
Mathematics Opportunities

News from the IMA

The Institute for Mathematics and its Applications (IMA) is holding a 10-day workshop on Mathematical Modeling in Industry for graduate students and qualified advanced undergraduates. The workshop, which will be held July 22–31, 1998, is meant to provide students with first-hand experience in industrial research.

Students will work in teams of up to six students under the guidance of a tutor from industry. Each team will be assigned project on the first day. The tutor will help guide the students in the modeling process, analysis, and computations through discussion sessions. Each team is expected to make a public oral presentation and submit a written report at the end of the 10-day period.

Some of the projects are polishing of semiconductor wafers, energy trading, computer security, crystalization process, and GPS systems. Companies represented include IBM, Motorola, 3M, Lockheed Martin, and Secure Computing.

Further information and application material can be found at the Web site <http://www.ima.umn.edu/>. The application deadline is **April 15, 1998**, but early submission is encouraged. Please contact the IMA for specific questions at imastaff@ima.umn.edu. The postal address is Institute for Mathematics and its Applications, University of Minnesota, 514 Vincent Hall, 206 Church Street, S.E., Minneapolis, MN 55455. The telephone number is 612-624-6066, and the fax number is 612-626-7370.

—IMA Announcement

Research Fellowship Opportunities in Asia

What follows is information about fellowship opportunities in Asia offered by the National Science Foundation (NSF).

Summer Programs in Japan and Korea: The NSF, in conjunction with the National Institutes of Health and the Agricultural Research Service, administers the Summer

Programs in Japan and Korea, which consists of three separate programs designed to provide participants with first-hand experience in Japanese or Korean research environments, an introduction to the science and science policy infrastructure of the respective countries, and language training. The primary goals of the programs are to introduce students to Japanese or Korean science and engineering in the context of a research laboratory and to initiate personal relationships that will better enable them to collaborate with Japanese or Korean counterparts in the future. All qualified graduate students in science and engineering, including the biomedical, agricultural, and social sciences, may apply. The deadline for application is **December 1**.

Research Fellowships in Japan: The NSF nominates researchers for five fellowship programs administered by the Japan Society for the Promotion of Science (JSPS) and the Science and Technology Agency (STA) of Japan. The range of programs allows visits of nearly any length to Japanese universities, interuniversity research institutes, and over 120 Japanese national laboratories, public corporations, and nonprofit research organizations. The following fellowships are available: (1) JSPS Postdoctoral Fellowships support 12–24-month research stays for researchers who have received the Ph.D. degree within the last six years, (2) JSPS Short-Term Postdoctoral Fellowships support 3–11-month research stays for researchers who have received the Ph.D. degree within the last ten years, (3) JSPS Short-Term Invitation Fellowships support research visits to Japan of 7–60 days for researchers with Ph.D. degrees, (4) STA Postdoctoral Fellowships support 6–24-month research stays for researchers who have received the Ph.D. degree within the last six years, (5) STA Short-Term Fellowships support research visits to Japan of 1–3 months for researchers with Ph.D. degrees.

For information, requirements, and application materials please access the NSF/Tokyo home page, <http://www.twics.com/~nsftokyo/home.html>. Specific questions can be directed to JKPinfo@nsf.gov. The mailing address is National Science Foundation, U.S. Embassy, Tokyo, Unit 45004, Box 236, APO AP 96337-0001.

—from NSF Announcement

1999–2000 Fulbright Awards for U.S. Faculty and Professionals

The Fulbright Senior Scholar Program offers opportunities for lecturing or advanced research in over 125 countries to college and university faculty and professionals outside academe. U.S. citizenship and the Ph.D. or comparable professional experience are required. For lecturing awards, university or college teaching is expected. Foreign language skills are needed for some countries, but most lecturing assignments are in English.

The deadlines are: **August 1, 1998**, for lecturing and research grants in the academic year 1999–2000; **May 1, 1998**, for distinguished Fulbright chairs in Western Europe and Canada; and **November 1, 1998**, for international education and academic administrator seminars.

For further information contact USIA Fulbright Senior Scholar Program, Council for International Exchange of Scholars, 3007 Tilden Street, NW, Suite 5L, Box GNEWS, Washington, DC 20008-3009; telephone 202-686-7877; World Wide Web <http://www.cies.org/>. Requests for application materials only may be sent by e-mail to apprequest@cies.iie.org.

—CIES Announcement

NSF Initiative in Knowledge and Distributed Intelligence

The National Science Foundation (NSF) has announced a new initiative entitled Knowledge and Distributed Intelligence (KDI). Projects funded under KDI will draw on expertise from all areas supported by the NSF, including mathematics. “This solicitation provides many opportunities for mathematicians in such areas as data security and integrity, data mining, problems involving multiple scales, modeling and simulation, cognitive studies, pattern recognition, etc.,” noted Donald J. Lewis, director of the NSF’s Division of Mathematical Sciences (DMS).

Lewis chaired the committee of NSF staff that conceived the KDI initiative. The KDI budget is expected to be about \$62 million for fiscal year 1998, and grants are expected to range from about \$100,000 up to \$1,000,000 per year.

KDI is intended to build on what has been achieved in computation and communications to make new advances in science and engineering. KDI proposals must be for research that is inherently multidisciplinary or that, while lying within a single discipline, has clear impact on at least one other discipline.

In the current fiscal year, KDI will have three foci.

- Knowledge Networking will focus on attaining new levels of knowledge integration, information flow, and interactivity among people, organizations, and communities.

- Learning and Intelligent Systems will emphasize research that advances basic understanding of learning and intelligence in natural and artificial systems and supports the development of tools and environments to test and apply this understanding in real situations.
- New Computational Challenges will emphasize new computational approaches to frontier science and engineering problems as well as problems involving data-intensive computations and simulations. In the first year NCC especially encourages projects that deal with interactions between phenomena involving multiple scales or structures and problems involving dynamic interplay between computations and data.

The Learning and Intelligent Systems component began last year, and 28 grants totaling \$22.5 million were awarded in October 1997. The grants included support for work that involved such mathematically based areas as statistics, control theory, and imaging.

It should be emphasized that KDI is an interdisciplinary initiative. But within that context there are great opportunities for the mathematical sciences. Common tools in areas touched by KDI use data-based optimization to achieve a task, but these tools do not always address the main issue of understanding the nature of the patterns encountered, the ability to describe them mathematically, or their structure. Biological, neural, and machine learning bring into focus the basic question of alternative processing or computational paths, translating natural processing into mathematical models of computations. In computation, the need for a mathematical algorithmic language to describe complex natural phenomena requires a detailed focus on geometry and approximation in high dimensions, as well as structures enabling systematic descriptions of scale transitions.

Because of the importance of mathematics to all facets of KDI, the DMS is strongly encouraging mathematicians to participate in the initiative. In fact, Lewis says that at least 50% of the proposals could well involve mathematicians. Each KDI focus area depends heavily on the mathematical sciences, presenting substantial opportunities in statistics, data mining, modeling, analysis, computation, and visualization of data, objects, or processes. Data security and integrity and communications management offer further opportunities for algebra and number theory.

There are two deadlines pertaining to KDI: **April 1, 1998**, for letters of intent to submit proposals, and **May 8, 1998**, for full proposals. The next deadline for KDI will be February 1, 1999. Letters of intent should be submitted by e-mail to kdi.let.in@nsf.gov. Proposals must be submitted through the NSF’s electronic FastLane system.

For further information and continuing developments, consult the Web site <http://www.nsf.gov/kdi/>. General questions about KDI may be sent to the e-mail address kdi@nsf.gov. Specific topical questions in one of the three KDI focus areas may be sent to kn@nsf.gov (for Knowledge Networking), lis@nsf.gov (for Learning and Intelligent Systems), and to ncc@nsf.gov (for New Computational Challenges).

—Alyn Jackson