

## Joint Summer Research Conferences in the Mathematical Sciences

**Snowbird Resort  
Snowbird, Utah  
June 17–July 5, 2007**

The 2007 Joint Summer Research Conferences will be held at the Snowbird Resort (<http://summer.snowbird.com/pages/home/default.php>) from June 17–July 5, 2007. 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 Luchezar L. Avramov, Bjorn Birnir, Michael Fried, Ilse Ipsen, Tasso Kaper, Ludmil Katzarkov, Charles Kooperberg, Bruce E. Sagan, Martin G. Scharlemann, Brooke E. Shipley, and Christopher Sogge.

It is anticipated that the conferences will be partially funded by a grant from the National Science Foundation. If NSF funding is not awarded, the conferences will not take place. Special encouragement is extended to qualified junior scientists (advanced graduate students and recent Ph.D.'s), women, and underrepresented minorities. 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 should watch the website for the conferences at <http://www.ams.org/meetings/src07.html> and complete the online application form when it is posted.

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.

### *Derived Categories in Mathematics and Physics*

**Sunday, June 17–Thursday, June 21**

Organizing Committee:

Aaron Bertram, University of Utah

Y. P. Lee, University of Utah

Eric Sharpe, University of Utah and Virginia Tech

The notion of a derived category first appeared in mathematics in 1967 in Grothendieck and Verdier's search for a natural language in which to describe homological algebra. Interest in derived categories has recently intensified significantly due to new developments in both algebraic geometry and physics. Moreover, these developments have provided fertile ground for interactions between the two subjects in topics such as: homological mirror symmetry, D-branes,  $\pi$ -stability, Lagrangian fibrations and matrix factorization. Experts in derived categories in both mathematics and physics will be invited to attend the workshop, whose schedule is based upon the following format: lecture series in the morning, and seminar talks in the afternoon. In addition, there will be a two-week-long VIGRE minicourse on derived categories at the University of Utah immediately preceding the workshop. The topics of the minicourse will range from the basics of the derived category to the preliminary material of the topics listed above. Some experts, e.g., those scheduled to give the morning lecture series in the workshop, will be invited to give the minicourse lectures. Graduate students (especially those interested in attending the workshop) will be

encouraged to apply for the minicourse. Further information will be posted at <http://www.math.utah.edu/yplee/src2007>.

### ***Interactions of Random Matrix Theory, Integrable Systems, and Stochastic Processes***

**Sunday, June 24–Thursday, June 28**

Organizing committee:

Jinho Baik (co-chair), Courant Institute of Mathematical Sciences  
 Percy Deift (co-chair), Courant Institute of Mathematical Sciences  
 Toufic Suidan (co-chair), University of California, Santa Cruz

Random matrix theory (RMT), which was first introduced into theoretical physics by Wigner in the 1950's, has now found applications in broad areas of mathematics, physics, and applied mathematics. Examples of such applications are:

- Ulam's problem on the length of the longest increasing subsequence in combinatorics
  - asymptotic representation theory
  - probabilistic models such as last passage percolation, random growth models, random tiling models, non-intersecting random walks, exclusion processes and queues in tandem
  - zeros of the Riemann-zeta function
  - principal component analysis in multivariate statistics

The purpose of this meeting is to bring together experts from random matrix theory, integrable systems, and probability theory in order to discuss such problems and to uncover and analyze their mathematical structure.

Invited speakers who have tentatively confirmed: Gerard Ben Arous (Courant Institute of Mathematical Sciences), Alexei Borodin (California Institute of Technology), Alice Guionnet (Ecole Normale Supérieure de Lyon, France), Alexander Its (IUPUI), Kurt Johansson, (Royal Institute of Technology, Sweden), Charles Newman (Courant Institute of Mathematical Sciences), Herbert Spohn (Technische Universität München, Germany), Craig Tracy (University of California, Davis), and Ofer Zeitouni (University of Minnesota).

### ***Symplectic Topology and Measure-Preserving Dynamical Systems***

**Sunday, July 1–Thursday, July 5**

Organizing Committee:

Albert Fathi, Ecole Normale Supérieure de Lyon  
 Yong-Geun Oh, University of Wisconsin  
 Claude Viterbo, Ecole Polytechnique

The algebraic structure of the homeomorphism or diffeomorphisms groups of a manifold and some of their subgroups (volume preserving, symplectic, measure preserving and etc...) has been studied extensively by many mathematicians, among them: Anderson, Banyaga, Epstein, Fathi, Herman, Mather, Thurston, Visetti and more recently Entov, Ghys, Gambaudo, Oh, Polterovitch and Py. There is one domain which has remained unknown yet: this is the case of measure-preserving homeomorphisms in two dimension. This is the dimension where the symplectic and volume-preserving diffeomorphisms coincide. Various recent advances have hinted that the symplectic aspect of the area-preserving dynamics provides a serious obstruction to understanding the homeomorphism case in two dimension.

Recently, as a byproduct of his study on Floer homology in symplectic geometry, Oh discovered a symplectically defined subgroup of the full measure-preserving homeomorphisms group, the Hamiltonian homeomorphism group, which is a good topological analog to the Hamiltonian diffeomorphism group. Many fundamental questions concerning structure of the Hamiltonian homeomorphism group itself remain open. And in two dimension it also sheds some light on the algebraic properties of the measure-preserving homeomorphism group itself. An important uniqueness theorem on the topological Hamiltonians, which are associated to each continuous flow on this group, has been proved by Viterbo and Oh. This provides the ground for the Hamiltonian topological dynamics, which is expected to generalize two dimensional area-preserving dynamics in high dimensions in a nontrivial way.

The subject of the proposed workshop is at the intersection of low-dimensional topology, low-dimensional dynamical systems and  $C^0$ -symplectic topology. The purpose of the workshop is to bring in specialists from different fields of mathematics to exchange knowledge and techniques to attack some of these problems, and to introduce young researchers to a topic that anticipates much development in the near future. The workshop will have two to three minicourses including at least one on symplectic methods in Hamiltonian dynamics and one on low-dimensional dynamics.

A conference webpage will be maintained at <http://math.wisc.edu/oh/src07.html>.