Report of the Executive Director: *State of the AMS, 2015*

I am pleased to report that 2015 was again a successful year for the American Mathematical Society (AMS). The Society remains financially healthy, very active in supporting the mathematics community, and responsive in addressing professional and public advocacy issues thanks to the efforts of its members and dedicated staff. Several notable events and transitions occurred in 2015.

• Attendance at the Joint Mathematics Meetings (JMM) in San Antonio totaled 5,962, an increase of 17 percent from the total at the last JMM in San Antonio in 2006, and a modest decrease of 8 percent from the attendance in Baltimore in 2014. JMM attendance has remained at approximately 6,000 or above since 2011.

• Ellen Maycock completed her phased retirement from the position of Associate Executive Director (AED) of Meetings and Professional Services, a role in which she was succeeded by T. Christine Stevens in 2014. During 2015 Ellen served as Special Projects Officer until August when she was succeeded by Thomas H. Barr.

• The Society completed its Strategic Plan for 2016—2020. The plan was approved by the Executive Committee and the Board of Trustees in November 2015 and by the Council in January 2016. The last section of this report highlights some of the plan's strategic initiatives.

Current Issues

An issue that continues to affect the AMS in its role as a scholarly publisher is the steady growth of research literature in the mathematical sciences. A society publisher such as the AMS has its incentives perfectly aligned with the community members and with research libraries. During the period 2000 through 2009, the number of new research articles published annually in journals covered by Mathematical Reviews (MR) increased by 37 percent, a compounded annual growth rate of 3.6 percent. To accommodate this growth in the volume of research literature, the AMS is striving to publish more high quality content. The issue has been addressed in the Strategic Plan through increases for the pages published in the primary research journals and by focused discussions of the Council and the Publishing Division on the possible introduction of new AMS journals.

New policies have now been put in place for public access to research sponsored by government funding. There are several dimensions to the discussion, including (1) what form the mandates for public access will take and (2) how business models for publishing scientific work will evolve; e.g., Open Access vs. subscription models for journals. In accordance with its mission statement, the AMS continues to promote open, rapid, and affordable communication of research. Some specific steps we have taken are described in the section on publishing below.

The AMS is concerned about how the support of basic research has become highly politicized. We continue to collaborate with other organizations in advocacy for the support of basic research.

Highlights of 2015 Activities

The Society's major activities rely on the contributions of dedicated volunteers and staff as well as the philanthropy of many individuals. We are grateful for their contributions of time and financial support.

"It truly was the best mathematical experience of my graduate career. I hope it will continue so that other young mathematicians can find a way to network and collaborate in meaningful research in their areas. I feel honored and I want to thank everyone involved in selecting me to take part in this experience."

—2015 MRC participant

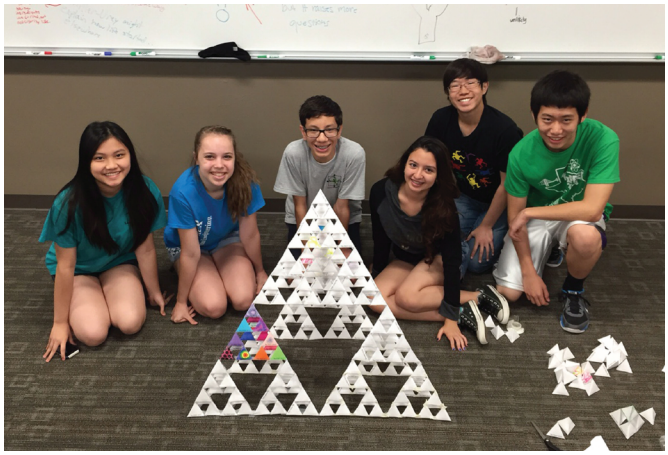
Serving the Community

Mathematicians continue to attend meetings and conferences in person—to learn, advance their careers, meet colleagues, and recognize recipients of AMS prizes and awards. While AMS staff handle the complicated logistics, AMS Secretaries and organizers of special sessions and panels manage the scientific programs of AMS meetings. Special thanks go to AMS Secretary Carla D. Savage and Associate Secretaries Georgia Benkart, Brian D. Boe, Michel L. Lapidus, and Steven H. Weintraub, as well as the many organizers, speakers, and panelists who contribute their time, leadership, and expertise to these endeavors.

In 2015, two special meetings were sponsored by the AMS in partnership with other organizations. The 2015 Joint International Meeting was held in Porto, Portugal in June and was cosponsored with the European Mathematical Society and Sociedade Portugesa de Matemática. It was a great success with over 1,100 participants from the US, Portugal, and many other European countries.

In July, the sixth Summer Research Institute on Algebraic Geometry was held at the University of Utah, Salt Lake City, sponsored by the AMS in collaboration with the Clay Mathematics Institute. The meeting continued a tradition of decennial summer institutes started in 1964. The goal of the three-week institute was to review major achievements in algebraic geometry in the past decade, and to bring the attendees to the forefront of the relevant subjects. The institute was modeled on the 2005 Summer Research Institute held at the University of Washington, Seattle, with plenary lectures in the mornings, and seminar series in the afternoons. Partial funding was provided by the National Science Foundation, the National Security Agency, and the Simons Foundation. Prior to the meeting, a one-week boot camp was held for advanced graduate students and postdocs to familiarize them with a broad range of developments in algebraic geometry and to introduce early-career algebraic geometers to their peers and to more senior algebraic geometers.

The Mathematics Research Communities (MRC) program continues to be highly successful. The 2015 MRC summer conferences at the Snowbird Resort in Utah drew 120 early-career mathematicians. These conferences, funded by the National Science Foundation, are part of this AMS program that also includes special sessions at JMMs, ongoing support from conference organizers, and a continuation of the connections and collaborations funded substantially by endowment income. Through 2015, approximately 900 participants have taken part in the MRC program.



TexPREP-Lubbock Summer Math Camp, Texas Tech University, Lubbock.

Each year, approximately 300 graduate students receive travel support from the AMS to attend meetings. About 100 students attended JMM in San Antonio with support. They were treated to a brunch where they could meet other students and members of the AMS leadership. The student travel grants are supported by one generous anonymous donor.

Members and the broader mathematical community also look to the AMS to provide crucial services—employment services, career information, and other opportunities for advancement and involvement.

`MathJobs.Org` and the Employment Center at JMM remain valued by both employers and job seekers, especially for academic employment. By 2015, MathJobs was serving over 8,000 job applicants and 650 employers, including some international employers who began accepting job applications through the system in 2014.

The AMS also gathers data on the profession in annual surveys regarding faculty recruitment, hiring and salaries, course enrollments, degrees awarded, and the demographics of new PhD recipients along with their employment status. The survey reports are vital for the mathematical sciences community in gaining support for programs, in understanding how one's department compares to peers, and in providing reliable information about employment patterns and higher education in mathematics, applied mathematics, and statistics.

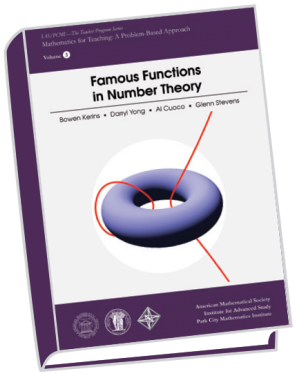
Support of summer math camps for talented pre-college students continues to grow. The Epsilon endowment fund is broadly supported by AMS member-donors. In 2015, the twenty-three summer camps receiving Epsilon Fund grants hosted over 1,450 students. It is a great program in which a modest amount of funding contributes to the support of a very large number of individual beneficiaries. The TexPREP program at Texas Tech University, for example, worked with 130 students from grades six through eleven to enhance their intellectual skills for success in college programs and careers in mathematics, science, and engineering.

AMS Publishing

In January Mathematical Reviews celebrated its 75th year of publishing comprehensive coverage of new research in the mathematical sciences. In 2015, 119,000 items were added to the MR database, including 89,000 reviews. The growth in the mathematics literature presents a significant challenge to MathSciNet® in its mission of (1) covering all new research contributions in mathematics and, at the same time, (2) continuing to improve the capabilities of MathSciNet for discovery of new research results; for example, the addition of 14 new Reference List journals in 2015 vastly improves the research-discovery capabili-

ties of MathSciNet. The strategic planning for MathSciNet done in 2015 addresses this challenge.

The Publishing Division, under the leadership of Associate Executive Director Robert M. Harington, and the Computer Services Division, under the leadership of Chief Information Officer Tom Blythe, continue to make major strides in broadening the availability of AMS eBooks. In 2015, the Society launched availability of additional back file collections for libraries, including selected out-of-series (MBK) volumes, the *CBMS Issues in Mathematics Education*, the *CBMS Regional Conference Series in Mathematics*, and *Mathematical World*.

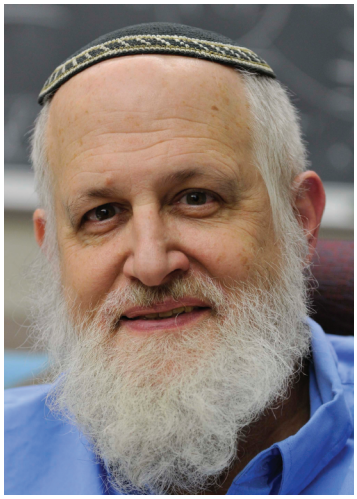


In 2015, the book program published 81 new titles, of which we are very proud. Two sets of AMS books published in 2015 are especially noteworthy.

A new book series was launched in collaboration with the Institute for Advanced Study Park City Mathematics Institute. The books of *IAS/PCMI-The Teacher Program Series* present materials from the IAS/PCMI Secondary School Teachers Program, an annual professional development program for middle school and high school teachers of mathematics. Books in the series are designed to facilitate the Secondary School Teacher's Program (SSTP) goal of improving teacher knowledge via a problem-based approach to learning. Three titles were published in this series in 2015: *Probability through Algebra, Famous Functions in Number Theory*, and *Applications of Algebra and Geometry to the Work of Teaching*.

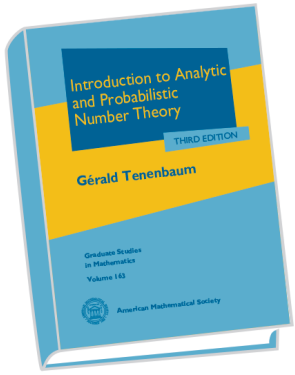
The 5-volume set, *A Comprehensive Course in Analysis* by Barry Simon covers real and complex analysis, harmonic analysis, and operator theory in 3,259 pages. This unique set can serve as a comprehensive graduate-level text as well as a definitive reference for almost all areas of classical analysis.

The AMS added nine new volumes to its *Graduate Studies in Mathematics* series in 2015, including *Introduction to Analytic and Probabilistic Number Theory: Third Edition*, by Gérald Tenenbaum. The new edition expands the content of the previous edition by more than fifty percent.



Barry Simon, AMS author and recipient of the 2016 Leroy P. Steele Prize for Lifetime Achievement.

A behind-the-scenes, high priority mission of the AMS is to continue the advancement of technology for the electronic distribution of mathematical content. The AMS partners with about twenty other organizations in the development of MathJax™. The AMS and the Society for Industrial and Applied Mathematics (SIAM) are the two leading partners for the MathJax Consortium. MathJax has had a revolutionary impact in enabling the high-quality web rendering of MathML and mathematics authored in LaTeX, in all standard browsers. The MathJax Content Delivery Network (CDN) currently serves more than 100 million unique visitors per month. In 2015, the key developers of MathJax were funded by the Alfred P. Sloan Foundation to develop capabilities using MathJax for embedding semantic markup of mathematical content and for developing a software infrastructure for *handicap accessibility* of mathematics on the web, such as text-to-speech processing. MathJax is just one part of the technology development being done by the Publishing Technology Group in the Computer Services Division and by the Publishing Division.



There were major developments for publishing of the AMS research journals as well in 2014–2015. I believe that a professional society such as the AMS has incentives that are perfectly aligned with the communities that our publications serve—the libraries, that are our customers, and the mathematical scientists, who are both our authors and our consumers. We can deliver the highest quality publications at the lowest possible cost. The logical implication for the AMS is that we should strive to publish more of the high-quality research content that is being created.

In 2015, the AMS made substantial increases to the pages published in its primary research journals. The increase is helping us to achieve two goals: (1) elimination of the backlogs of *Proceedings of the AMS* and *Transactions of the AMS*, and (2) delivery of more high-quality content at lower cost to the subscribers. The AMS published 26,000 journal pages in 2015, compared to 20,600 pages in 2013, an increase of 26 percent in two years.

In 2014, the AMS launched two new open access research journals, *Proceedings of the AMS, Series B* and *Transactions of the AMS, Series B*, companion journals to the primary AMS journals *Proceedings and Transactions*. The new journals offer the open access option for authors who wish to publish their work in the "gold" open-access model. In 2015, the Publishing and Computer Services divisions introduced Early View as a new AMS member benefit. As soon as an article is accepted by one of the primary research journals, the author's final submitted manuscript is posted on `ams.org` and made freely available for members to view. Authors are also encouraged to post their final manuscript at `arXiv.org`. All of these initiatives are designed to achieve rapid and broad dissemination of new research.

Advocacy, Partnerships for Mathematics and Science, and Public Awareness

The AMS Public Awareness Office, the Washington, DC Office, as well as many in the profession, are key to promoting awareness of news and information about mathematics and mathematicians—to our own community as well as to scientists in other fields, students, decision-makers, the media, and the broader public.

The Washington Office leads or oversees a number of activities in advocacy for the mathematical sciences and public policy in support of science. These activities include an annual Congressional Briefing, leadership of the Coalition for National Science Funding (CNSF), staff liaison for the AMS policy committees on Education and Science Policy, recruitment and selection of the AMS Congressional Fellow and the AMS Mass Media Fellow, and a variety of advocacy initiatives.

CNSF is an alliance of over 140 professional societies, research institutes, higher education institutions, and businesses that works to increase the national investment in the National Science Foundation's research and education programs. The coalition organizes a reception and exhibition each year for members of Congress and Congressional staffers. The 2015 exhibition was attended by 275 people, including ten members of Congress. Katharine Gurski (Howard University) represented the AMS and presented her work on "Mathematical Algorithms for Space Weather, Tsunamis, and Plasma Physics."

Katharine Gurski and Dr. France A. Córdova, director of the National Science Foundation.

For several years, the Committee on Science Policy has combined its annual spring meeting in Washington with "visits to the Hill." In April 2015, committee members visited the offices of thirty Senators and Representatives to have conversations about the state of science funding and to ask for support of budget increases proposed for NSF in FY 2016. Such visits are important; at the time of the visits, the NSF was being subjected to unprecedented scrutiny by the House Committee on Science, Space, and Technology.

The AMS Public Awareness Office (PAO) provides leadership and support for activities that communicate with the general public and with select constituencies about the importance of mathematics. In April 2015, the PAO and the AMS more broadly participated in the inaugural National Mathematics Festival. The PAO lent a lot of support to promoting the festival and sponsored the *Who Wants to Be a Mathematician* game.

Really Big Numbers won the first Mathical: Books for Kids from Tots to Teens book prize in two categories: Grades 3–5 and Grades 6–8 as part of the National Mathematics Festival. The book, written by Richard Evan Schwartz of Brown University, was published by the AMS. The Mathical: Books for Kids from Tots to Teens book prize, presented by the Mathematical Sciences Research Institute (MSRI) and the Children's Book Council (CBC), recognizes the most inspiring math-related fiction and nonfiction books for young people of all ages.

Strategic Planning

At the May 2013 meeting of the Executive Committee and Board of Trustees (ECBT), the ECBT approved of the President appointing a committee to oversee the strategic planning for the AMS. President Vogan appointed a Strategic Planning Oversight Committee (referred to as SPOCK) including Ralph Cohen (EC member), Mark Green (BT Chair), Donald E. McClure (Executive Director), Emily Riley (CFO), Carla D. Savage (Secretary), and David A. Vogan Jr. (President). The committee was later expanded by adding William Jaco (2014 BT Chair) and Robert Bryant (2015–16 President). Also, Ronald Solomon (Chair, Mathematical Reviews Editorial Committee) was added for the part of strategic planning focused on MathSciNet.

The strategic planning has been done in three parts. The first part focuses on the AMS as a membership organization: membership, professional services, and the Washington Office. The second part concerns the AMS publishing of journals and books, plus the AMS web presence. The third part focuses on MathSciNet.

At the end of 2014, the first two parts were on track to start finalizing plans in mid-2015. The planning for MathSciNet achieved an ambitious schedule to finish in the fall of 2015.

The planning for membership, professional services, and Washington activities engaged the services of a consulting firm McKinley Advisors from Washington, DC. The Society and McKinley had designed a survey of the mathematics community that was carried out right after JMM 2015. The objective of the survey was to assess and quantify the perceptions, needs, and expectations of AMS members and the mathematics community to inform the strategic planning process.

The plan was finalized by SPOCK in October 2015 and was recommended for approval to the ECBT and the Council. Final approval was given at the Council meeting on January 3, 2016, in Seattle. The plan relied very heavily on the findings of the member survey and on focused discussions of the Council on MathSciNet, membership, and publishing. The last discussion on publishing took place at the April 2016 Council meeting; that Council discussion expanded on earlier discussions in 2014 and 2015 by the Committee on Publications.

The plan consists of two parts, (1) a one-page Strategy Map outlining Goals, Objectives, and broad Strategic Initiatives, and (2) six pages with more detailed outlines of six groups of Initiatives to guide the planning of the Society over the five-year period 2016–2020.

The 2014 State of the AMS report summarized findings from the member survey about top-ranked professional challenges faced by respondents and about top-ranked areas of activity for emphasis by the AMS (Notices, December 2015, pp. 1357–60).

The ranking of areas of activity was determined by the proportion of responses categorizing that objective as "among the most important."

The four top-ranked activities were:

1. Support and encourage young mathematicians and individuals pursuing undergraduate/graduate degrees in mathematics.
2. Increase advocacy efforts on key issues, such as support for basic research.
3. Promote awareness and appreciation of the importance of mathematics among the public.
4. Create programs to promote and foster diversity in the mathematics profession.

The six groups of Initiatives included in the approved plan reflect these priorities. They are:

1. Diversity and Inclusion—including the formation of the new Department of Education and Diversity
2. Advocacy, Awareness & Visibility
3. Membership Development
4. Development and promotion of a coherent portfolio of programs, meetings, publications, and professional services
5. Future directions for Mathematical Reviews / MathSciNet—including a roadmap for future development, as well as strategies to broaden access to MathSciNet by many more mathematical scientists
6. Publishing—including the development of tools for research and teaching, and strategies for publishing more mathematics content

The Board of Trustees made $250,000 available in the 2016 budget for implementation of the Strategic Initiatives and the work has begun in earnest.

—Donald E. McClure
Executive Director

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