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# Mathematics Opportunities

## NSF Postdoctoral Research Fellowships

The National Science Foundation (NSF) awards Mathematical Sciences Postdoctoral Research Fellowships (MSPRF) for appropriate research in areas of the mathematical sciences, including applications to other disciplines. Awardees are permitted to choose research environments that will have maximal impact on their future scientific development. Awards are made in the form of either Research Fellowships or Research Instructorships. The Research Fellowship option provides full-time support for any eighteen academic-year months in a three-year period in intervals not shorter than three consecutive months. The Research Instructorship option provides a combination of full-time and half-time support over a period of three academic years, usually one academic year full-time and two academic years half-time. Under both options the award includes six summer months; however, no more than two summer months of support may be received in any calendar year. Under both options the stipend support for twenty-four months (eighteen academic-year months plus six summer months) will be provided within a forty-eight-month period.

The deadline for proposals is **October 17, 2007**. See [http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5301&org=DMS](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5301&org=DMS).

—From an NSF announcement

## Domestic Nuclear Detection Office/NSF Academic Research Initiative

The Domestic Nuclear Detection Office (DNDO) within the Department of Homeland Security (DHS), in partnership with the National Science Foundation (NSF), has announced a joint effort to advance fundamental knowledge in new technologies for the detection of nuclear threats and to develop intellectual capacity in fields relevant to long-term advances in nuclear detection capability. Research will focus on detection systems, individual sensors, or other research that is potentially relevant to the detection of nuclear weapons, special nuclear material, radiation dispersal devices, and related threats.

One of the most pressing needs for the detection of nuclear weapons and material is the development of algorithms for intelligent signal processing. Examples include algorithms that can detect a weak signature in ambient background noise, algorithms that can be programmed in a chip that is embedded directly in a detector, and algorithms that can process information from multiple sensors that are detecting weak signals from nuclear material in transit and can combine the information in a meaningful way and lead to a conclusion with a very low false alarm rate. Other relevant areas of mathematics research include network theory, decision theory, uncertainty and risk analysis, pattern recognition, image and signal processing, and data fusion.

The deadline for full proposals is **May 2, 2007**. See [http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=501056](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501056).

—From an NSF announcement

## NSF-CBMS Regional Conferences, 2007

With funding from the National Science Foundation (NSF), the Conference Board of the Mathematical Sciences (CBMS) will hold two NSF-CBMS Regional Research Conferences during the summer of 2007.

These conferences are intended to stimulate interest and activity in mathematical research. Each five-day conference features a distinguished lecturer who delivers ten lectures on a topic of important current research in one sharply focused area of the mathematical sciences. The lecturer subsequently prepares an expository monograph based on these lectures.

Support for about thirty participants will be provided for each conference. Both established researchers and interested newcomers, including postdoctoral fellows and graduate students, are invited to attend.

Information about an individual conference may be obtained by contacting the conference organizer. The two conferences to be held in 2007 are as follows.

*Numerical Methods for Nonlinear Elliptic Equations*, Roland Glowinski, lecturer. May 21–25, 2007, University of Iowa. Organizers: Kendall E. Atkinson, email: [kendall-atkinson@uiowa.edu](mailto:kendall-atkinson@uiowa.edu); Weimin Han, email: [whan@math.uiowa.edu](mailto:whan@math.uiowa.edu); Laurent O. Jay, email: [na.ljay@na-net.ornl.gov](mailto:na.ljay@na-net.ornl.gov); Brian E. Moore, email: [bemoore@math.uiowa.edu](mailto:bemoore@math.uiowa.edu).

edu; Suely Oliveira, email: [oliveira@cs.uiowa.edu](mailto:oliveira@cs.uiowa.edu); and David Stewart, email: [dstewart@math.uiowa.edu](mailto:dstewart@math.uiowa.edu); conference email: [cbms\\_2007@math.uiowa.edu](mailto:cbms_2007@math.uiowa.edu); conference website: <http://www.math.uiowa.edu/events/CBMS2007/>.

*Finite Morse Index Solutions and Related Topics*, E. N. Dancer, lecturer. December 16–20, 2007, University of Texas, San Antonio. Organizer: Shair Ahmad, email: [shair.ahmad@utsa.edu](mailto:shair.ahmad@utsa.edu); conference website: <http://math.utsa.edu/~ahmad/cbms/>.

—From a CBMS announcement

## Call for Proposals for 2008 NSF-CBMS Regional Conferences

To stimulate interest and activity in mathematical research, the National Science Foundation (NSF) intends to support up to seven NSF-CBMS Regional Research Conferences in 2008. A panel chosen by the Conference Board of the Mathematical Sciences will make the selections from among the submitted proposals.

Each five-day conference features a distinguished lecturer who delivers ten lectures on a topic of important current research in one sharply focused area of the mathematical sciences. The lecturer subsequently prepares an expository monograph based on these lectures, which is normally published as a part of a regional conference series. Depending on the conference topic, the monograph will be published by the American Mathematical Society, by the Society for Industrial and Applied Mathematics, or jointly by the American Statistical Association and the Institute of Mathematical Statistics.

Support is provided for about thirty participants at each conference, and both established researchers and interested newcomers, including postdoctoral fellows and graduate students, are invited to attend.

The proposal due date is **April 20, 2007**. For further information on submitting a proposal, consult the CBMS website, [http://www.cbmsweb.org/NSF/2008\\_call.htm](http://www.cbmsweb.org/NSF/2008_call.htm), or contact: Conference Board of the Mathematical Sciences, 1529 Eighteenth Street, NW, Washington, DC 20036; telephone: 202-293-1170; fax: 202-293-3412; email: [tkolbe@maa.org](mailto:tkolbe@maa.org) or [rosier@georgetown.edu](mailto:rosier@georgetown.edu).

—From a CBMS announcement

## International Mathematics Competition for University Students

The fourteenth International Mathematics Competition (IMC) for University Students will be held August 3–9, 2007, at the American University in Blagoevgrad, Bulgaria. Participating universities are invited to send several students and one teacher; individual students are welcome. Students completing their first, second, third, or fourth years of university education are eligible. The competition

will consist of two sessions of five hours each. Problems will come from the fields of algebra, analysis (real and complex), and combinatorics. The working language will be English.

The deadline for registration is **May 31, 2007**. For details, see the website <http://www.imc-math.org.uk/> or contact John Jayne, University College London, Gower Street, London WC1E 6BT, United Kingdom; telephone: +44-20-7679-7322; email: [j.jayne@ucl.ac.uk](mailto:j.jayne@ucl.ac.uk).

—John Jayne, University College London

## News from the IMA

The 2007–2008 thematic program at the Institute for Mathematics and its Applications (IMA), University of Minnesota, is “Mathematics of Molecular and Cellular Biology”. This program provides a setting for mathematicians and scientists to explore recent and nascent breakthroughs in molecular and cellular biology.

The fall workshops emphasize nucleic acid (DNA and RNA) organization, structure, function, and the interaction between DNA and RNA in the production of proteins and the orchestration of cellular metabolism. A tutorial, *Mathematics of Nucleic Acids*, will be held on September 15, 2007. The two workshops are: *Mathematics of DNA Structure, Function, and Interactions*, September 16–21, 2007; and *RNA in Biology, Bioengineering, and Nanotechnology*, October 29–November 2, 2007.

The winter workshops are devoted to protein structure and function. A tutorial, *Mathematics of Proteins*, will be held January 10–11, 2008. The two workshops are: *Protein Folding*, January 14–18, 2008; and *Organization of Biological Networks*, March 3–7, 2008.

The spring workshops focus on the mathematics of cellular physiology. A tutorial, *Network Dynamics and Cell Physiology*, will be held April 17–18, 2008. The two workshops are: *Design Principles in Biological Systems*, April 21–25, 2008; and *Quantitative Approaches to Cell Motility and Chemotaxis*, May 27–30, 2008. Limited financial support is available for the workshops. Detailed information about this program can be found at <http://www.ima.umn.edu/2007-2008/>.

The IMA is currently accepting applications for postdoctoral fellows, industrial postdoctoral fellows, New Directions Visiting Professors, and general members in connection with the 2008–2009 IMA thematic program, “Mathematics and Chemistry”. The application deadline for New Directions professorships and postdoctoral fellowships is **January 5, 2008**; applications for general memberships are accepted at any time.

The IMA actively solicits proposals for programs from members of the mathematical sciences community. Possibilities include annual programs (which run from September to June), summer programs (which typically run for two to four weeks and involve between 60 and 120 participants), and Hot Topics workshops (which typically last a few days and treat a topic of exceptional contemporary interest and potential impact). Additional information is available at <http://www/ima.umn.edu/solicit>.

For detailed information about IMA programs, as well as the online application forms for IMA workshops and memberships, see <http://www/ima.umn.edu>.

—From an IMA announcement

## News from IPAM

The Institute for Pure and Applied Mathematics (IPAM), located at the University of California, Los Angeles, holds long- and short-term research programs and workshops throughout the academic year for junior and senior mathematicians and scientists who work in academia, the national laboratories, and industry. In the summer IPAM sponsors a program for undergraduate students (RIPS) and graduate students/postdocs (Graduate Summer School). IPAM's 2007–2008 academic year programs are listed below. Please go to <http://www.ipam.ucla.edu> for detailed information and online application and registration forms.

IPAM's Science Advisory Board meets in November, when it considers program proposals. Program proposals from the community are encouraged, and instructions on how to do this are available at our website.

IPAM is seeking its next director, to begin July 2008. Information about the position and how to apply is available on our website.

**Graduate Summer School.** Probabilistic Models of Cognition: The Mathematics of Mind, July 9–27, 2007. Interested individuals may register online.

**Mathematics of Knowledge and Search Engines.** September 10–December 14, 2007. Please apply by August 1. This long program includes the following workshops, which are also open for participation. Individuals may apply online for support to be core participants for the entire program or to attend individual workshops.

*Mathematics of Knowledge and Search Engines Tutorials:* September 11–20, 2007.

*Workshop I: Dynamic Searches and Knowledge Building:* October 1–5, 2007.

*Workshops II: Numerical Tools and Fast Algorithms for Massive Data Mining, Search Engines and Applications:* October 22–26, 2007.

*Workshop III: Social Data Mining and Knowledge Building:* November 5–9, 2007.

*Workshop IV: Search and Knowledge Building for Biological Datasets:* November 26–30, 2007.

**Winter 2008 Short Programs.** Individuals may apply online for support to attend.

*Scientific Computing Applications in Surgical Simulation of Soft Tissues:* January 7–11, 2008.

*Challenges in Image Analysis in Molecular Microscopy:* January 28–February 1, 2008.

*Expanders in Pure and Applied Math:* February 11–15, 2008.

*Graph Cuts and Related Discrete or Continuous Optimization Problems:* February 25–29, 2008.

**Optimal Transport.** March 10–June 13, 2008. Please apply by February 1, 2008. This long program includes the following workshops, which are also open for participation. Individuals may apply online for support to be core

participants for the entire program or to attend individual workshops.

*Optimal Transport Tutorials:* March 11–14, 2008.

*Workshop I: Aspects of Optimal Transport in Geometry and Calculus of Variations:* March 31–April 4, 2008.

*Workshop II: Numerics and Dynamics for Optimal Transport:* April 14–18, 2008.

*Workshop III: Transport Systems in Geography, Geosciences, and Networks:* May 5–9, 2008.

*Workshop IV: Optimal Transport in the Human Body: Lungs and Blood:* May 19–23, 2008.

—IPAM announcement

## International Dobrushin Foundation

Roland L. Dobrushin (1929–1995) was one of the greatest mathematicians of the twentieth century. He is widely known for his achievements in probability theory, information theory, statistical physics, and mathematical and computer linguistics. He was also a brilliant lecturer and research director particularly well known for his support of young mathematicians. Dobrushin was one of the founders of the Independent University of Moscow. He created a laboratory at the Institute for Information Transmission Problems which now bears his name. The Dobrushin Laboratory became known throughout the world for its staff of outstanding mathematicians including three Fields Medal laureates.

Recently the International Dobrushin Foundation was established by admirers of his talent. The purpose of the foundation, which is funded by a private endowment, is to support science and scientists, in particular mathematics and mathematicians. Toward this goal, the foundation is launching the International Dobrushin Prize, five Dobrushin scholarships for senior students of the Independent University of Moscow, and a Dobrushin grant for a professor.

The International Dobrushin Prize is awarded annually to outstanding researchers for the totality of their work in the domains of research interests of Dobrushin, including information theory, statistical physics, probability theory, and mathematical and computer linguistics. The prize committee, formed of independent experts, accepts nominations from any researcher or a group of researchers. Nominations should be sent **before May 10, 2007**, to [dobrushinawards@yahoo.com](mailto:dobrushinawards@yahoo.com) and should include a list of significant publications of the candidate, a brief summary of several of the candidate's most important publications, and a list of three experts who have agreed to endorse the nomination.

The prize is awarded each year on June 20, the birthday of Dobrushin. The winner receives a diploma and the equivalent of US\$3,000 dollars and is invited to present a lecture at the Institute for Information Transmission Problems in Moscow.

—Dobrushin Foundation announcement