Mathematics Opportunities

Deadlines and Target Dates at the DMS

The Division of Mathematical Sciences (DMS) of the National Science Foundation (NSF) has a number of programs in support of mathematical sciences research and education. Listed below are some of the programs and their deadlines or target dates for the year 2005. Some dates are tentative; please refer to the program announcement or contact the program director for more information.

First week of January 2005 (target date): Mathematical Biology part of Applied Mathematics (includes all proposals for Research in Undergraduate Institutions [RUI])

January 15, 2005 (target date): Mid-Career Methodological Opportunities

Late January 2005 (deadline; see solicitation): Major Research Instrumentation (MRI) Program, Scientific Computing Research Environments for the Mathematical Sciences (SCREMS)

February 1, 2005 (target date): Research Planning Grants and Career Advancement Awards for Minority Scientists and Engineers

February 19, 2005 (deadline): Interdisciplinary Grants in the Mathematical Sciences (IGMS)

March 1, 2005 (deadline): Interactions between the Mathematical Sciences and Computer Science (MSPA-MCS), part of Mathematical Sciences: Innovations at the Interface with the Sciences and Engineering (MSPA)

Early April 2005 (target date; see solicitation): CBMS Regional Research Conferences in the Mathematical Sciences

June 30, 2005 (deadline): Joint DMS/BIO/NIGMS Initiative to Support Research Grants in the Area of Mathematical Biology

July 2005 (deadline; see solicitation): Faculty Early Career Development (CAREER) Program

August 15, 2005 (target date): Mid-Career Methodological Opportunities

August 19, 2005 (deadline): Letters of intent for Focused Research Groups (FRG) in the Mathematical Sciences

September 15, 2005 (deadline): Research Experiences for Undergraduates (REU) sites

September 16, 2005 (deadline): Proposals for Focused Research Groups (FRG) in the Mathematical Sciences

October 4, 2005 (target date): Algebra and Number Theory, Analysis, Foundations

October 12, 2005 (deadline): Enhancing the Mathematical Sciences Workforce in the 21st Century (includes Vertical Integration of Research and Education in the Mathematical Sciences [VIGRE])

October 21, 2005 (deadline): Mathematical Sciences Postdoctoral Research Fellowships

Early November 2005 (deadline; see solicitation): Graduate Research Fellowship Program

November 8, 2005 (target date): Applied Mathematics, Statistics and Probability, Geometric Analysis, Topology

November 13, 2005 (deadline): University-Industry Cooperative Research Programs in the Mathematical Sciences

First week of December 2005 (target date): Computational Mathematics

Proposals for conferences, workshops, and special years that are submitted to the Statistics and Probability program or to the Topology and Foundations program can be sent at any time. However, proposals for these activities that are submitted to all other DMS programs (Analysis, Algebra and Number Theory, Applied Mathematics, Computational Mathematics, and Geometric Analysis) must be submitted according to the target dates for those programs. Proposals for supplements for Research Experiences for Undergraduates may be submitted at any time.

For further information consult the DMS website at `http://www.nsf.gov/mps/divisions/dms/news/c_deadlines.htm`. The mailing address is Division of Mathematical Sciences, National Science Foundation, Room 1025, 4201 Wilson Boulevard, Arlington, VA 22230. The telephone number is 703-292-5111.

—From a DMS announcement

University-Industry Cooperative Research Programs in the Mathematical Sciences (UICRP)

The Division of Mathematical Sciences (DMS) of the National Science Foundation (NSF) announces the University-Industry Cooperative Research Programs in the Mathematical Sciences (UICRP), which will award university-industry postdoctoral research fellowships, university-industry senior research fellowships, industry-based graduate research assistantships, and industry-based graduate cooperative fellowships.

The University-Industry Postdoctoral Research Fellowships provide recent doctoral recipients with the chance to work on research in industrial settings as well as in the university environment. The University-Industry Senior

Research Fellowships offer university faculty sabbatical support to work in industry and opportunities to collaborate with scientists from industry. The Industry-Based Graduate Research Assistantships provide opportunities for graduate students to do research in industrial settings. The Industry-Based Graduate Cooperative Fellowships will allow graduate students to work full time as interns in industrial settings for up to one year.

The deadline for applications is **June 2, 2005**. For more information, see http://www.nsf.gov/pubsys/ods/getpub.cfm?nsf05504.

—From an NSF announcement

ONR Young Investigator Program

The Office of Naval Research (ONR) sponsors a Young Investigator Program to support academic scientists and engineers who have recently received Ph.D. or equivalent degrees and who show exceptional promise for doing creative research. The ONR expects to make up to twenty-four new awards in fiscal year 2004. Awards of up to $100,000 per year for three years are made, and additional funds may be provided based on need. Special attention will be given to proposals in naval priority research areas. The program is open to United States citizens, nationals (native residents of a U.S. possession), and permanent residents who hold tenure-track or permanent faculty positions at U.S. universities and who received their graduate degrees on or after November 1, 1998.

Proposals in mathematical, computer, and information sciences should be sent to: Office of Naval Research (FY05 YIP under BAA 05-002), Attn: Director, Mathematical, Computer, and Information Sciences Division, ONR Code 311, Room 607, 800 North Quincy Street, Arlington, VA 22217-5660; telephone 703-696-4314. Proposals must be received by 4:00 p.m. Eastern Standard Time on **January 13, 2005**. For further information and instructions for proposal preparation, see the ONR website, http://www.onr.navy.mil/sci_tech/industrial/363/yip.asp.

—From an ONR announcement

AWM Collaborative Research Grants for Women

The Association for Women in Mathematics (AWM), with support from the National Science Foundation (NSF), will award one or two Collaborative Research Grants in 2005 to enable tenured women to carry out collaborative research at other institutions. Each grant will be made for an amount up to $2,500 to fund travel, accommodations, and other required expenses for a tenured woman mathematician to travel to an institute or a department to do research with a specified individual. All travel should be completed within one year of the award.

Applicants must be women who have tenure or equivalent experience and have a work address in the United States. The applicant's research must be in a field that is supported by the NSF's Division of Mathematical Sciences. The deadline for applications to be received is **February 1, 2005**. Five copies of application materials should be sent to Collaborative Research Grant Selection Committee, Association for Women in Mathematics, 4114 Computer and Space Sciences Building, University of Maryland, College Park, MD 20742-2461. For more information, see the website http://www.awm-math.org/travelgrants.html#collaborative or call 301-405-7892 or email: awm@math.umd.edu.

—AWM announcement

NRC-Ford Foundation Fellowships for Minorities

The National Research Council (NRC) administers the Ford Foundation Fellowships for Minorities program. Eligible applicants must be U.S. citizens or nationals who are members of one of the following groups: Black/African American, Alaskan Native (Eskimo or Aleut), Mexican American/Chicano/Chicana, Native American, Native Pacific Islander (Polynesian, Micronesian), or Puerto Rican.

The Postdoctoral Fellowship program offers one year of postdoctoral support for individuals who have received their Ph.D.'s no earlier than January 1998 and no later than January 15, 2005. The stipend is $40,000, with an employing institution allowance of $1,500. The application deadline is **December 15, 2004.** Applicants are encouraged to apply online at http://www7.nationalacademies.org/fellowships/applyonline.html. The postal address is: Fellowship Office, GR 346A, National Research Council of the National Academies, 550 Fifth Street, NW, Washington, DC 20001. The telephone number is 202-334-2872. The email address is infofell@nas.edu.

—From an NRC announcement

Call for Nominations: Monroe H. Martin Prize

The Institute for Physical Science and Technology (IPST) at the University of Maryland, College Park, announces the seventh Monroe H. Martin Prize. The prize will be awarded for an outstanding paper in applied mathematics (including numerical analysis) by a young research worker. Candidates for the prize must be residents of North America and not have reached their thirty-sixth birthday by July 31, 2005. The submitted paper must be by a single author and have been published or accepted for publication in the open literature. The work must not have been performed in connection with the completion of requirements for an

academic degree. The candidate must neither be, nor have been, affiliated with the University of Maryland.

Applications from qualified candidates or nominations are solicited for the Monroe H. Martin Prize. Entries should include a copy of the paper or contribution with a covering letter and, for full consideration, be submitted before **July 31, 2005**, to R. Roy, Director, Institute for Physical Science and Technology, University of Maryland, College Park, MD 20742-2431.

The award will be announced by November 1, 2005. The recipient will be asked to present his or her work at the Monroe H. Martin Lecture at the University of Maryland in December 2005 and will be awarded a prize of $5,000 plus travel expenses.

The Monroe H. Martin Prize was established to commemorate the achievements of Monroe H. Martin, former director of the Institute for Fluid Dynamics and Applied Mathematics and former chair of the Department of Mathematics at the University of Maryland. Previous prize winners are Neil Berger (1975), Marshall Slemrod (1980), Jonathan Goodman (1985), Marek Rychlik (1990), A. M. Stuart (1995), Z. Xia (1995), R. J. McCann (2000), and Y. Grabovsky (2000).

—Frank W. J. Olver, University of Maryland, College Park

News from the IMA

In today's rapidly evolving and interdisciplinary research environment, a realignment of research direction can open up opportunities for dramatic increases in productivity, impact, and professional satisfaction. However, such realignment poses formidable hurdles for most mathematicians. By its very nature, successful interdisciplinary research involves identifying and establishing credibility with suitable collaborators from other fields, building a common vocabulary, and formulating projects of interest and importance to multiple scientific communities.

The Institute for Mathematics and its Applications' (IMA) New Directions program offers established mathematicians extraordinary opportunities to branch into new research areas and increase the impact of their research. The IMA attracts over a thousand visitors each year, many of whom are from disciplines other than mathematics. This visitor pool, in combination with the IMA's workshops and exceptional environment, provides unmatched opportunities for interdisciplinary collaboration. In 2003 the IMA introduced the New Directions program, with the goal of providing midcareer academic mathematicians with the resources required to undertake a significant shift of research emphasis through intensive involvement with the IMA. The two components of the program are New Directions Visiting Professorships, which involves participation in the full academic-year program, and the annual New Directions Short Course, which is a two-week summer program.

The 2005–2006 New Directions Visiting Professorships program will bring two established mathematicians to the IMA to spend the academic year immersed in the annual program "Imaging". The IMA will supply 50 percent of faculty salary, up to $45,000 maximum. New Directions Visiting Professors are expected to be active participants in the program but are not assigned formal duties. IMA tutorials and short courses are designed to familiarize researchers from a broad range of disciplines with the concepts and methodologies needed for entry into the research areas central to the annual program and so are ideal for Visiting Professors.

The 2003–2004 New Directions Visiting Professors were Shmuel Friedland, from the University of Illinois at Chicago, and Yuhong Yang, from Iowa State University; the 2004–2005 Visiting Professors are Shi Jin (University of Wisconsin), Zhiqiang Wang (Utah State University), and Baisheng Yan (Michigan State University). Yang writes "The tutorials in bioinformatics helped me to move from 'zero' to being able to find research topics in this area. A student of mine, Minhu Paik, and I finished a paper on the use of the nearest-neighbor method for tumor classification based on micro-array data. Without the IMA, this would not have happened." Friedland's participation led to several papers on applications (including phase transitions and reconstruction of missing data in DNA) he had not previously considered, a new course, and an active research program in mathematical biology.

Next year's thematic program, "Imaging", runs from September 1, 2005, through June 30, 2006, and focuses on the processes of image formation, particularly the manipulation of data from sensors to form images, and image interpretation, the extraction of information from images. (See `http://www.ima.umn.edu/imaging` for further information.) The application form for the 2005–2006 New Directions Visiting Professorship program is available at `http://www.ima.umn.edu/docs/newdirapp.html`. The application deadline is **March 1, 2005**.

The other component of the New Directions program is an annual two-week intensive short course in an active and developing area of application, intended for established mathematics faculty interested in expanding their research activity into that area. Many participants from the 2003 short course on Cellular Physiology are now actively pursuing research in mathematical biology. For example, Bjorn Sandstede (Ohio State University) is currently working on two biological applications, one of which is a continuation of a group project in the IMA short course, and is helping to develop an M.Sc. program in mathematical biology.

Even though the 2004 short course on Computational Topology took place only three months ago, it has already yielded new results. For example, three participants—Henry King (University of Maryland), Kevin Knudson (Mississippi State University), and Neza Mramor (University of Ljubljana)—have written a paper together and implemented their algorithm for generating a discrete Morse function on a simplicial complex from a collection of values on the vertices. Knudson explains, "This is definitely a new direction for me. The New Directions program really has made me think in new ways and encouraged me to branch out. It's very easy to just keep doing what I've been doing,

but it can get stale." Many other participants report that they have formed new collaborations and embarked on new research projects inspired by the course.

The 2005 New Directions Short Course, Quantum Computation, August 15–26, will be taught by Peter Shor, professor of mathematics at MIT, and Alexei Kitaev, professor of physics and computer science at Caltech. The course will begin with an introduction to quantum mechanics and quantum computation, then pursue two tracks: quantum algorithms and error correction (led by Shor) and topological quantum computation (led by Kitaev). A typical day will consist of two general lectures in the morning, with topical lectures and problem-solving sessions in the afternoon. See http://www.ima.umn.edu/new-directions/2005NDshort-course for a complete program description.

Participation in the short course is by application only. Participants will receive full travel and lodging support during the workshop. The application form is available at http://www.ima.umn.edu/new-directions/2005NDshort-course/NDcourse-app.php. The application deadline is **April 1, 2005**.

—IMA announcement

News from Oberwolfach

Starting in 2004, the Mathematisches Forschungsinstitut Oberwolfach (MFO) has published official reports of every workshop it has held. These reports contain extended abstracts of one to three pages, including references, of the given talks. These "Oberwolfach Reports" (OWR) are published in the *Tagungsberichte* (*Reports of Meetings*). The aim is to report periodically on the state of mathematical research and to make these reports available to the mathematical community.

The MFO publishes on a quarterly basis the collected workshop reports electronically as well as in the hardcover book series Oberwolfach Reports (OWR, ISSN 1660-8933) in cooperation with the European Mathematical Society. Interested libraries or institutes can subscribe to OWR on a nonprofit basis (in 2004, four issues with more than 2,200 pages for 190 euros plus shipping) or can make exchange arrangements with their institute publications. *Zentralblatt MATH* and *Mathematical Reviews* will regularly receive a copy of OWR. The electronic version with full search facilities will be available for each subscriber on the website of the European Mathematical Society.

As a sample copy, Issue 1 of Volume 1 (2004) of OWR is freely available as a PDF file on our homepage, http://www.mfo.de/cgi-bin/path?programme/owr. There one can also find information concerning subscription, copyright, editorial oversight, etc. The fast publication process (three months after the end of each quarter) guarantees up-to-date information about recent research results of the top experts. Sample copies have been sent to many libraries by surface mail.

—MFO announcement