — progress could be made on all relevant open problems in the near future. With this in mind, the conference will summarize the current situation for real groups, and offer a forward-looking view toward how the remaining outstanding problems might be attacked.

The beginning of the conference will coincide with the culmination of a two-week mini-course (organized by Casselman, Miličić, and Trapa) on the theory of SL(2,R) held at the University of Utah. The minicourse is designed to prepare graduate students for the main themes of the conference which follows.

The conference will have a large instructional component and will primarily organized around the following three lecture series: Endoscopy (Jean-Pierre Labesse*, Marseille), Conjectures of Arthur (David Vogan*, MIT), and The Rankin-Selberg Method and Modern Variations (Wilfried Schmid*, Harvard University). In addition, a number of talks will address complementary material. Invited speakers include: Barbasch* (Cornell University), Casselman* (University of British Columbia), MacPherson (IAS), Miličić* (University of Utah), Mirković* (University of Massachusetts), Shahidi (Purdue University), Vilonen* (Northwestern University). An asterisk indicates tentative confirmation.

A conference webpage will be maintained at `http://www.math.utah.edu/eptrapa/src2006/`.

Integer Points in Polyhedra-Geometry, Number Theory, Representation Theory, Algebra, Optimization, Statistics

Sunday, June 11 –Thursday, June 15

Organizing Committee
Matthias Beck (cochair), San Francisco State University (beck@math.sfsu.edu)
Christian Haase (cochair), Freie Universität Berlin (christian.haase@math.fu-berlin.de)
Bruce Reznick, University of Illinois, Urbana-Champaign
Michele Vergne, Ecole Polytechnique Paris
Volkmar Welker, Philipps-Universität Marburg
Ruriko Yoshida, Duke University

How many nonnegative integral solutions does the following equation have?

$$12223x1 + 12224x2 + 36674x3$$
$$+61119x4 + 85569x5 = 89643482$$

Questions like the above have applications in a wealth of areas outside mathematics. At the same time, they appear in different disguises in various mathematical fields. For example, the original question has a number-theoretical flavor. But in view of a discrete geometer it "actually" asks for the number of lattice points in a polyhedron. In Commutative Algebra one would ask for the Hilbert series of a graded ring, and in Algebraic Geometry for the Todd class of a toric variety. The question of whether a solution exists is an integer linear feasibility problem. In addition, the last decade saw many applications of lattice-point questions to seemingly distant fields such as Representation Theory, Statistics, and Computer Science.

The proposed workshop focuses on these inner mathematical aspects of lattice points. The main motivation is to provide an opportunity to nurture and further develop the interaction between the following disciplines, in which lattice-point questions arise:

- Algebraic Geometry
- Commutative and Computational Algebra
- Discrete Geometry and Combinatorics
- Number Theory
- Optimization
- Representation Theory
- Statistics

A website for this conference will be developed at `http://math.sfsu.edu/beck/src06.html`.

Discrete and Computational Geometry—Twenty Years Later

Sunday, June 18 –Thursday, June 22

Organizing Committee
Jacob E. Goodman, City College, CUNY
Janos Pach, City College, Courant Institute, and Renyi Institute
Richard Pollack, Courant Institute, NYU

Discrete and Computational Geometry arose as a new field within the past twenty-five years, through an amalgamation of the old field of discrete geometry and the nascent field of computational geometry. It is now a very active area of research, on the interface between pure mathematics and theoretical computer science, which is devoted to understanding the structure and complexity of discrete geometric structures as well as the design and analysis of geometric algorithms for the manipulation of these structures. Key examples of the objects studied or manipulated are arrangements (of lines and curves and their higher-dimensional analogues), polytopes and polyhedra, tilings, packings and coverings, oriented matroids, simplicial complexes, geometric graphs, spaces of transversals to families of convex sets, Voronoi diagrams, etc.

Discrete and Computational Geometry bears strong relations to other mathematical areas such as algebra (toric varieties, symmetry groups, real algebraic geometry), topology (combinatorial manifolds, realization spaces), probability theory (randomization techniques, geometric probability), and combinatorics (extremal graph and hypergraph theory). At the same time there are numerous applications to such areas as mathematical programming, geographic information systems, solid modeling, crystallography, and computational biology.

The conference, which is the third decennial Summer Research Conference in this field, and which, at the same time, coincides with the twentieth anniversary of the founding of the journal *Discrete & Computational Geometry*, will bring together people in all of these areas. In particular, we hope to focus on several topics in which there has been a good deal of activity recently, including extremal and reconstruction problems on polytopes, real-algebraic techniques and problems, rigidity theory, toric varieties, Erdős-type problems involving incidences between points and curves and distances in point sets, relations with enumerative combinatorics, sphere packing, geometric transversal theory, geometric discrepancy, and geometric graph theory.

Invited speakers who have tentatively confirmed:

Pankaj K. Agarwal, Duke; Nina Amenta, UC Davis; Imre Bárány, Rényi Inst., Hungarian Academy of Sciences;

Alexander Barvinok, Michigan; Louis J. Billera, Cornell; Bernard Chazelle, Princeton; Henry Cohn, Microsoft Research; Robert Connelly, Cornell; Erik Demaine, MIT; Noam Elkies, Harvard; Thomas C. Hales, Pittsburgh; Gil Kalai, Hebrew University; Jeff Lagarias, Michigan; Jiří Matoušek, Charles University, Prague; Joseph O'Rourke, Smith; Micha Sharir, Tel Aviv University; Jozsef Solymosi, UBC; Ileana Streinu, Smith; Bernd Sturmfels, Berkeley; Terence Tao, UCLA; Emo Welzl, ETH Zürich; Günter M. Ziegler, Technical University Berlin.

Machine and Statistical Learning: Prediction and Discovery

Sunday, June 25 –Thursday, June 29

Organizing Committee
Joseph Verducci, Ohio State University
Xiaotong Shen, University of Minnesota
John Lafferty, Carnegie Mellon University

The conference will be structured around the themes of support vector machines and other large margin classifiers, boosting and ensemble methods, methods for approximate inference, and applications. In addition we are planning a special session on random forests and networks in honor of the memory of Leo Breiman who helped to make the 2003 conference a very special one. Further information will be posted at `http://www.cs.cmu.edu/~lafferty/ml-stat/`.