

A Report of the
AMERICAN MATHEMATICAL SOCIETY



Maintaining Excellence in
Mathematical Sciences Research

Research

Advancing the
Mathematics Profession

Profession

Supporting Mathematics
Education at All Levels

Education

Fostering Awareness and
Appreciation of Mathematics

Awareness



www.ams.org





A Report of the AMERICAN MATHEMATICAL SOCIETY

The American Mathematical Society was founded in 1888 to further the interests of mathematical research and scholarship, and serves the national and international community through its meetings, publications, advocacy, and other programs.

The Society's offices in Providence, Ann Arbor, and Washington, D.C. employ approximately 220 people. There are nearly 30,000 individual members and over 500 institutions worldwide that benefit from membership in the Society. This Report outlines some of the programs and services that support the Society's missions.

The screenshot shows the homepage of the American Mathematical Society website. At the top, there is a navigation bar with the AMS logo and the text "AMERICAN MATHEMATICAL SOCIETY". Below this, there are several menu items: "AMS Bookstore", "CML", "Journals", "MathSciNet", "MR Lookup", and "MSC". The main content area is divided into several columns, each with a heading and a list of links. The headings include: "Membership", "Customer Services", "Employment Services", "Meetings & Conferences", "AMS Governance", "Careers & Education", "MathSciNet", "Journals", "Books", "Mathematical Reviews Database", "Math on the Web", "Reference Tools", "Government Relations", "Public Awareness", "Prizes & Awards", "Giving to the AMS", "Search the AMS website", "News", "What's New in Math", "Feature Column", "Math in the Media", "Archive", "Calendar", and "Recent Additions". The "News" section contains several items, including "Register Now for the 2002 Joint Mathematics Meetings in San Diego", "NSF announces International Postdoctoral Research Fellowships", and "Mathematics to Have Nobel Equivalent". The "Calendar" section mentions "Abstract Submissions for the 2002 Joint Mathematics Meetings in San Diego are due October 2nd" and "2002 AMS election ballots are due November 10th".

MAINTAINING EXCELLENCE IN MATHEMATICAL SCIENCES RESEARCH

Research

The AMS supports mathematical research by sponsoring meetings and conferences, giving prizes and awards, publishing high-quality high-level mathematics, developing reference tools and resources, and advocating for strong federal science funding.

Meetings and Conferences

The AMS sponsors and co-sponsors meetings—forums where members and others in the mathematical community from around the world meet colleagues and leaders in the profession, announce research, keep abreast of current research, and gain recognition for work.

- **Joint Mathematics Meetings**, held each January, offer broad mathematical programs and special lectures. These are co-sponsored with the Mathematical Association of America, and in recent years have drawn over 4,500 mathematicians.
- **Eight Sectional Meetings** are held each fall and spring at colleges and universities around the country.
- **International Meetings** are co-sponsored annually with other societies.
- **Summer Research Conferences** are co-sponsored by the AMS, Institute of Mathematical Statistics (IMS), and the Society for Industrial and Applied Mathematics (SIAM) on the campus of Mount Holyoke College. The National Science Foundation funds these conferences.

Prizes and Awards

The AMS recognizes outstanding research by offering prizes and awards to mathematicians. The winners are announced annually at a special awards ceremony at the annual Joint Mathematics Meetings.

An AMS Special Awards Panel of Judges gives the Menger Awards for mathematics at the annual Intel-International Science and Engineering Fair for high school students. The AMS also provides scholarships to undergraduate students through the Waldemar J. Trjitzinsky Memorial Fund: mathematics departments at the selected schools choose students to receive the funds to assist them in pursuit of careers in mathematics.

Publications Program

The AMS publishes over 100 books annually and keeps in print an extensive backlist of **monographs, textbooks, and proceedings**, including a substantial number of classics originally from **Chelsea Publishing**. The Society also distributes publications from other societies and publishers from around the world, making the AMS a primary source for current international research in the mathematical sciences.

The AMS is a leader in electronic publishing, contributing to the creation of standards and developing tools for mathematicians. The Society's research journals—*Transactions of the AMS*, *Proceedings of the AMS*, *Mathematics of Computation*, *Journal of*

the AMS, *Conformal Geometry and Dynamics*, *Representation Theory*, and *Electronic Research Announcements*—are published electronically and are cross-searchable.

The **Mathematical Reviews (MR) database**—a database of almost two million items covering over 60 years of mathematical literature—comprises the AMS's premier electronic database, MathSciNet. This electronic version of Mathematical Reviews includes many powerful search and retrieval features for the researcher and links to over 165,000 original articles. Many items now include reference lists, allowing easy linking and the compilation of citation information.

The AMS offers **Consortia Pricing** to increase access to MathSciNet for small- and mid-sized institutions—public and private colleges and universities, community colleges, corporations and satellite campuses—that have limited budgets. The AMS also sponsors the **National Mathematical Reviews Subscription Program** for institutions in many developing countries to provide affordable access to MR.

Reference Tools and Resources

The AMS develops tools and resources for researchers, authors, and educators in the mathematical sciences, accessible at no charge on the AMS website. **MR Lookup** is a tool for verifying references and for adding links to MathSciNet. Authors or publishers can add a permanent link to the MathSciNet entry for each reference in a published paper using a format and tools provided free by the Society. The Society in return adds links from MathSciNet to original papers whenever possible. Users are therefore able to navigate from any reference in two clicks, first to the MathSciNet entry and then to the original paper (when it is available). The Society encourages publishers to include links in all electronic literature.

The **Combined Membership List**, **Directory of Institutions, Mathematics Subject Classification (MSC) scheme**, **MR Serials Abbreviations** and **MR Institution Codes** are among the searchable databases on the AMS website, as are links to **TeX** and **AMS-TeX** resources (for typesetting mathematics symbols and formulas), and the **Directory of Mathematics Preprint and e-Print Servers**.

Prizes and Awards

George David Birkhoff Prize in Applied Mathematics (with Society for Industrial and Applied Mathematics)

Bôcher Memorial Prize

Frank Nelson Cole Prize in Algebra

Frank Nelson Cole Prize in Number Theory

Levi L. Conant Prize

Delbert Ray Fulkerson Prize (with Mathematical Programming Society)

Frank and Brennie Morgan Prize

Ruth Lyttle Satter Prize

Leroy P. Steele Prizes (3)

Oswald Veblen Prize in Geometry

Albert Leon Whiteman Memorial Prize

Norbert Wiener Prize in Applied Mathematics (with Society for Industrial and Applied Mathematics)

ADVANCING THE MATHEMATICS PROFESSION

Profession

The AMS provides employment programs, publications, and information about the mathematics profession, and is a central source of assistance for Ph.D. mathematicians who are seeking employment. The Society is a strong and respected leader of the mathematical community and represents the profession effectively in its collaborations and communications with other scientific societies, organizations, federal agencies, and business groups.

Special Membership Opportunities

AMS Nominee Membership is offered free to graduate students proposed by AMS Institutional Member mathematics departments. A **special introductory dues** rate is available for qualifying first-time members, enabling those individuals to become part of the professional research community. A **special low dues** rate is offered to individuals who reside in developing countries.

Employment Services

The AMS provides a variety of career and employment services to graduate students and to mathematicians throughout their careers.

The **Mathematical Sciences Employment Center**, held at the annual Joint Mathematics Meetings each January, offers a computer-scheduled and employer-scheduled Interview Center. It is co-sponsored by the Mathematical Association of America (MAA) and the Society for Industrial and Applied Mathematics (SIAM). The AMS administers registration online and the Center on site.

The **Job Application Database for Mathematicians**, developed at the Duke Math Department and now supported online by the AMS, includes an application system and cover sheet service, plus note-taking, email, data-downloading, and customizable functions for employers. Reference writers can submit their letters online.

Employment Information in the Mathematical Sciences (EIMS) has become the profession's standard location for advertising positions in mathematics. The electronic version allows job-seekers to search for specific positions by type of employer, type and level of position, subject area, and geographic location, and allows employers to submit ad listings electronically.

Fellowships and Grants

The **AMS Centennial Research Fellowship Program** makes several awards annually to a select number of outstanding mathematicians to help further their research careers. The Society provides matching funds for a portion of individual contributions to the program. The award for 2002-2003 is expected to be approximately \$55,000 plus a small expense allowance.

Travel Grants of various kinds are awarded and administered by the AMS on an ongoing basis. The Ky and Yu-Fen Fan Endowment facilitates collaborations between Chinese and U.S./Canadian researchers by supporting their travel between the two continents. All administrative costs are borne by the

Society. The AMS also administers a program of Travel Grants to mathematicians attending the quadrennial International Congress of Mathematicians, funded by the National Science Foundation.

Surveys and Reports

The **Annual Survey of the Mathematical Sciences** (AMS-ASA-IMS-MAA) published by the AMS includes statistics on undergraduates, graduate students, recent Ph.D.s, faculty, and departments. The Society is a respected source for the mathematics profession and for journalists seeking data and analysis about the profession, and frequently provides **customized reports** on request from department chairs.

The Society administers a major survey of the profession every five years under the auspices of the Conference Board of the Mathematical Sciences. This survey provides detailed information about education and employment in the mathematical sciences, providing detailed information for the past forty years. The report is jointly published by the American Mathematical Society and the Mathematical Association of America.

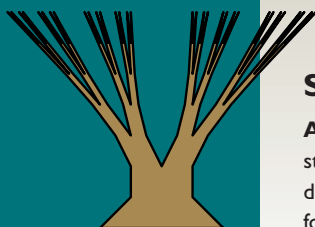
Services and Resources for Mathematics Departments

The **Workshop for Chairs and Leaders of Doctorate-granting Departments of Mathematical Sciences**, organized by the AMS Washington office, is a one-day professional development workshop held in conjunction with the annual Joint Mathematics Meetings. Past topics include: dealing with the dean and other departments, finding funding, using technology effectively, and addressing personnel issues.

As a service to the mathematical community, the AMS publishes and distributes free of charge **Towards Excellence: Leading a Doctoral Mathematics Department in the 21st Century**, edited by John Ewing, and **Proceedings of the Conference on Summer Undergraduate Mathematics Research Programs**, edited by Joseph A. Gallian.

Services to All Mathematicians

The **Notices of the American Mathematical Society** is the journal of record for the AMS and is freely accessible online. It is published eleven times per year, and includes regular features such as "Mathematics People," "Mathematics Opportunities," new publications listings, employment and institutional surveys, expository papers, and meeting and conference information. Throughout the world it is viewed as a central source for information about mathematics and the profession.



The **Book & Journal Donation Program** serves to match donors with recipients. Academic institutions in many countries, including the former Soviet Union and Eastern Europe, have a crucial need for research-level publications to support their math research programs. The AMS provides guidelines on suitable book and journal donations, and provides some shipping subsidies.

Representing the Mathematics Profession in Washington, D.C.

This AMS Washington office represents the mathematics profession in Washington-based conferences for leaders of the scientific community, and regularly visits Congressional offices

to discuss science policy and funding issues. This AMS office also sponsors receptions in connection with the NSF Presidential Awards for Excellence in Mathematics Teaching; organizes participation of mathematicians in the annual Congressional Visits Day; organizes a mathematics exhibit at the annual Coalition for National Science Funding Exhibition on Capitol Hill; and administers (with the American Astronomical Society and American Physical Society) the annual AAS-AMS-APS Public Service Award to officials committed to the support of science, mathematics, and engineering.



SUPPORTING MATHEMATICS EDUCATION

Education

The AMS recognizes that excellence in mathematics education at all levels is key to sustaining mathematical research.

High School Level

The AMS invests in the future of the mathematical research community by supporting Young Scholars Programs that provide a crucial first experience in mathematics for talented and enthusiastic high school students who attend summer programs. The **Epsilon Fund** (“Epsilon” was a term used by the late Paul Erdős for young mathematicians) endows the Society’s support of these summer research programs.

The annual **Arnold Ross Lecture**, held at a science museum or center, gives high school students the chance to meet and hear a prominent mathematician. As part of AMS outreach activities in Rhode Island, the Public Awareness Officer is a guest speaker in local classrooms and hosts a competitive Who Wants To Be A Mathematician game, and the Society offers an AMS Award for Outstanding Achievement in Mathematics to high school seniors chosen by their school.

Undergraduate Mathematics

With the sponsorship of the National Security Agency (NSA), the AMS organized a three-day conference on **Summer Undergraduate Research Programs**. The conference allowed program directors to exchange ideas, discuss issues and establish contacts so that these programs will continue to thrive. Participants included directors of the NSF Research Experience for Undergraduates programs, directors of summer programs for women and minorities, representatives from the NSF and NSA, and people active in promoting undergraduate mathematics research. The AMS published and distributes at no charge the proceedings of this conference.

A three-year grant from the NSF enables the AMS to send 10 undergraduate students per year to the **Math in Moscow Semester**, a study program at the Independent University of

Moscow. Another way the AMS helps to encourage and support talented undergraduates in the pursuit of mathematics is through the **AMS-MAA-SIAM Frank and Brennie Morgan Prize** for outstanding research.

Graduate-Level Mathematics

Assistantships and Graduate Fellowships, published by the AMS, is a resource on graduate study in mathematical sciences departments in the U.S. and Canada. The annual publication includes information on the number of faculty, graduate students, and degrees awarded (bachelor’s, master’s, and doctoral) for each department (when available); stipend amounts and the number of awards available; and information about foreign language requirements. Also listed are sources of support for graduate study and travel, summer internships, and graduate study in the U.S. for foreign nationals.

The AMS also publishes the highly-regarded **Graduate Studies in Mathematics** and other series of textbooks that are often adopted as graduate-level course texts.

The AMS co-sponsors the **AMS-AAAS Mass Media Fellowship Program**, which offers mathematics graduate students a ten-week fellowship to work full-time over the summer as reporters, researchers, and production assistants in U.S. mass media organizations.

The AMS is one of several organizations that support **Project NExT** (New Experiences in Teaching)—a program of the Mathematical Association of America for new or recent mathematics Ph.D.s who are interested in improving the teaching and learning of undergraduate mathematics.



FOSTERING AWARENESS AND APPRECIATION OF MATHEMATICS

Awareness

The AMS **Public Awareness Office** works with the media, scientific societies, institutes, universities and museums to promote awareness of mathematics and to publicize meetings, events, prizes, and AMS programs.

Mathematical Moments

This series of informational flyers is designed to promote appreciation and understanding of the role mathematics plays in science, nature, technology, and human culture. These introductory "snapshots" can be used as teaching tools or as informational handouts.

Discoveries and Breakthroughs Inside Science

The AMS collaborates with the American Institute of Physics to find story ideas that highlight new applications of mathematics. *Discoveries and Breakthroughs Inside Science* is a series of video news segments aired by local TV stations, showing how recent advances in science impact consumers.

Math in the Media and Math Digest

These monthly postings on the AMS website summarize articles on mathematics that appear in the general media and in popular science publications such as *Science*, *Nature*, *Discover*, and *Science News*. The summaries allow visitors to the site to keep current and to locate articles of interest.

Mathematics Awareness Month

The Joint Policy Board for Mathematics (AMS, MAA, and SIAM) sponsors Mathematics Awareness Month each April. The societies produce and mail a theme poster and publicity materials to mathematics departments and others, and maintain a website with additional related resources. Mathematics departments, math clubs, and teachers use the opportunity to create corollary materials, sponsor invited talks, and organize contests and events to publicize mathematics. Recent themes are "Mathematics and the Internet," "Mathematics and the Ocean" and "Mathematics and the Genome."

Outreach Programs of the AMS Public Awareness Office

The Public Awareness Office hosts *Who Wants To Be A Mathematician* at the Joint Mathematics Meetings and in Rhode Island in conjunction with Mathematics Awareness Month. Ten students qualify for a chance to compete for the AMS-offered \$2,000 Grand Prize in this game of pre-calculus questions and multiple-choice answers. The office also publicizes outreach activities of math departments and other associations.

Securing Internet Communication

No one could shop, pay bills, or conduct business securely on the Internet without the mathematics of encryption. Although based on algebraic facts proved centuries ago, today's sophisticated encryption techniques were formulated within the past twenty-five years.

Public key encryption allows a user to publish the encryption key for all to use, while keeping the decryption key secret. One such algorithm, called RSA, is behind the encryption in modern browsers. The National Institute of Standards and Technology recently adopted an Advanced Encryption Standard that will be used for electronic communication in the years to come. This new standard uses permutations, modular arithmetic, polynomials, matrices, and finite fields to transmit information freely but securely.

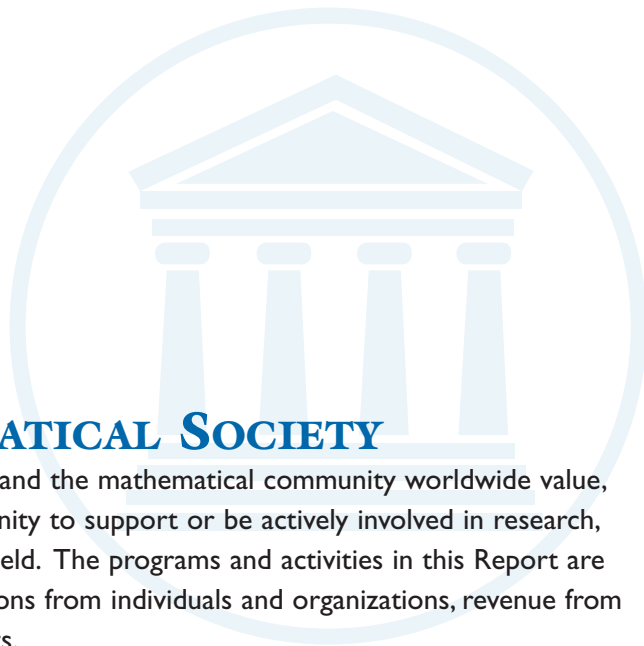
For More Information:
"Communications Security for the Twenty-first Century," Susan Landau, *Notices of the American Mathematical Society*, April 2000.

AMS
AMERICAN MATHEMATICAL SOCIETY

The Mathematical Moments program promotes appreciation and understanding of the role mathematics plays in science, nature, technology, and human culture.

The AMERICAN MATHEMATICAL SOCIETY

provides tangible benefits that members and the mathematical community worldwide value, and it also offers individuals the opportunity to support or be actively involved in research, communications, and programs in their field. The programs and activities in this Report are made possible through grants, contributions from individuals and organizations, revenue from publications and services, and investments.



AMS FACTS AND FIGURES

Founded: 1888 in New York, NY

Incorporated: 1923

Moved to Providence, Rhode Island: 1951

Locations: Providence and Pawtucket, Rhode Island; Washington, D.C.; Ann Arbor, Michigan

Membership: Nearly 30,000 individuals (approximately 7,300 outside the U.S.). Over 500 institutions worldwide

Organization:

Officers: mathematicians elected by the membership for terms of varying length

Council: formulates and administers matters dealing with scientific policy

Executive Committee of the Council: president, secretary, president-elect (in even-numbered years), immediate past president (in odd-numbered years), and four elected members act on matters delegated by the Council

Board of Trustees: sets fiscal policy and includes the president, treasurer, associate treasurer, and five members elected by the membership

Committees: Publications, Profession, Education, Science Policy, Meetings and Conferences, Prizes and Awards, among others, totaling 108

The Executive Director (at Providence headquarters), appointed by and responsible to the Board of Trustees and Council, is the chief administrator of the Society

Employees: 221

Divisions: Publications, Mathematical Reviews, Meetings and Professional Services, Washington Office, Finance and Administration

Financing: Publication sales, dues, contributions, endowments (restricted and unrestricted), investments, government grants, service contracts

Budget: Approximately \$20 million

Meetings: One national, eight sectional, one or more joint international, and several co-sponsored Summer Research Conferences per year

Publications: First publication: *Bulletin of the New York Mathematical Society* in 1891–1893
Over 100 books published per year
Over 3,000 books in print
Nine research journals
Notices of the AMS, the Society's journal of record
Abstracts of Papers presented to the AMS
Current Mathematical Publications subject index classified by *Mathematical Reviews*
Over 1,000 journal articles published per year

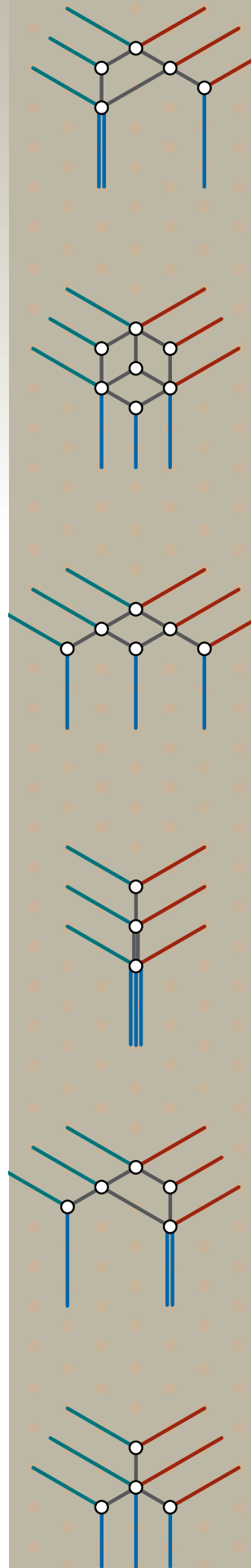
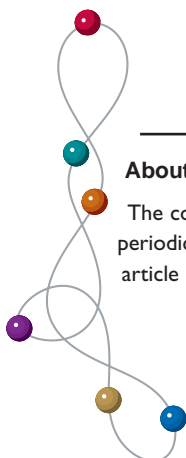
Mathematical Reviews: Founded 1940
Over 1.7 million items in the MR database
Approximately 70,000 items (reviews and citations) added each year
1,800 journals covered
365,000 authors indexed
10,900 active reviewers

Electronic Advances:
AMS-TeX typesetting launched 1979
AMS Fonts released for public use 1985
AMS on ARPANET 1987
MathSciNet online 1996
All Journals online 1996
MathSciNet in 2001 links to 182,500 original articles; additions ongoing

About the Cover

The cover shows several frames of an animation constructed by Carles Simó—redrawn slightly—that exhibits the periodic orbital motion of six objects of equal mass on a single orbit. This is what is called in Richard Montgomery's article a "simple choreography". The whole series can be obtained from <http://www.maia.ub.es/dsg/nbody.html>.

— Bill Casselman (covers@ams.org)



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