



RANDOM SHAPES

• **March 12 – June 15, 2007**

ORGANIZING COMMITTEE: PETER JONES, CHAIR (YALE), IGOR FRENKEL (YALE), RICHARD KENYON (UNIVERSITY OF BRITISH COLUMBIA), STANLEY OSHER (UCLA), NICHOLAS READ (YALE), STEFFEN ROHDE (UNIVERSITY OF WASHINGTON), BERNARD SAPOVAL (ÉCOLE POLYTECHNIQUE), LEON TAKHTAJAN (SUNY STONY BROOK)

Scientific Overview

The study of random shapes started over 100 years ago as a collection of examples, e.g. those arising from Brownian Motion. It has turned out to be a meeting place for probability theory, mathematics, physics, combinatorics, computer science, and certain areas of algebra. Recent advances in areas diverse as brain imaging, astrophysics, nanotechnology, and communications and sensor networks have been driven by notions related to random shapes or motions, and random transport. The past decade has seen both an explosion of results as well as new structures (for example, Stochastic – Loewner Evolution (SLE) processes) that unify various problems. While much progress has been made, this is still a very young field. For example, one is lacking a theory similar to SLE for generating random surfaces. The purpose of this program is to bring together experts from these rapidly developing areas in mathematics and the sciences to share new ideas and study new problems. We are mainly concerned with structures in two or three dimensions, as they have a strong connection to biology and physics, but some of the topics to be covered concern higher dimensional Euclidean spaces and some problems with networks may have no specified ambient dimension. Besides these general areas, there will also be activity in the study of random shapes and complex geometries arising in brain mapping and astrophysics.

Workshop Schedule

- Random Shapes Tutorials. March 13 - 16, 2007
- Workshop 1: Random Shapes, Representation Theory & Conformal Field Theory. March 26 - 30, 2007
- Workshop 2: Random Curves, Surfaces, and Transport. April 16 - 20, 2007
- Workshop 3: Random and Dynamic Graphs and Networks. May 7 - 11, 2007
- Workshop 4: Image Processing for Random Shapes: Applications to Brain Mapping, Geophysics & Astrophysics. May 21 - 25, 2007
- Culminating Workshop at Lake Arrowhead Conference Center, June 10-15, 2007

Participation

This long program will involve a community of senior and junior researchers. The intent is for participants to have an opportunity to learn from the perspectives of many different fields – mathematics, science, and engineering – and to meet a diverse group of people and to have an opportunity to form new collaborations.

Full and partial support for long-term participants is available. We are especially interested in applicants who intend to participate in the entire program (March 12 – June 15, 2007), but will consider applications for shorter periods. Funding is available for participants at all academic levels, though recent PhDs, graduate students, and researchers in the early stages of their careers are especially encouraged to apply. Encouraging the careers of women and minority mathematicians and scientists is an important component of IPAM's mission and we welcome their applications. More information and an application is available online.

• www.ipam.ucla.edu/programs/rs2007/



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