For Your Information

MathSciNet Version 5 Released

The AMS has released MathSciNet Version 5. Many new features are incorporated in Version 5, including new browsing options, reviews to be added nightly, expanded access to original articles, a new simple search, and more. A complete listing of new features is available in the MathSciNet Version 5 "What's New" at `http://www.ams.org/mathscinet/`.

—AMS announcement

BMS Report on Institutes

In the spring of 1999, the Board on Mathematical Sciences (BMS) of the National Research Council (NRC) issued a report about mathematical sciences research institutes. Entitled *U.S. Research Institutes in the Mathematical Sciences: Assessment and Perspectives*, the report provides some background about institutes and recommends that two new kinds of institutes be established in the U.S.

The institute model, the report notes, was conceived in the early part of this century by Gösta Mittag-Leffler, whose fortune is the basis for the institute in Sweden that bears his name. In the 1930s came the establishment of the School of Mathematics at the Institute for Advanced Study, which has been a model for many other institutes, such as the Istituto de Matemática Pura e Aplicada in Rio de Janeiro, founded in 1957, and the Institut des Hautes Études Scientifiques near Paris, founded a year later. The 1940s saw the establishment of the mathematical sciences conference center in Oberwolfach, Germany, and of the Tata Institute in Bombay. But it was not until the 1980s and 1990s that the growth of mathematical sciences institutes really took off. During that time, the Division of Mathematical Sciences (DMS) of the National Science Foundation (NSF) established two institutes in the U.S.: the Mathematical Sciences Research Institute in Berkeley, California, and the Institute for Mathematics and its Applications at the University of Minnesota. Today there are around twenty major mathematical sciences institutes in the world and many more that operate on smaller scales or address narrower topical areas.

These institutes are a well-established part of the culture of research in the mathematical sciences and have had an important impact on the field. The report goes on to describe this impact more precisely, discussing how institutes catalyze new developments by bringing together researchers in the same area, how they provide a focused and stimulating environment for research, and how they put postdoctoral researchers into contact with mentors who can help guide the young mathematicians' work. Some of the institutes also have an impact beyond the community of researchers by offering programs in mathematics education and events aimed at helping the general public understand better the nature of mathematical research.

The BMS report notes that the major U.S. institutes are broadly based ones, in the sense that they cover all areas of mathematical sciences research. The success of this model is documented in the report. What the U.S. needs now, the report argues, are more focused institutes that address two research themes whose importance has become clear only in recent years. The first theme, called in the report "emerging fields", concerns areas of science or engineering in which promising mathematical developments are newly emerging. The report presents mathematical biology as one example but notes that there could be several such institutes in various areas. The second theme is experimental mathematics and electronic tools in mathematical research. The idea is to have an institute focused on developing, maintaining, and utilizing advances in software and computer technology that support mathematical sciences research.

The report makes just two recommendations: The first says that the DMS should collaborate with other interested funding units or agencies to establish an "emerging fields" institute, and the other says that the DMS should

establish an institute for experimental mathematics and electronic tools in mathematical research.

Originally the purpose of the report was to provide input and support for the recent recompetition of the NSF-funded mathematical sciences research institutes (see "NSF Keeps Two Existing Institutes and Funds a Third", *Notices*, August 1999, pages 800–801). The report appeared too late to have an impact on that competition, though the NSF did fund one institute, at the University of California, Los Angeles, which has some of the characteristics of the emerging-areas institutes described in the report. There was some sentiment within the committee producing the report that there would be some value in establishing a U.S.-based mathematical sciences conference center similar to that in Oberwolfach. However, in collecting comments about what kinds of institutes are needed, the committee found "[t]here was no enthusiasm among respondents for a U.S. counterpart" to Oberwolfach, and therefore the report contains no recommendation for such an institute.

There are indications that the DMS intends to issue a new solicitation for proposals for mathematical sciences institutes (see "New NSF Institute Competition Possible", *Notices*, November 1999, page 1241). If the new competition comes to pass, the BMS report could well influence the outcome.

—Allyn Jackson

AMS Report on Doctoral Mathematics Departments

Doctoral mathematics departments today face difficult problems. Many stagger under huge teaching loads and weather criticism about lack of attention to instruction while also struggling to maintain their major and graduate programs and their research. Perceived as isolated on their campuses and unwilling to address teaching problems, many departments also lack support from their administrations. Back in 1995, the mathematics department at the University of Rochester, threatened with the elimination of its doctoral program, became the poster child for such problems.

But, as the Rochester department has now shown, solutions are possible. This upbeat message is also the conclusion of the AMS publication, *Towards Excellence: Leading a Doctoral Mathematics Department in the 21st Century*. Issued last summer, the report was the centerpiece of a Leadership Conference held in August 1999 at Indiana University, which brought together about ninety people from around thirty doctoral mathematics departments. *Towards Excellence* will also be showcased at the upcoming Mathematical Sciences Department Chairs' Colloquium to be held in Washington, DC, in mid-November by the Board on Mathematical Sciences of the National Research Council.

Running 261 pages, *Towards Excellence* has the format of a paperback. Part report and part resource book, it is chock full of advice, philosophy, recommendations, information, data, and opinions. But it is no hodgepodge: All of this diverse material has been shaped into a useful, well-organized package.

Towards Excellence is the product of the AMS Task Force on Excellence in Mathematics Scholarship. After a slow start following its appointment in 1992, the task force held an extensive series of focus group discussions, site visits, and meetings. Their activities were supported by grants from the Exxon Education Foundation and the National Science Foundation. The chair of the task force was Morton Lowengrub of Indiana University, Bloomington.

Doctoral mathematics departments and the universities in which they live vary greatly. Therefore the task force could not make specific recommendations that could apply to all departments. Rather, the main message is that what is important for an individual mathematics department is to understand the mission of its university and its own role in that mission. When a department acts to carry out its part of that mission, it will be in a good position to seek resources for its own goals. One mission all universities and all doctoral mathematics departments share is quality teaching. Thus one of the task force's main conclusions is that proper attention to teaching will support and strengthen everything else a department does. The first part of *Towards Excellence* presents reasoning and evidence to support these conclusions, as well as some general recommendations for departments and for the AMS. This presentation is informed by an analysis of the environment in which today's universities and mathematics departments operate.

The rest of *Towards Excellence* brings together diverse views of the problems facing doctoral mathematics departments today and diverse ways of solving them. The excerpts from the focus groups of deans and of mathematics department chairs are rescued from chaos by careful organization according to topic (one of the topics for the deans carries the frank label "Insularity"). The site visits were the basis for descriptions of five successful doctoral mathematics departments. These descriptions provide plenty of specifics, including in one case a detailed financial accounting of the costs of freshman and sophomore mathematics teaching. There is also a chapter giving shorter descriptions of outstanding programs at a number of other schools. The next section of the report provides six essays by prominent mathematicians about the issues explored by the task force.

Included in the final section of *Towards Excellence* is a description of how to plan and conduct an external review of a doctoral mathematics department, with many useful details and tips. There is also a chapter called "Where to Find Data (and How to Use It)", which gives information about and references to data that mathematics departments often find they need in conducting reviews or working with their administrations. Another chapter presents brief summaries of about a dozen of the most influential reports on these issues from a variety of organizations, and the final chapter gives an extensive listing of other reports.

Two copies of *Towards Excellence* were sent to chairs of all doctoral mathematics departments in the U.S. and to the deans who participated in the focus groups. In total,

about 800 copies have been distributed. To order a printed copy of the book, send e-mail to `res@ams.org` with subject line "Book Order", and include the full mailing address in the body of the message. Copies are free until the supply runs out. *Towards Excellence* is also available on the World Wide Web at `http://www.ams.org/towardsexcellence/`.

—Allyn Jackson

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Correction to Article on Alternating Sign Matrix Conjecture

The June/July 1999 issue of the *Notices* carried our article, "How the Alternating Sign Matrix Conjecture Was Solved". There was an error in the definition of a *descending plane partition* at the bottom of page 640 and at the top of page 641. The definition should have included the additional restriction that the number of entries in each row must be greater than or equal to the largest entry in the succeeding row. Thus the number of DPPs of order 4 is 42, as printed, and not 43, as the definition of DPP in the article would have produced. The authors are grateful to Georg Schüller and Eric Weisstein for pointing out the discrepancy.

—David Bressoud and James Propp