Report of the Executive Director: *State of the AMS, 2014*

I am pleased to report that 2014 was again a successful year for the AMS. The Society remains financially healthy, very active in supporting the mathematics community, and flexible in addressing professional and public advocacy issues, thanks to the efforts of its members and dedicated staff. Several notable events and transitions occurred in 2014.

• The Joint Mathematics Meetings (JMM) in Baltimore maintained the very high level of participation of the previous two JMMs. The total registration of 6,448 was 26 percent greater than that of the 2003 JMM in Baltimore and essentially equal to the 2013 attendance in San Diego.

• Edward Dunne became Executive Editor of Mathematical Reviews (MR) in August, succeeding Graeme Fairweather who completed six years of service upon retirement in the summer. Ed moved to MR from his previous position as Senior Editor in the Editorial Division of the AMS.

• T. Christine Stevens joined the AMS in August as Associate Executive Director (AED) of Meetings and Professional Services. She succeeded Ellen Maycock who started a period of phased retirement after nine years as AED. Chris is widely known for her service to the mathematics community, notably her role in the building and the leadership of MAA's Project NExT.

Current Issues

An issue affecting 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 increased by 37 percent, a compounded annual growth rate of 3.6 percent. To accommodate the growth in the volume of research literature, the AMS should be publishing more—and the Committee on Publications reached the same conclusion in its 2014 review of the primary research journals. An unanticipated issue affecting the mathematics community and the AMS stemmed from the summer 2013 revelations about the National Security Agency (NSA) by Edward Snowden. The controversies affected mathematics more than many other disciplines because of the major role that mathematics has in the NSA. During much of 2014, the *Notices of the AMS* provided a forum for presentation and discussion of disparate opinions in seven articles, an Opinion piece, and Letters to the Editor.

The Society made substantial progress on strategic planning for (1) membership, professional programs, and activities of the Washington office, (2) journal and book publishing, and (3) MathSciNet®. The last section of this report highlights some findings from a survey of the mathematics community designed to help guide the formulation of strategic initiatives.

Highlights of 2014 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.

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 Savage and Associate Secretaries Georgia Benkart, Brian D. Boe, Michel L. Lapidus, and Steven H. Weintraub and the many organizers, speakers, and panelists who contribute their time, leadership, and expertise.

James H. Simons, Chairman, Simons Foundation, gave the Einstein Public Lecture, "Mathematics, Common Sense, and Good Luck" at the sectional meeting at San Francisco State University in October. About 300 people filled the room to hear him talk about his career in mathematics, finance, and philanthropy. Some of the audience members were recipients of AMS-Simons Travel Grants, supported by the AMS and the Simons Foundation, and they came up and spoke with him afterward. It was nice to see the philanthropist and his beneficiaries connect in person and so warmly.

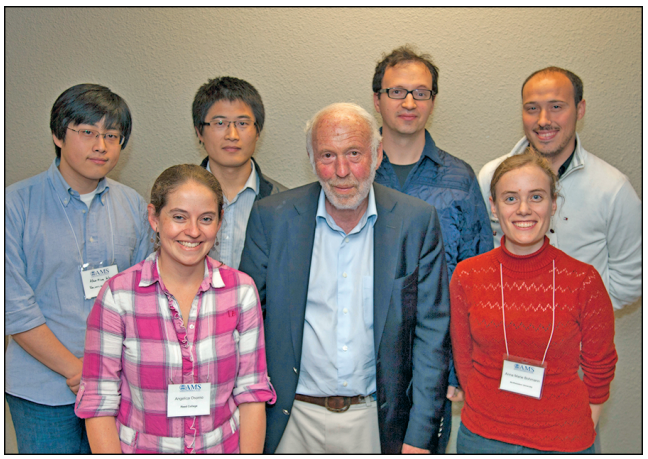


Photo by Lisa Sze.

James Simons with recipients of AMS-Simons Travel Grants, after his 2014 Einstein Lecture

The Mathematics Research Communities (MRC) program continues to be highly successful. The 2014 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 2014, a total of 769 participants have taken part in the MRC program.

"I feel very lucky to have had the opportunity as a young researcher to participate in this MRC program. It is a great way to network, think about new research problems not entirely connected to your dissertation topic, and spend a week in a beautiful setting with people who are passionate about math. I would highly recommend the conference to anyone."

—2014 MRC participant

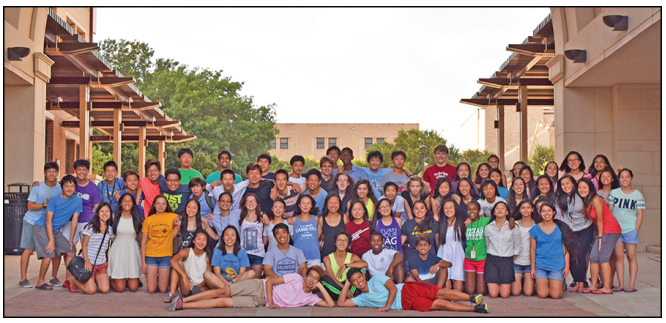
Each year, approximately 300 graduate students receive travel support from the AMS to attend meetings. About 100 students attended JMM in Baltimore with support. They were treated to a brunch where they could meet other students and members of the AMS leadership. The student travel grants are supported 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 to advance and get involved.

`MathJobs.org` and the Employment Center at the JMM remain valued by both employers and job seekers, especially for academic employment. By the end of 2014 MathJobs was serving over 8000 job applicants and 650 employers, including some international employers who began accepting job applications through the system in July 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



Texas State Honors Summer Math Camp, Texas State University, San Marcos.

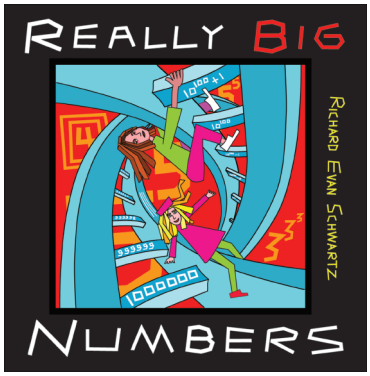
continues to be broadly supported by AMS member-donors. In 2014, the summer camps receiving Epsilon Fund grants hosted over 1,200 students. It is a great program in which a modest amount of funding contributes to the support of a very large number of individual beneficiaries.

AMS Publishing

Mathematical Reviews (MR) completed its 75th year of publishing comprehensive coverage of new research in the mathematical sciences. Over 126,000 items were added to the MR database, including more than 91,000 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 fifteen new Reference List journals in 2014 improves the research-discovery capabilities of MathSciNet®. The strategic planning for MathSciNet® is addressing the challenge.

The Publishing Division under the leadership of Associate Executive Director Robert Harington continues to make major strides in broadening the availability of AMS eBooks. In 2014, the Society launched availability of backfile collections for *Memoirs of the AMS* and for the *Mathematical Surveys and Monographs* series. In all, 220 volumes of *Memoirs* were released, spanning the years 1950 to 2012, and 169 volumes of *Surveys* were released, spanning the years 1943 to 2010. The newly digitized volumes all meet the highest quality standards. The release of other electronic book series continues in 2015.

In 2014, the book program published 74 new titles, of which we are very proud. Two AMS books published in 2014 received noteworthy awards: *Hilbert's Fifth Problem and Related Topics* by Terence Tao received a prestigious American Publishers Award for Professional and Scholarly Excellence (PROSE Award) for the best book published in mathematics in 2014. *Really Big Numbers*, by Richard E. Schwartz, the Society's first book for children ("of all ages"), received an



inaugural Mathical: Books for Kids from Tots to Teens award for books published in 2014.

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. In 2014, the key developers of MathJax™ received funding from the Sloan Foundation to develop capabilities using MathJax™ for embedding semantic markup of mathematical content and for developing capabilities of *handicap accessibility* of mathematics on the web, such as text-to-speech processing. This 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. 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 who 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 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. We also made substantial increases in the pages published annually in the primary subscription journals *Proceedings, Transactions, Mathematics of Computation*, and *Memoirs*.

Advocacy, Partnerships for Mathematics and Science, and Public Awareness

The AMS Public Awareness Office and the Washington, DC Office, as well as many in the profession, are key in 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

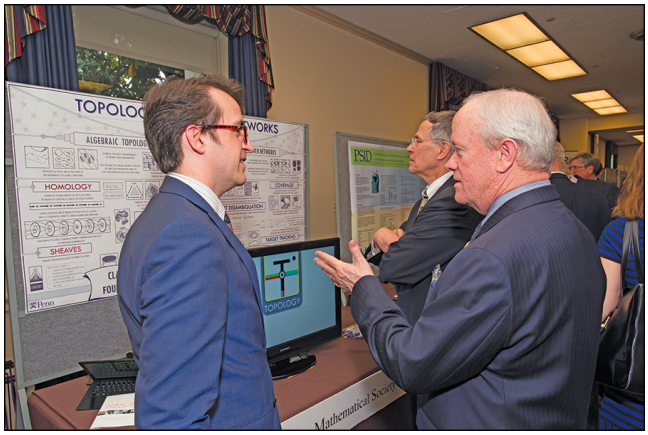


Photo courtesy of Scavone Photography.

Robert Ghrist (L) with US Representatives Jerry McNerney (R) (CA-09) and Rush Holt (back R) (NJ-12).

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. Over 280 attendees came to the May 2014 event on Capitol Hill, where Robert Ghrist (University of Pennsylvania) represented the AMS and presented his work on "Topological Sensor Networks."

For several years, the Committee on Science Policy has combined its annual spring meeting in Washington with "visits to the hill." In March 2014, committee members visited the offices of twenty-nine senators and representatives to have conversations about the state of science funding and to ask for support of budget increases proposed for NSF in FY2015. 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 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 2014, the AMS worked to motivate mathematical scientists to become more proactive in communicating with the public. At JMM 2014, a forum on *The Public Face of Mathematics* was organized jointly by the committees on Education and Science Policy. Moderated by Arthur Benjamin, the panelists included Keith Devlin (Stanford University), Jerry McNerney (US House of Representatives), Cathy O'Neil (Johnson Research Labs), Tom Siegfried (Freelance Science Journalist), and Steven Strogatz (Cornell University). The forum motivated more members of the mathematical sciences community to take initiatives in representing mathematics to the general public and to key audiences of leaders in discussions of public policy.

Strategic Planning

At the May 2013 meeting of the Executive Committee and Board of Trustees, 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 McClure (Executive Director), Emily Riley (CFO), Carla

Savage (Secretary), and David Vogan (President). The committee was later expanded by adding William Jaco (2014 BT Chair) and Robert Bryant (2015–2016 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 and the planning for MathSciNet® had 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 to be 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.

I will close with some of the key findings of the survey.

Top Professional Challenges

90 percent of the respondents work in academia and 10 percent work in a nonacademic setting.

Among the respondents in academia, the three top challenges are:

- Making progress in my research (cited by 45 percent)
- Balancing teaching and research (cited by 36 percent)
- Obtaining grants/funding (cited by 35 percent)

Among the respondents working in a nonacademic setting, the three top challenges are:

- Staying up-to-date on news and trends in the field (cited by 45 percent)
- Making progress in my research (cited by 33 percent)
- Progressing in my career (cited by 26 percent)

Not surprisingly, the top three challenges vary with the years of professional experience. Among the respondents with one to five years of experience, the three top challenges are:

- Getting a job (cited by 52 percent)
- Making progress in my research (cited by 46 percent)
- Progressing in my career (cited by 32 percent)

Among the respondents with twenty or more years of experience, the three top challenges are:

- Making progress in my research (cited by 45 percent)
- Balancing teaching and research (cited by 33 percent)
- Obtaining grants/funding (cited by 33 percent)

Future Priorities

The respondents were also asked to categorize the relative importance of eleven different activities for the AMS. Three categories of priority were possible:

1. Among the most important priorities
2. Somewhat of an important priority
3. Not an important priority

The activities were then ordered 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.

—Donald McClure
Executive Director