AMERICAN MATHEMATICAL SOCIETY
EXECUTIVE COMMITTEE AND BOARD OF TRUSTEES MEETING
MAY 19, 2012

MINUTES

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A joint meeting of the Executive Committee of the Council (EC) and the Board of Trustees (BT) was held Saturday, May 19, 2012, at the AMS Headquarters in Providence, Rhode Island.

All members of the EC were present: Helene Barcelo, Ralph L. Cohen, Robert J. Daverman, Eric M. Friedlander, Bryna Kra, Joseph H. Silverman, and David A. Vogan, Jr.

The following members of the BT were present: Ruth M. Charney, Eric M. Friedlander, Jane M. Hawkins, William H. Jaco, Zbigniew H. Nitecki, and Ronald J. Stern. Karen Vogtmann attended part of the Saturday-afternoon session via Skype. Mark L. Green was unable to attend.

Carla D. Savage (Secretary Elect) was also present.

Also present were the following AMS staff members: Thomas J. Blythe (Chief Information Officer), Graeme Fairweather (Executive Editor, Mathematical Reviews), Sergei Gelfand (Publisher), Ellen H. Heiser (Assistant to the Executive Director [and recording secretary]), Elizabeth A. Huber (Associate Executive Director, Publishing), Robin Marek (Director of Development), Ellen J. Maycock (Associate Executive Director, Meetings and Professional Services), Donald E. McClure (Executive Director), Emily D. Riley (Chief Financial Officer), and Samuel M. Rankin (Associate Executive Director, Washington Office).

President Eric Friedlander presided over the EC and ECBT portions of the meeting (items beginning with 0, 1, or 2). Board Chair Ronald Stern presided over the BT portion of the meeting (items beginning with 3).

Items in these minutes occur in numerical order, which is not necessarily the order in which they were discussed at the meeting.

0	CALL TO ORDER AND ANNOUNCEMENTS

0.1 Opening of the Meeting and Introductions.

President Friedlander called the meeting to order and asked those present to introduce themselves.

0.2 Housekeeping Matters.

Executive Director McClure mentioned some details about the schedule and arrangements for the events that took place during this meeting.

1I	EXECUTIVE COMMITTEE INFORMATION ITEMS

1I.1 Secretariat Business by Mail. Att. #1.

Minutes of Secretariat business by mail during the months December 2011 – May 2012 are attached (#1).

2	EXECUTIVE COMMITTEE AND BOARD OF TRUSTEES ACTION/DISCUSSION ITEMS

2.1 Report on Mathematical Reviews Editorial Committee (MREC).

The ECBT was informed that MREC has not met since the last ECBT meeting. At this time, there is nothing new to report. The next meeting is scheduled for October 8, 2012 in Ann Arbor.

2.2 Report on Committee on Publications (CPub).

The ECBT was informed that CPub's most recent meeting was September 23-24, 2011 in Chicago; a report on that meeting can be found in the November 2011 ECBT minutes. CPub's 2011 Annual Report was presented at the January 2012 Council meeting and is also available on the AMS website (http://www.ams.org/ams/cpub-home.html).

The following 2011 CPub action items were approved by the January 2012 Council:

- Revision of the AMS Policy on Author Charges
- Discontinuation of publication of the Scientific Program of the Joint Mathematics Meetings in *Notices of the AMS*
- Updates to certain book and journal editorial committee charges

CPub's next meeting is scheduled for September 28-29, 2012 at the Hilton Chicago O'Hare Airport Hotel. According to its charge, CPub will conduct an evaluation of the AMS Book Program for presentation at its 2012 meeting. Professor Matthew Ando of the University of Illinois, Urbana-Champaign will serve as Chair of CPub for the period February 1, 2012 – January 31, 2013.

2.3   Report on Committee on the Profession (CoProf).

The ECBT was informed that CoProf held its most recent meeting on September 24-25, 2011, at the Hilton Chicago O'Hare Airport Hotel; a report on that meeting is included in the November 2011 ECBT minutes. CoProf's next meeting is scheduled for September 29-30, 2012, at the Hilton Chicago O'Hare Airport Hotel. The 2011 Annual Report on CoProf activities was presented to the January 2012 Council and is also posted on the AMS website (http://www.ams.org/ams/cprof-home.html).

The Committee selected the Society's activities in the area of employment issues and opportunities as the topic of the 2012 review. The Chair of CoProf for the period February 1, 2012 – January 31, 2013 is Abigail Thompson, of the University of California, Davis.

2.4   Report on Committee on Meetings and Conferences (COMC). Att. #13.

The ECBT received the attached report (#13) on the March 24, 2012 COMC meeting. The Chair of COMC for the period February 1, 2012 – January 31, 2013 is David Farmer of the American Institute of Mathematics.

2.5   Report on Committee on Science Policy (CSP). Att. #2.

The ECBT received the attached report (#2) on the March 16-17, 2012 CSP meeting.

Ken Golden, University of Utah, is the Chair of CSP in 2012.

CSP held a session at the Joint Mathematics Meetings in Boston on January 6, 2012. Dr. Subra Suresh, Director of the National Science Foundation, spoke to meeting attendees on "The Changing Landscape of Research Funding."

2.6   Report on Committee on Education (COE).

The ECBT was informed that the next COE meeting will be held October 18-20, 2012 in Washington, DC.

COE hosted a panel discussion at the Joint Mathematics Meetings in Boston on January 7, 2012 entitled "Models for Engaging Undergraduate Students in Research." Panelists included: Dean Evasius, National Science Foundation; Joe Gallian, University of Minnesota-Duluth; Steven Miller, Williams College (Organizer); Ivelisse Rubio, University of Puerto Rico-Rio

Piedras; Jake Levinson, University of Michigan; and Gina-Maria Pomann, North Carolina State University. The moderator was David Damiano, College of the Holy Cross (Organizer).

Tara Holm, Cornell University, chairs COE in 2012.

2.7   PCAST Report. Att. #12.

The US President's Council of Advisors on Science and Technology (PCAST) released its report entitled "Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics." The report calls for initiatives to improve STEM (science, technology, engineering and mathematics) education during the first two years of college and ultimately place more students on the pathway to pursue STEM majors.

The report makes five overarching recommendations, the third of which is to launch a national experiment in mathematics undergraduate education to address the math preparation gap. This recommendation includes an initiative that would put faculty from other mathematics-intensive disciplines in charge of curricula development and teaching of college mathematics.

An executive summary of the PCAST report and a statement from the White House outlining President Obama's commitments in support of the report's recommendations are attached (#12).

The ECBT discussed the attachment and was informed that a Committee on Education subcommittee is currently working on a response to the PCAST report.

[It is noted for the record that this response was completed shortly after the ECBT meeting and is available here: http://www.ams.org/policy/govnews/pcast-statement]

2.8   Washington Office Report. Att. #3.

The ECBT received the attached report (#3) on the activities of the Washington Office.

2.9   Report on Long Range Planning Committee (LRPC).

The ECBT was informed that the following topics were discussed at the May 18, 2012 LRPC meeting: the AMS response to the PCAST report (see item 2.7 above), whether it is time for the AMS to do strategic planning (see item 2E.1 of the executive session minutes of this meeting), and the role of CSP.

2.10   Report from the President.

President Friedlander reported briefly on the following:

- Last fall, there was discussion of a proposal under consideration by the NSF that its Division of Mathematical Sciences be renamed the Division of Mathematical and Statistical Sciences. NSF has not announced a decision about this yet.
- Status of planning grant for internships in business, industry, and government for graduate students in the mathematical sciences (Math-BIG). See item 2E.3 of the executive session minutes of this meeting.
- Appointments are being made to the new AMS Committee on Women in Mathematics which was approved by the April 2012 Council. The charge to the Committee is as follows:

> In order to support the broadest possible participation of women in mathematics, the Committee on Women in Mathematics (CoWIM) will collect and disseminate data; propose actions to encourage participation, career development and recognition of women in mathematics; and promote best practices within the mathematical community.

- Appointments are being made to the new Web Editorial Group (WEG). The WEG will give attention to the scientific and mathematical content of the AMS website.

2.11   2013 Journal Pages and Prices.

The ECBT approved the following numbers of pages, and the BT approved the following prices, for 2013 journal subscriptions.

	2013 pages	**2013 list prices**
Abstracts of Papers Presented to the AMS*	1,000*	$ 161
Bulletin of the AMS	768	$ 513
Conformal Geometry and Dynamics	350	$ 25
Journal of the AMS	1,200	$ 351
MR Products		
Data Access Fee	NA	$9,199
MathSciNet	NA	$2,369
Mathematics of Computation	2,400	$ 595
Memoirs of the AMS	3,200	$ 795
Notices of the AMS	1,550	$ 547
Proceedings of the AMS	4,200	$1,302
Representation Theory	750	$ 25
St. Petersburg Mathematical Journal*	1,000*	$2,110
Sugaku Expositions	240	$ 235
Theory of Probability and Mathematical Statistics*	375*	$ 806
Transactions of the AMS	6,600	$2,137
Transactions of the Moscow Mathematical Society*	300*	$ 571
*the numbers of pages for these journals are not completely within the staff's control, so they are currently the staff's best estimates and were included in the version of the 2013 budget presented at this meeting.		

2.12   2013 Individual Member Dues.

The process for setting individual dues for year x starts in November of year x-2 when the ECBT makes a recommendation to the Council. The Council then acts on that recommendation and sends it back to the BT for final ratification.

The January 2012 Council approved the BT's recommendation that the 2013 "Regular Member" dues rate for those in the high-income category be set at $176 (this represents a $4 increase over the 2012 rate). The income level cutoff remains at $85,000.

The BT ratified the January 2012 Council's decision.

2.13   2013 Institutional Member Dues.

The ECBT approved an average increase of 3% in institutional member dues for 2013.

2.14   Registration Fees for the January 2013 Joint Mathematics Meetings.

The ECBT reviewed budget summaries for the January 2013 San Diego, California Joint Meetings and exhibits. Based on this information, the ECBT voted to advise the May 2012 Joint Meetings Committee that the member pre-registration fee for this meeting be set at $228 (0%

increase over 2012 fee). [It is noted for the record that the May 2012 Joint Meetings Committee set the member pre-registration fee at $235 (3% increase over 2012 fee).]

2.15   Stipend and Expense Allowance for Centennial Fellowship.

The ECBT approved awarding one Centennial Fellowship for 2013-2014 in the amount of $82,000, with an expense allowance of $8,200.

2.16   Proposal for Student Chapters.

The ECBT was informed that the January 2012 Council unanimously approved the establishment of student chapters organized along the lines described in the "Proposal for the Creation of an AMS Student Chapter Program" which had previously been endorsed by the ECBT, the Committee on the Profession, and the Committee on Education. Staff expects to launch the program in fall 2012 as a pilot program with a few select chapters. The pilot program will help determine how to implement a more ambitious program with a broad call for applications for creation of new chapters in 2013-14.

To date there has been no authorization of funding of the program by the Board of Trustees. It is important to do this for a program which is anticipated to grow to the level of $50,000 to $100,000 per year. The funding needed for 2012 is expected to be immaterial, less than $5,000, and does not need special approval. For 2013, the funding will be discussed as part of the normal budget review and approval process in November 2012. To put these numbers in perspective, the plan for student chapters suggests standard funding of $500 per year for each active chapter.

2.17   Monitoring the Submission of Proposals.

The AMS has substantial support from the Infrastructure Program in the Division of Mathematical Sciences at the National Science Foundation. This program supports Mathematics Research Communities, Math in Moscow, and ICM Travel Grants. NSF occasionally reminds AMS staff that when AMS has multiple proposals pending, AMS is effectively competing against itself.

At the May and November 2011 ECBT meetings, the Board supported the suggestion that the Board, and perhaps the Executive Committee, should be involved in decisions about the Society's priorities for grant funding when choices need to be made. The Executive Director was asked to suggest a procedure for review and approval of planned proposals at this ECBT meeting.

The Executive Director suggested that the same standards used for approval of capital expenditures be used for the approval of proposals to government funding agencies and private foundations. In the case of capital expenditures, Board approval is required for a purchase of $100,000 or more. The approval is usually done at regular meetings of the ECBT, but it can be

done at a special "Meeting by Technical Means." In the case of proposals, staff would try to get approval at regular ECBT meetings.

The ECBT is normally informed of all proposals that are being contemplated. The BT approved the following recommendation regarding proposals of $100,000 or more:

Board authorization is required for the planning, preparation, and submission of proposals of $100,000 or more intended for submission to a government agency or private foundation.

2.18   2013 ABC and ECBT Meetings.

The ECBT approved the following dates and sites for 2013 ABC and ECBT meetings:

ABC	April 5, 2013 (Friday)	by conference call
ECBT	May 17-18, 2013 (Friday-Saturday)	Ann Arbor, Michigan
ABC	October 11, 2013 (Friday)	Providence, Rhode Island
ECBT	November 22-23, 2013 (Friday-Saturday)	Providence, Rhode Island

It was noted that the members of the ABC in 2013 will be: Green, Hawkins, Nitecki, Savage, and Vogan.

2C   EXECUTIVE COMMITTEE AND BOARD OF TRUSTEES CONSENT ITEMS

2C.1   AMS Membership for the AMS/AAAS Congressional Fellow.

The ECBT approved the recommendation that the Congressional Fellow supported by the AMS be given a complimentary "Regular" membership in the Society if he or she is not already a "Regular" member. The membership should cover the period of the fellowship including the full calendar year in which the fellowship ends.

2C.2   November 2011 ECBT Meeting.

The ECBT approved the minutes of the meeting of the Executive Committee and Board of Trustees held November 18-19, 2011, in Providence, Rhode Island, that had been distributed separately. These minutes include:

- ECBT open minutes prepared by the Secretary of the Society (http://www.ams.org/secretary/ecbt-minutes/ecbt-minutes-1111.pdf),
- ECBT executive session minutes prepared by the Secretary of the Society

See also item 3C.1.

2I	EXECUTIVE COMMITTEE AND BOARD OF TRUSTEES INFORMATION ITEMS

2I.1 **State of the AMS**. Att. #7.

The Executive Director's annual report to the spring Council is attached (#7).

2I.2 **Changes in Registration Fees for Conferences, Employment Center, Mathjobs, and Short Course**. Att. #18.

The Executive Director is authorized to make changes in registration fees for conferences, Employment Information in the Mathematical Sciences (EIMS), the Employment Center and Short Courses held at the Joint Mathematics Meetings, MathJobs.org, and MathPrograms.org.

Att. #18 reports the changes authorized since the last ECBT meeting.

2I.3 **AMS Presence at Annual SACNAS Meeting**. Att. #19.

The AMS provides $5,000 toward support of the mathematics program at the annual national meeting of the Society for Advancement of Chicanos and Native Americans in Science (SACNAS). Public Awareness Officers Annette Emerson and Michael Breen represented the AMS at the most recent meeting October 27-30, 2011 in San Jose, California. There was also a session of the game, "Who Wants to be a Mathematician," that was very popular. Att #19 is a report on the activities related to mathematics at this meeting.

SACNAS has shown itself to be highly effective at nurturing talented undergraduates from within their target communities to successful completion of graduate degrees in science and mathematics. AMS's continuing support for and presence at the SACNAS national meetings has enabled it to build strong ties within this community of scholars committed to excellence.

2I.4 **Epsilon Awards for Young Scholars Programs**. Att. #20.

In 1999, the Epsilon Fund was created by the Society to provide support for the Young Scholars Program. The Program awards grants, which support student scholarships and program operating costs, to selected summer programs for mathematically talented high school students. This year, the Young Scholars Awards Committee evaluated 17 applications for support from the Epsilon Fund, and recommended funding 13 of them. The members of the Committee are: Irwin Kra, Rafe Mazzeo (chair), Brian Hunt and Zvezdelina Stankova. A list of the programs funded for summer 2012 is attached (#20).

2I.5 **Report on AAAS Meeting**. Att. #8.

A report on the AMS-supported activities at the 2012 annual meeting of the American Association for the Advancement of Science (AAAS) is attached (#8).

2I.6   <u>2012-2013 AMS Centennial Fellowship.</u>

The AMS Centennial Fellowship Committee has announced that Karin Hanley Melnick (University of Maryland) is the winner of the 2012 Fellowship competition. Melnick has accepted the award. The amount of this fellowship for 2012-2013 is $80,000, with an additional expense allowance of $8,000.

2I.7   <u>AAAS-AMS Mass Media Fellowship.</u>

The AMS will sponsor Evelyn Lamb as its 2012 Mass Media Fellow. Evelyn is a graduate student in mathematics at Rice University and will work at *Scientific American* this summer.

The Mass Media Fellowship program is organized by the American Association for the Advancement of Science (AAAS) and is intended to strengthen the connections between science and the media, to improve public understanding of science, and to sharpen the ability of the fellows to communicate complex scientific issues to non-specialists. It is a 10-week summer program that places graduate and post-graduate level science, engineering and mathematics students at media organizations nationwide.

An announcement of the AMS Mass Media Fellow for 2012 will be made in the *Notices* and it has been posted on the AMS website.

2I.8   <u>Congressional Fellow.</u>

The AMS, in conjunction with the American Association for the Advancement of Science (AAAS), will again sponsor a Congressional Fellow from September 2012 through August 2013.

The Fellow will spend a year working on the staff of a Member of Congress or a congressional committee, working as a special legislative assistant in legislative and policy areas requiring scientific and technical input.

The fellowship is designed to provide a unique public policy learning experience, to demonstrate the value of science-government interaction, and to bring a technical background and external perspective to the decision-making process in the Congress.

Applications invited from individuals in the mathematical sciences are currently being reviewed and a selection will be made shortly. An announcement of the AMS Congressional Fellow for 2012-13 will be made in the *Notices* and posted on the AMS website.

2I.9   Using AMS Points to Donate to Book Donation Program.

The November 2008 ECBT approved a trial plan to allow AMS Points to be used for donations to the Book and Journal Donation Program. The results of the trial were to be reviewed at the May 2010 ECBT meeting. The trial was postponed until the new association management software is operational. Thus the review of the trial was also postponed. Staff now expects that the earliest the trial can take place is in 2013, with a review to be presented at the May 2014 ECBT meeting.

2I.10   New Travel Reimbursement Level for Policy Committees and MREC.

For many years, the Mathematical Reviews Editorial Committee (MREC) has included among its members one representative from Europe and one representative from Japan. MREC reaches out to include distinguished members from abroad among its members. Because it is extremely demanding to ask a person to fly from Tokyo (or a European country) to Detroit for a one day meeting, the Executive Director, in consultation with the Secretary, is implementing a new level of travel reimbursement ("Level P") for members of MREC and the five Policy Committees whose domicile is abroad. Such foreign members may now be reimbursed for Business Class travel with the prior approval of the Executive Director and the Secretary.

2I.11   Report on Use of Funds Collected for FIMU on AMS Membership Renewal Form.

The Executive Director agreed to report to the ECBT on the use of contributions made by AMS members to Friends of the International Mathematical Union (FIMU) for support of mathematicians in developing countries. From 1989 until June 2011, the contributions were given to the *IMU Special Development Fund* that supports travel to the International Congress of Mathematicians (ICM) every four years. Starting in July 2011, the use of the funds was broadened to possibly support needs other than travel. In particular, the membership renewal form now contains the words *"Contribution to Friends of the International Mathematical Union to foster mathematics research and scholarship in developing countries."*

From January to June 2011, contributions totaling $3,107 were received. This amount will be designated for the *IMU Special Development Fund* and will support travel by mathematicians from developing countries to attend ICM2014 in Seoul, Korea or to attend an ICM after 2014.

From July through December 2011, contributions totaling $14,259 were received. Martin Groetschel, Secretary of the IMU, reports that these funds will be held as temporarily restricted assets until the needs for travel support for ICM2014 are better known. If needed, the funds will be used to support travel by mathematicians from developing countries to attend ICM2014. If the funds are not used for ICM2014 travel, they will be used to support programs of the IMU Commission for Developing Countries (CDC). One program that CDC has identified as a priority is AMMSI, a scholarship program for graduate students in sub-Saharan Africa.

2I.12   Associate Secretary Vacancy.

Matthew Miller, Associate Secretary for the Southeastern Section, has stepped down from that post. A search committee consisting of Ruth Charney, Carla Savage, Joseph Silverman and Robert Daverman (Chair) has been formed to identify his successor.

3	**BOARD OF TRUSTEES** **ACTION/DISCUSSION ITEMS**

3.1   Financial Review.

3.1.1   Discussion of Fiscal Reports.

The BT received and discussed various fiscal reports. Approval of the 2013 budget will be requested at the November 2012 ECBT meeting.

3.1.2   Capital Expenditures – 2011 and 2012 Capital Purchase Plans. *RILEY*.

Capital purchases in 2011 totaled $379,683, compared to a budgeted amount of $1,526,760. The purchases were under budget primarily due to the delay in the Personify project implementation.

The 2012 capital budget totals $1,675,000 and includes the purchase and implementation costs of the new Personify Association Management Software system at $1,209,500. In addition, some Mathematical Reviews improvement projects, such as upgrades in furniture, were delayed until 2012.

3.1.3   Capital Expenditures - Approval of Specific Purchases.

This item is reserved for requests for authorization to make specific large purchases (items costing $100,000 or more). There were no such requests at this meeting.

3.2   Spendable Income, Operations Support Fund and Other Related Items. Att. #9.

The Society uses its long-term investments for several purposes, and for that reason it divides its investments into various funds. The following five standing items deal with those funds – additions, transfers and spending.

The description of the way in which the AMS uses its long-term investment portfolio is summarized in the diagram in Att. #9, which has labels showing how the five parts of Item 3.2 are connected to the process.

3.2.1   Addition to Operations Support Fund (OSF).

At its November 2011 meeting, the Board approved the staff recommendation that the amount owed to operations[1] from the long-term investment portfolio at December 31, 2011 would remain there and be officially added to the OSF. The total added to the OSF was $1,958,238.

At December 31, 2011 the Society's current assets totaled $19,571,648 and its current liabilities totaled approximately $16,096,890 resulting in a current ratio[2] of 1.2 to 1. In the past, the Society has targeted a ratio of 1 to 1 for current assets to current liabilities. The current ratio is slightly lower than the ratio in 2010, due to the transfer of operating funds into the OSF during 2011.

Each year, the operating portfolio, current ratio, and other factors are evaluated to determine if additions can be made to the OSF. The last addition was $2,000,000, approved to be added to the OSF at the May 2011 ECBT meeting. The BT was informed it does not appear that there is excess cash in operations at this time to move to the OSF, even though the current ratio exceeds the target of 1 to 1.

3.2.2   Rebalancing of Economic Stabilization and Operations Support Funds.

Under the policy adopted by the May 2006 Board of Trustees, at the end of each fiscal year the allocated values of the Economic Stabilization Fund (ESF) and the Operations Support Fund (OSF) are rebalanced such that the ESF always equals the target balance.

The amount and direction of the rebalancing required at each year end is principally dependent upon the return on the long-term investment portfolio in any year. It was reported that this return was approximately -0.11% for 2011; accordingly, the OSF transferred approximately $743,649 to the ESF at the end of 2011. In addition to the negative return affecting the amount transferred, the post-retirement benefit plan liability increased significantly, which increased the amount needed to fund the ESF. There was a decrease in the discount rate used to calculate the net present value of future benefit payments, thus increasing the liability.

3.2.3   Allocation of Operations Support Fund (OSF) Spendable Income.

The May 2001 Board of Trustees approved the following:

Income from reserves should be allocated to each year's budget to service
and outreach programs of the Society (without specifying exactly which

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[1] The amount owed to operations arises as a result of spendable income netted against contributions to endowment and Board designated funds.

[2] The current ratio is the Society's current assets from the balance sheet divided by the current liabilities. It is a liquidity ratio that measures the Society's ability to pay short-term obligations. A ratio under 1 generally suggests that an organization would not be able to pay its short-term obligation if they came due at that point in time.

programs). The total amount should be approved by the May ECBT, when revenue projections for the following year are made.

The spendable income from the OSF for 2011 and 2012, determined according to the guidelines approved by the BT is $1,645,100 and $1,744,100 respectively. The 2012 amount had been previously approved. The amount available for 2013 is $1,798,000.

The BT approved Chief Financial Officer Riley's recommendation that $1,798,000 be designated as OSF spendable income for 2013.

3.2.4   Appropriation of Spendable Income from Unrestricted Endowment.

The May 2001 Board of Trustees approved the following:

Each year, the budgeting process will include recommendations for allocating spendable income from the Unrestricted Endowment for specific projects. The allocated income will be treated as revenue for operations, offsetting (part of) the expenses. These recommendations will be brought to the Board for approval at its November meeting in the normal budgeting process. The goal will not be to use all the income from such funds each year, but rather to use some of the income every year for the support of mathematical research and scholarship. Using such income should be a regular part of our operations rather than an exceptional situation.

The BT was informed that the 2013 preliminary revenue budget includes the full amount of 2013 spendable income from unrestricted true endowment funds under the assumption that appropriate projects will be designated to receive the income. The amounts budgeted for 2012 and 2013 are $266,400 and $251,300 respectively. The BT will vote on the use of the spendable income in 2013 by specific projects at its November 2012 meeting.

3.2.5   Report on Changes in Appropriated Spendable Income.

The Executive Director has the authority to transfer spendable income that will not be used on an approved project to another approved project, in case additional support is needed. There will be no transfer of spendable income at this time. In 2011, approximately $65,000 in spendable income was not used. These funds are designated for the Young Scholars Camp Conference in 2012 or 2013 ($60,000) and an archiving project ($5,000).

3.3   Audit Committee. Att. #29.

Audit Committee Chair Jane Hawkins reported that the Committee met on May 18, 2012 with the following representatives from the auditing firm of CBIZ Tofias:

- Michael Burns, Managing Director
- Craig Klein, Managing Director
- Joyce Masse, Director/Principal

to hear a report on the 2011 audit and to review the audited financial statements for the years ended December 31, 2011 and 2010 (drafts of these documents had been provided separately prior to the meeting to all members of the BT). Several other BT and staff members attended the meeting, and the Audit Committee also met privately with the CBIZ Tofias representatives.

Upon recommendation of the Audit Committee, the BT voted to accept the draft audited financial statements for the years ended December 31, 2011 and 2010 and delegate to management final resolution of minor edits and issuance of the final statements. The final statements are attached (#29).

3.4 <u>Investment Committee</u>. Att. #27.

Investment Committee Chair Jane Hawkins reported that the Committee met on May 18, 2012 and discussed the following matters:

- current portfolio returns
- current asset allocation
- spending rate and spendable income
- asset allocation policy

The Committee reviews the endowment and quasi-endowment spending rate every five years and makes a recommendation to the BT. Such a recommendation was due to be made at the present meeting, and the Committee did consider the attached proposal (#27) to lower the spending rate. The BT was informed that the Committee would like to consider the proposal further and then make a recommendation to the November 2012 BT. The BT had no objection.

3.5 <u>Cash Management and the Operating Portfolio</u>. Att. #10.

The BT received the attached report (#10) summarizing the Society's cash management policies and short-term investment performance during 2011.

3.6 <u>Report on the Personify Project</u>. Att. #11.

The BT was informed that progress continues on the implementation of the Personify association management software from TMA Resources (TMAR) with a targeted "go live" date of August 2012. After consulting with TMAR and AMS staff, it was determined that the initial runs of 2013 dues and subscription renewals should be performed using the existing system, before conversion to Personify. These renewals will run in June and July and Personify implementation is scheduled for August. A detailed report is attached (#11).

3.7   Meeting of the Mathematical Reviews Corporation.

In 1983, when the building that currently houses Mathematical Reviews was purchased, a Michigan non-profit corporation was formed in order to obtain exemption from local property taxes in Ann Arbor and from sales and use taxes in Michigan. In order to maintain these exemptions, the corporation ("Mathematical Reviews") must be maintained by holding an annual meeting at which the Officers and Directors of the corporation are elected.

The AMS Board of Trustees meeting was therefore temporarily adjourned, and the AMS Trustees convened as the Board of Directors of the Mathematical Reviews Corporation.

The Board of Directors of the Mathematical Reviews Corporation elected the following officers:

President of the Corporation:	Ronald J. Stern
Treasurer of the Corporation:	Jane M. Hawkins
Secretary of the Corporation:	Zbigniew H. Nitecki
Directors of the Corporation:	Ruth M. Charney
	Eric M. Friedlander
	Mark L. Green
	William H. Jaco
	Karen Vogtmann

The meeting of the Board of Directors of the Mathematical Reviews Corporation then adjourned and the meeting of the AMS Board of Trustees reconvened.

3C   BOARD OF TRUSTEES **CONSENT ITEMS**

3C.1   November 2011 BT Closed Executive Session Meeting.

The BT approved the minutes of the closed executive session meeting of the Board of Trustees held November 19, 2011, in Providence, Rhode Island, which had been distributed separately by 2011 Secretary of the Board Stern.

3C.2   Procedures for the Appeals for Discounted Subscriptions.

The BT approved the use of the following guidelines for 2013:

- Minimum price for MR Data Access Fee (DAF) of $200 applicable to institutions in countries found in the two poorest World Bank country listing. Staff can provide this level of discount even if the country does not have a national DAF.
- The discounted price for MR DAF for domestic institutions would not be lower than the greater of 40% of a list price DAF or 40% of the institution's mathematical sciences serials budget, not to exceed regular list price for a DAF.

- The discounted price for MR DAF for non-domestic institutions not included in the first category above would not be lower than 40% of a DAF. To the extent possible, information about serials budgets would also be collected, and, if desired, staff would provide information on publishing activity at the institution.
- Allowable prices for MathSciNet can be no less than the lowest published price.
- For other AMS journals, the lowest allowable price would be marginal cost, applicable to the most desperate cases.
- Participation is restricted to academic institutions.

3C.3   **Resolutions for Retirees.**

The BT approved the following proclamations for employees who retired recently or will retire prior to the next Board meeting:

Be it resolved that the Trustees accept the retirement of **Leslie DiPierro** *with deep appreciation for her faithful service over a period of 42 years. The Board expresses its profound gratitude for this long record of faithful service. It is through the dedication and service of its employees that the Society is able to effectively serve its members and the greater mathematical community. The Trustees offer Leslie their special thanks and heartfelt good wishes for a happy and well-deserved retirement.*

Be it resolved that the Trustees accept the retirement of **Michelle Ogilvie** *with deep appreciation for her faithful service over a period of 25 years. The Board expresses its profound gratitude for this long record of faithful service. It is through the dedication and service of its employees that the Society is able to effectively serve its members and the greater mathematical community. The Trustees offer Michelle their special thanks and heartfelt good wishes for a happy and well-deserved retirement.*

Be it resolved that the Trustees accept the retirement of **Maxine Wolfson** *with deep appreciation for her faithful service over a period of 27 years. The Board expresses its profound gratitude for this long record of faithful service. It is through the dedication and service of its employees that the Society is able to effectively serve its members and the greater mathematical community. The Trustees offer Maxine their special thanks and heartfelt good wishes for a happy and well-deserved retirement.*

3C.4   **Retirement Plan Amendment.**   **Att. #21.**

The BT approved the attached amendments (Att. #21) to the AMS Retirement Plan to clarify certain vesting and eligibility provisions of the Plan and to insure the Plan complies with various sections of the Internal Revenue Code (IRC).

3C.5   Tax-Deferred Annuity Plan Amendment. Att. #22.

The BT approved the attached amendments (Att. #22) to the AMS Tax-Deferred Annuity Plan to clarify certain eligibility provisions of the Plan to insure the Plan complies with the Internal Revenue Code.

3C.6   Proposal for 2015 Summer Institute in Algebraic Geometry. Att. #28.

In November 2011, the AMS was approached with a request to handle arrangements for a Summer Institute in Algebraic Geometry in summer 2015. Since a positive response would lead to submission of a proposal in excess of $100,000 to the NSF, the Executive Director consulted the BT by email. The result of the email conversation was unanimous agreement of those participating to respond positively to the request (one member of the Board did not participate in the discussion). Specifically, consent was expressed to proceed with planning the summer institute and preparing proposals. Att. #28 describes the request, what it would require in terms of AMS support, and discussions with the NSF. The BT ratified the approval voiced in the email discussion.

3C.7   Expenditure from the Program Development Fund.

During the 1990s, the AMS received contributions from members for the Program Development Fund. Contributions were made through a check off on the membership renewal form. The Program Development Fund was to be used at the discretion of the Board to pay start-up costs for a new program not otherwise funded through revenues generated by the program.

In a review in 2011 of temporarily restricted assets, the Chief Financial Officer discovered that the fund had a balance of $13,015. The Executive Director, who was familiar with the purpose of the fund, approved the use of the $13,015 for pilot projects and planning for eBooks. Additional funds for this same purpose ($50,000) were appropriated from spendable income from the unrestricted endowment.

The Executive Director and Chief Financial Officer were not aware at the time that expenditures from the Program Development Fund should have Board approval. This came to their attention in April 2012 when reviewing the history of the fund and seeing ECBT Minutes from 1992 and 1997. In order to assure that the requirements for the use of the donated funds are met, the Board's approval was now sought.

The Board approved the 2011 expenditure of $13,015 from the Program Development Fund for pilot projects related to development of eBooks.

3I	**BOARD OF TRUSTEES**
	INFORMATION ITEMS

3I.1 **Minor Changes in Fringe Benefits.**

The November 1996 BT authorized the Executive Director to approve changes in benefit plans (except for those changes which would significantly enhance or degrade the Society's financial health or relations with its employees) and asked that these changes be reported to the BT when appropriate. No changes have been made since the last ECBT meeting.

Respectfully submitted,

Robert J. Daverman, Secretary
Knoxville, Tennessee
July 6, 2012
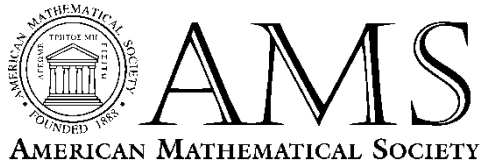
SECRETARIAT
Business by Mail
December 1, 2011

MINUTES
from the Ballot dated November 1, 2011

There were four votes cast by Georgia Benkart, Robert Daverman, Michel Lapidus and Steven Weintraub.

1. Approved electing to membership the individuals named on the list dated October 20, 2011.

2. Approved (Inst ID: PONUCAT-LIM) Pontifica Univ Catolica, San Miguel, Lima, PERU, for International Institutional Membership.

3. Approved the minutes of the Secretariat Business by Mail from the ballot dated October 3, 2011.

Robert J. Daverman

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AMERICAN MATHEMATICAL SOCIETY

SECRETARIAT
Business by Mail
January 9, 2012

MINUTES
from the Ballot dated December 1, 2011

There were four votes cast by Georgia Benkart, Robert Daverman, Michel Lapidus and Steven Weintraub.

1. Approved electing to membership the individuals named on the list dated November 20, 2011.

2. Approved holding a meeting of the AMS Central Section at Texas Tech University in Lubbock, Texas, on April 11-13, 2014.

3. Approved the minutes of the Secretariat Business by Mail from the ballot dated November 1, 2011.

Robert J. Daverman
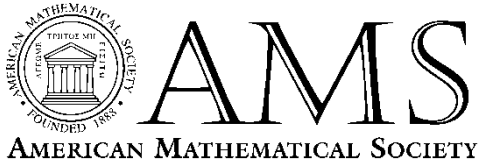
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Robert J. Daverman, Secretary
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SECRETARIAT
Business by Mail
February 1, 2012

MINUTES
from the Ballot dated January 9, 2012

There were five votes cast by Georgia Benkart, Robert Daverman, Michel Lapidus, Matthew Miller and Steven Weintraub.

1. Approved electing to membership the individuals named on the list dated December 20, 2011.

2. Approved holding an AMS Central Section meeting at the University of Wisconsin-Eau Claire in Eau Claire, Wisconsin, on Sept. 20-21, 2014.

3. Approved holding a Western Sectional Meeting at the University of Colorado in Boulder, Colorado, on April 13-14, 2013.

4. Approved the minutes of the Secretariat Business by Mail from the ballot dated December 1, 2011.

Robert J. Daverman
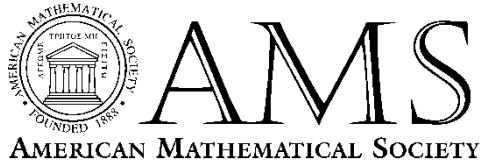
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**SECRETARIAT
Business by Mail
March 1, 2012**

**MINUTES
from the Ballot dated February 1, 2012**

There were five votes cast by Georgia Benkart, Robert Daverman, Michel Lapidus, Matthew Miller and Steven Weintraub.

1. Approved electing to membership the individuals named on the list dated January 20, 2012.

2. Approved holding a Council meeting on 20 April 2013 in Chicago, Illinois, at facility near O'Hare Airport.

3. Approved ratifying action taken by an email exchange in January 2012 to approve designating the David Blackwell Memorial Conference, to be held April 19-20, 2012, as being done "in cooperation with" the AMS.

4. Approved the minutes of the Secretariat Business by Mail from the ballot dated January 9, 2012.

Robert J. Daverman
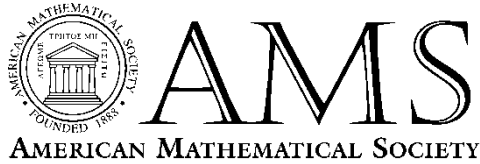
SECRETARIAT
Business by Mail
April 2, 2012

MINUTES
from the Ballot dated March 1, 2012

There were five votes cast by Georgia Benkart, Robert Daverman, Michel Lapidus, Matthew Miller and Steven Weintraub.

1. Approved electing to membership the individuals named on the list dated February 20, 2012.

2. Approved holding an AMS Western Sectional Meeting at San Francisco State University in San Francisco, CA, on October 25-26, 2014.

3. Approved holding a meeting of the AMS Western Section at the University of New Mexico in Albuquerque, NM, on April 5-6, 2014.

4. Approved the minutes of the Secretariat Business by Mail from the ballot dated February 1, 2012.

Robert J. Daverman

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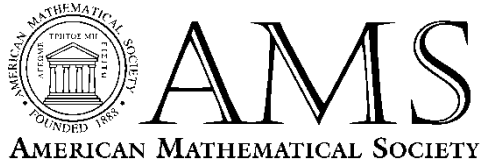Email: daverman@math.utk.edu

SECRETARIAT
Business by Mail
May 1, 2012

MINUTES
from the Ballot dated April 2, 2012

There were four votes cast by Georgia Benkart, Robert Daverman, Michel Lapidus and Steven Weintraub.

1.   Approved electing to membership the individuals named on the list dated March 20, 2012.

2.   ***Vote on the following item was postponed – no action taken.***
"Approve holding 'An International Conference on the Laws of Form, honoring Spencer Brown's 90th anniversary' in cooperation with the AMS. Conference locale: England; Date: September 2012.

3.   Approved holding an "International Conference on Group Theory, Combinatorics, and Computing" in Cooperation with the AMS. Conference Date: October 3-8, 2012; Conference Locale: Florida Atlantic University (FAU), Boca Raton, Florida.

4.   Approved the minutes of the Secretariat Business by Mail from the ballot dated March 1, 2012.

Robert J. Daverman

American Mathematical Society
Committee on Science Policy Meeting
March 16-17, 2012
Washington, DC

Summary

The 2012 Committee on Science Policy (CSP) meeting consisted of presentations and discussions over a day and a half. Attendees included committee members, a number of chairs of departments of mathematics from around the country and guests.

Highlights from presentations:

Dahlia Sokolov
Democratic Staff Director, Subcommittee on Research and Education
House Committee on Science, Space and Technology
Dahlia Sokolov gave her perspective on the outlook for STEM research and education in 2012. She mentioned that there were a number of hearings held last year on STEM education, but they were focused mostly on private sector activities. She is anticipating hearings on federal activities in STEM during the coming year, as well as on ways to better measure the impact of efforts in STEM education.

Sokolov also spoke about the diverging views between the two parties on the role of the federal government in supporting the research and science agenda. The elections this year also bring uncertainty as to how things will play out.

Tom Culligan
Legislative Director, Office of Rep. Frank Wolf (R-VA-10)
Tom Culligan spoke about the provisions in the Budget Control Act of 2011. He pointed out that the Act impacts discretionary, non-defense spending in FY 2012 and FY2013. Additionally, the elections this fall, the promise of across-the-board cuts (sequestration), tax reform, deficit reduction, the expiration of the Bush tax cuts, and other budget interests are coming together at once to make predictions of federal support for science and education programs impossible.

There was general discussion on how the mathematics community can contribute to the conversation on Capitol Hill about the importance of science. Culligan said that talking about the ways that research gives back to society is important for lawmakers to hear and he encouraged the group to develop relationships with representatives to further this understanding.

Tom Statler
Program Director, Division of Astronomical Sciences
National Science Foundation
Tom Statler spoke to the group about initiatives at the National Science Foundation in expanding public access to research results and he provided definitions, background and context to NSF activities related to 'open access.' He mentioned that data management plans have been required in all NSF proposals since January 2011 and he talked about NSF's commitment to setting priorities and establishing policies to further public access to high-value digital products of NSF-funded research.

Statler described an internal working group at NSF that is looking at alternatives for open access publishing. He also talked about the challenges to an open access transition and the pilot projects that are underway that will aid in the assessment of how to proceed.

Joan Ferrini-Mundy
Assistant Director, Directorate for Education and Human Resources
National Science Foundation

Joan Ferrini-Mundy's presentation was centered on undergraduate STEM education, particularly the recently released President's Council of Advisors on Science and Technology (PCAST) report entitled "Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics," which provides a strategy for improving STEM education during the first two years of college. The report presents five broad recommendations to increase the number of college graduates in STEM fields in the next ten years. She spoke particularly to the recommendation for a national experiment in mathematics undergraduate education at NSF, the Department of Labor and the Department of Education, which includes an approach that would have curricula development and teaching of college mathematics done by faculty from mathematics-intensive disciplines other than mathematics.

Ferrini-Mundy also described several NSF programs that address STEM education, including Transforming Undergraduate Education in STEM Programs (TUES), a signature program of the NSF Directorate for Education and Human Resources (EHR) that supports innovations in teaching and learning. This program, along with the new WIDER, E² and collaborations with the Department of Education are at the core of EHR undergraduate efforts. Jennifer Slimowitz-Pearl (NSF/MPS-DMS) also spoke briefly about the NSF's K-16 mathematics initiatives.

Richard Yamada
AMS Congressional Fellow
Office of Senator John Boozman (R-AZ)
Richard Yamada gave his impressions of how the federal government works from his perspective as a Congressional Fellow working in a Senate office. He spoke about the difficulty of trying to balance stakeholder needs when it comes to federal spending and other legislative priorities. He also talked about the role of lobbyists and his impression that issues are more likely to be regional than political.

Hans Kaper
SIAM Committee on Science Policy
Math & Comp Sci Division, Argonne National Laboratory
Hans Kaper gave a presentation about how the Committee on Science Policy of the Society for Industrial and Applied Mathematics (SIAM) operates. He shared their committee charge and composition guidelines, as well as their membership list and information on their meetings schedule and broad activities under the direction of a private government relations firm.

The SIAM Committee on Science Policy meets twice per year – in the fall to prepare for the following year and in the spring to advocate policy priorities in Congress. The committee may also advocate for or against particular legislative issues when necessary throughout the year and will provide input when requested by outside concerns. If the committee is to take a position on something or write a report, it is done with the guidance of the SIAM Council.

Sastry Pantula
Director, Division of Mathematical Sciences (DMS)
Directorate for Mathematical and Physical Sciences (MPS), National Science Foundation
Sastry Pantula began his presentation by asking the mathematics community to help identify new program officers for NSF/MPS-DMS and encourage people to apply, including for the Assistant Director position at MPS. He then talked about the new "One NSF" framework and the priority areas for MPS in 2013, including INSPIRE and Expeditions in Education (E²); Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21); and Cyber-Enabled Materials, Manufacturing, and Smart Systems (CEMMSS).

Pantula then discussed funding at the NSF, particularly within MPS, the largest directorate. He said that although the MPS budget as presented in the President's Request for FY2013 is up 2.8%, the reality is that it is still down compared to FY2010. With budgets shrinking, he encouraged the mathematics community to help set the budget drivers.

Other Discussion
There was discussion on how to make the Committee on Science Policy more effective -- this centered on the structure of future Committee on Science Policy meetings. It was decided that the meeting dates for 2013 will be Thursday - Friday, March 14-15. The meeting will begin with an orientation and training session beginning mid-day Thursday and culminate with visits to Congressional offices on Friday. This type of CSP meeting will need to be ongoing in order to build the relationships necessary to make these efforts effective. There were also a few other suggestions for CSP activities, including providing opinion pieces for the Notices and raising awareness of the issues involved in the data deluge.

Another subject discussed at some length was the PCAST Report. It was noted that there was no mathematician on the council of advisors and although the recommendations in the report are not a mandate, the committee felt that the AMS should respond to the report. It was suggested that the AMS Committee on Education (COE) have a forum at the Joint Meetings related to the issue of undergraduate teaching. Also, COE could assemble a working group to collect documentation of exemplary programs and anecdotal stories of what is already being done to address the issue of getting more undergraduate students to pursue STEM majors. Tara Holm, the Chairs of COE, will identify individuals to spearhead this effort. Bob Daverman and Eric Friedlander also volunteered to help assemble the working group.

Committee on Science Policy Events at the 2012 Joint Mathematics Meeting
The committee now has one slot at the Joint Mathematics Meetings each year and the committee discussed making a presentation on the issue of Open Access at the 2013 JMM in San Diego, CA.

Date of Next Meeting
The 2013 Committee on Science Policy meeting will be held on March 14-15, 2013 in Washington, DC.

Submitted by Anita Benjamin
American Mathematical Society
April 20, 2012

Washington Office Report
April 19, 2012

FY 2012 Appropriations bills were passed in two stages in 2011. The first stage included three appropriations bills signed into law on Novermber 18, 2011: Agriculture, Rural Development, Food and Drug Administration, and Related Agencies; Commerce, Justice, Science, and Related Agencies; Transportation, Housing and Urban Development, and Related Agencies. The remaining nine appropriations bills were signed into law on December 23, 2011. The NSF received a $7.03 billion FY 2012 budget, a $120.55 million or 1.7 percent increase over FY 2011, while the Division of Mathematical Sciences (DMS) received $237.77 million, a $2.02 million or 0.8 percent decrease.

The Office of Science of the Department of Energy (DOE) received a FY 2012 budget of $4.874 billion, a $23 million or 0.5 percent decrease from FY 2011, while the Applied Mathematics program received $45.60 million, the same level as the FY 2011 budget. The Scientific Discovery through Advanced Computing (SciDAC) program received $44.25 million for FY 2012, a $8.56 million or 15.8 percent decrease from FY 2011. Mathematics is funded mainly through these two DOE programs.

As you may recall, the House Appropriations Committee had passed a Commerce, Justice, Science and Related Agencies (CJS) Appropriations bill that provided NSF with a FY 2012 budget of $6,859,867,000, the same as the FY 2011 NSF budget level. The Senate Appropriations Committee had approved a bill that gave NSF a budget of $6,698,095,000 or $161,772,000 below the FY 2011 NSF budget. During conference negotiations, Congressman Frank Wolf (R-VA) was adamant about funding the NSF adequately and worked a deal that provided NSF with a $7.03 billion budget. If not for Congressman Wolf's actions, it is very likely that NSF would have received at best the FY 2011 NSF budget level for FY 2012, but most likely would have received a decrease from the FY 2011 budget level.

The FY 2013 Budget Request was announced on February 13, 2012. The NSF budget Request is $7.37 billion, an increase of $340 million or 4.8 percent over FY 2012. The DMS request is $245 million, a $7.23 million or 3.0 percent increase over the FY 2012 budget level. The Office of Science FY 2013 Budget Request is $4.99 billion, a $12 million or $2.5 percent over the FY 2012 budget level. The Applied Mathematics Program Request is $49.50, a $3.9 million or an 8.6 percent increase and the SciDAC Request is $56.78 million, a $12.53 million or a 28.3 percent increase, over FY 2012 levels.

The introduction of the Budget Request begins the congressional appropriations process so the Budget Request numbers will not be the final FY 2013 budget levels for federal programs. In fact, these numbers may be reduced dramatically. Already, a political budget battle is brewing. The House Budget Committee has passed a Budget Resolution that provides a FY 2013 discretionary budget spending limit of $1.028 trillion. This is $19 billion less than the FY 2013 spending limit of $1.047 trillion allowed by the Budget Control Act, passed last summer. Senator Reid, Majority Leader of the Senate, has indicated that the Senate will use $1.047 trillion

as the discretionary spending limit. The spending limit gap between the two chambers guarantees that the House and Senate will have many differences in the allocation of discretionary funds, making final passage of appropriations bills difficult.

The difference in spending caps is not the only problem hindering the development of a FY 2013 budget. Since the Joint Select Committee on Deficit Reduction (JSCDR) did not come up with a plan to reduce the deficit by $1.2 trillion to $1.5 trillion, an automatic "trigger" goes in to effect in January, 2013. The trigger mandates the Office of Management and Budget to order across-the-board cuts in defense and non-defense discretionary spending, Medicare, farm and housing subsidies, and a few other smaller entitlements. Roughly, defense discretionary is scheduled to be cut by $55 billion and non-defense discretionary by $43 billion. These cuts would reduce discretionary spending in FY 2013 to $949 billion dollars, $98 billion less than the Budget Control Act cap. Federal funding for scientific research will not go unscathed with cuts of this magnitude.

Given that 2012 is an election year, appropriations budgets will not be completed until after the election. The budget, budget deficits, tax reform, and the Budget Control Act will be subject to congressional politics throughout the fall and perhaps into 2013, making it difficult for Congress to complete its work before a new Congress is installed.

Jane Hawkins, treasurer of the AMS and professor of mathematics at the University of North Carolina, Chapel Hill (UNC), testified before the House Commerce, Justice, Science, and Related Agencies Appropriations Subcommittee on March 22, 2012 regarding appropriations for the NSF. Jane spoke about the importance of a sustained federal investment in the NSF and gave several examples of how NSF funding benefits faculty and students at UNC.

The AMS Washington Office through the Coalition for National Science Funding (CNSF) organized and managed a sign on letter to oppose House bill H.R. 3433, the Grant Reform and New Transparency (GRANT) Act of 2011. The main problems with this Act are the requirements of posting a complete copy of a funded grant proposal to a new government-wide website and disclosure of peer reviewers. Proposals often contain intellectual property of the researchers and in most cases the ideas and directions of research are based on years of work. The success of the peer review system depends on the willingness of reviewers to provide candid assessments of research proposals. Without anonymity, many researchers would not be willing to be reviewers. Eighty-five organizations, consisting of professional societies and universities were signatories of the letter. H.R. 3433 has been passed by the House Committee on Oversight and Government Reform. It is not likely that the bill will go any further in this Congress, however registering opposition to the bill early may cause bill sponsors to rethink its impact.

Sam Rankin continues to participate in the Government Affairs Task Force (GATF), a group of commercial and society publishers, concerned with open access policies the federal government is considering for journal publications based on federally funded research. GATF was instrumental in getting the language contained in Section 103 of the American Competes Reauthorization Act of 2010 (P.L. 111-358).   Section 103 outlines a process through which stakeholders can work together to establish a viable open access policy.   The Act directs the

Office of Science and Technology Policy (OSTP) to lead a process through the National Science and Technology Council to coordinate the development of public access policies for all federal agencies with extramural research budgets of over $100 million. This is to be accomplished in a manner that reflects the variability among agencies and scholarly disciplines with input and collaboration from non-federal stakeholders. The law also calls for the consideration of how any new policy would impact the scientific and engineering community, and to take into account the critical role publishers play in the process.

Even with the existence of P.L. 111-358, Members of Congress introduce bills mandating open access policies. One of those bills, introduced in the House and Senate, is the Federal Research Public Access Act of 2012 (FRPAA), requiring each federal agency with extramural research expenditures of over $100,000,000 to develop a federal research public access policy. This bill mandates the submission to the federal agency an electronic version of the author's final manuscripts of original research papers that have been accepted for publication in peer-reviewed journals and result from research supported in whole or in part, from funding by the federal government. This submitted manuscript must incorporate all changes resulting from the peer review publication process. If the publisher consents, the peer-reviewed manuscript will be replaced by the final published journal article. Free online public access to such final peer-reviewed manuscripts or published versions should be available as soon as possible, but not later than six months after publication in peer reviewed journals.

OSTP, through the National Science and Technology Council (NSTC), began the process outlined in Section 103 of COMPETES by establishing an interagency working committee and sending out a Request for Information (RFI). In mid-April NSTC issued a report **Interagency Public Access Coordination: A Report to Congress on the Coordination of Polices Related to the Dissemination and Long-Term Stewardship of the Results of Federally Funded Scientific Research.** GATF has been meeting with congressional offices suggesting that it is more prudent to let the process outlined in Section 103 of the COMPETES Act to be completed. Now that the NSTC has issued a report to Congress, the report should be studied and digested before any new laws are passed concerning public access of federally funded research.

The Washington Office continues to support the Coalition for National Science Funding (CNSF), planning monthly meetings and organizing Coalition events. The CNSF Annual Exhibition and Reception on Capitol Hill will be held May 15, 2012. This will be the eighteenth exhibition. AMS will sponsor an exhibit of the Institute for Computational and Experimental Research in Mathematics, led by Jill Pipher. On March 29, 2012 CNSF sponsored a Hill briefing titled **Science Means Innovation.** Ninety-five people attended the briefing including several Members of Congress. Sam Rankin welcomed the audience, spoke briefly about CNSF, and introduced Subra Suresh, Director of NSF.

At the Joint Meetings, the Washington Office was responsible for the Department Chairs Workshop, the AMS Conversation on Non-Academic Employment session, the AMS Science Policy session, the AMS Committee on Education session, and the AMS Congressional Fellowship session. The Non-Academic Employment session was moderated by C. Allen Butler, president of Daniel H. Wagner Associates, Inc. Panelists included Grant Boquet, Metron, Inc; Sara Del Valle, Los Alamos National Laboratory; Andy Niedermaier, Jane Street Capital, LLC;

Bonita Saunders, National Institute of Standards and Technology; and Charles Toll, National Security Agency. The session was very well attended. The CSP session sponsored a presentation by Subra Suresh, Director of the NSF. The COE session was about engaging undergraduate students in research.

Sam Rankin continues to serve on the Advisory Board for the WPI Mathematical Sciences department, the AAAS Science and Technology Fellowship Advisory Committee, AAAS Mass Media Selection Committee, and has recently been asked to be a co-chair of GATF. Sam again contributed the chapter on mathematical sciences to the AAAS Annual Research and Development Report.

The Washington Office organized the Committee on Science Policy that took place on March 16-17. Information about the CSP meeting is contained in an attachment to the ECBT agenda.

Respectfully submitted,
Sam Rankin, Associate Executive Director
April 19, 2012

Report of the Executive Director

Prepared for the Council, April 21, 2012[1]

This report to the Council will become the foundation for the report on Society activities in 2011 that appears in the *2011-2012 Annual Report of the American Mathematical Society* and in the *State of the AMS* article to appear in *Notices.* Both of those publications will also include a Treasurer's Report which provides detailed financial reporting. I shall be happy to discuss financial highlights during Council discussion of the report.

I am pleased to report that the AMS remains healthy, vibrant, and relevant, despite the difficult economic times, evolution of technologies, and challenges of the profession and associations. The stability, successes, and advances of the Society are due in large part to four factors: AMS leaders and volunteers, AMS members, a well-structured and efficient operation, and the diversified sources of revenue that support the Society's varied programs and services. All played a crucial role in 2011 to help the AMS fulfill its goals.

Service by Volunteers and Members

AMS leaders and volunteers—both elected and appointed—offer their commitment, expertise, thoughtfulness, and time (traveling, meeting, writing). Their service is critical and is a solid foundation on which the administration and staff are able to implement the Society's many and varied programs. Great appreciation must be given to those who have organized AMS meetings, reviewed book proposals and manuscripts, advocated for federal funding or research, reported on proposals and meetings, studied mathematics curricula, inspired the AMS Grad Student Blog, suggested solutions to problems affecting membership and employment, solicited nominations for Programs That Make a Difference, shaped the AMS book publishing program, co-created the *Who Wants to Be a Mathematician* game, mentored participants in the Mathematics Research Communities and the department chairs at workshops, and helped in many other ways.

Mathematicians worldwide joined and renewed membership in the AMS, showing that they value being part of—and supporting—the mathematics profession. They attended AMS sectional and international meetings and the 2012 Joint Mathematics meetings in Boston, which drew an all-time record attendance of 7,199 to more than 2,700 scheduled talks, 64 Special Sessions, and social events. Certainly among the highlights of the meeting were the Gibbs Lecture by Brad Efron and Colloquium Lectures by Edward Frenkel. AMS members and other friends also made generous donations to the AMS to support programs and services. In 2011, the Society placed a special priority on its graduate student members, whom the AMS reaches

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[1] A skeleton of this report was presented at JMM2012 in Boston. I gratefully acknowledge the help of Annette Emerson of the AMS Public Awareness Office in drafting the report.

out to during their critical transition from being a student to the early years of professional employment.

Through the operations of AMS headquarters in Providence, RI, Mathematical Reviews in Ann Arbor, MI, and the Washington, DC, office, and supported by revenue from a variety of sources (MathSciNet, membership dues, publications, meetings, grants, donations, and investments), the Society was able to initiate, sustain, and adapt programs and services for mathematicians in all stages of their careers.

Highlights of 2011 Activities

2011 was a very busy year for the Society in all of its principal areas of activity. I shall highlight a number of specific accomplishments in publishing, professional programs and services, meetings, and advocacy for the mathematics community.

Serving the Community

The AMS is placing a very high priority on the support of early career mathematicians. 2011 marked the launch of the AMS-Simons Travel Grants for recent doctorates. This program is funded by a three year grant from the Simons Foundation. The main selection criteria for the competitive program are the applicant's record of research accomplishments and potential for future research contributions. Sixty two year awards were made in the first year.

A great program, introduced four years ago, awards travel grants for graduate students to attend JMM and AMS Sectional Meetings. At the 2012 JMM 100 grants were made possible by the generosity of an anonymous donor. In 2011 the program was extended to include travel grants for AMS Sectional Meetings, 100 for fall sectional meetings and 100 for spring sectional meetings. Starting in 2011 the donor now makes it possible for the AMS to award 300 travel grants each year for advanced students in the mathematical sciences.

Another successful AMS program for early career mathematicians is the Mathematics Research Communities (MRC). Three one-week summer sessions in the 2011 program served about 120 advanced graduate students and recent Ph.D.s. The NSF grant began in 2008 and continues in 2012 and 2013, fostering collaborations among early career mathematicians. One objective of the program is to foster formation of research communities that will be sustained over the years. In 2011, we were able to offer additional support for communities established in 2008, 2009, and 2010 to meet again and renew collaboration. The response was terrific, and so far we have approved funding for a total of 53 individuals to travel to meet with collaborators in groups ranging in size from two to ten.

"I have never been to a research conference like this. I feel I accomplished a lot more research and collaboration here than at any other conference I have been to."

Several projects were begun in 2011 to enhance existing programs and services. *Assistantships and Graduate Fellowships*, long valued in book form, is becoming an online searchable database, allowing undergraduates to search and compare graduate programs across the U.S. The Annual Survey data has expanded its reporting and added a wealth of supplementary data on the web that go beyond the published reports in *Notices*.

The popular Mathjobs.org job employment application service was combined with the JMM Employment Center registration. The Employment Center is the in-person interviewing service that takes place at JMM every year. About 470 hiring institutions now use Mathjobs.org, and about 100 of those also interviewed applicants at the Joint Meetings in 2011 and 2012.

The individual membership program for graduate students was strengthened in 2011 through the guidance of a volunteer Graduate Student Working Group. Many graduate students receive the benefits of AMS membership at no cost to them individually if their institution is an institutional member of the AMS. At the Council meeting in January 2012, a new program of AMS Student Chapters received final approval. We expect to launch a pilot program of student chapters later this year.

Publications

There were several advances in the AMS publishing program in 2011. In response to the needs of the academic library community, the *Contemporary Mathematics* series was offered as an

electronic subscription product for 2012. In addition, about 550 previously published *Contemporary Mathematics* volumes were digitized and packaged as an electronic bundle for research libraries. Many hundreds of the 3,000 books on the AMS "backlist" became available as Google eBooks. The AMS, in cooperation with SIAM and Design Science, continued to support the development of MathJax, a really wonderful software resource for publishing mathematics on the web. Mathematical Reviews continues to play a central role in the development and refinement of MathJax.

Mathematical Reviews (MR) added 98,593 new items (journal articles, books, refereed papers presented at conferences) and 88,000 reviews to the MR database. The staff at MR continues to develop new online production tools which make it possible to keep up with the rapid growth in the mathematical sciences literature; between publication years 2000 and 2009, the number of journal articles published in all of the journals MR follows increased by 37 percent.

The AMS supports a number of programs designed to make its research publications available and affordable to international mathematics communities. For many years, the Society has participated in the electronic delivery service of the International Centre for Theoretical Physics in Trieste. The ICTP service provides articles from research journals to scientists in developing countries. In 2011, the AMS also participated in the Libraries without Borders project to provide free access to AMS journals and MathSciNet to a library in Haiti that was just opened this year. We expanded our National Mathematical Reviews Program to provide access to MathSciNet to five new schools in Cambodia, Vietnam, and Africa at deeply discounted prices. The October earthquake in eastern Turkey destroyed the library of one of our subscribing institutions and they needed to set up an electronic 'virtual' library so that their faculty and students could keep up with their research and studies while they rebuild. The AMS is providing free access to MathSciNet to this virtual library for 2012 so that the university can use funds saved to help with recovery from the disaster.

The AMS book program paid special attention in 2011 to the publication of books for mathematics students at all levels and for their teachers. Together with MSRI and with partial support of a grant MSRI had received from the Templeton Foundation, the AMS published five new titles in the *Mathematical Circles Library* series. These books address a variety of audiences, from parents of five-to-seven year old
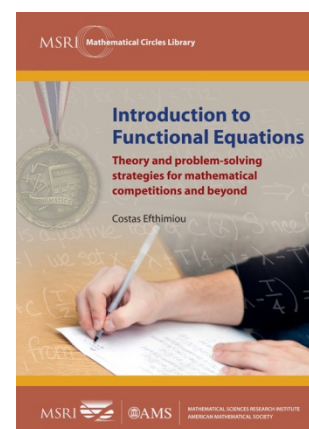
children who want to show their children the beauty of mathematics, to middle and high school students interested in mathematics and in attending Mathematical Circles, and to organizers of such circles and high school math teachers who are looking for new approaches in explaining their subject in the classroom. The AMS also continued to develop its *Pure and Applied Undergraduate Texts* series by publishing several high quality undergraduate textbooks in various areas of mathematics, and making them available to students at prices that are significantly lower than textbook prices from large commercial publishers. The book program also added notable titles to other text and research monograph series.

The AMS created a new position of Web Editor in 2011. The editor is working to engage the mathematics community and other important constituencies (librarians, authors, and mass media) in making www.ams.org a polished and substantive internet publication promoting the Society's mission.

Public Awareness and Advocacy for Mathematics

The AMS Washington, DC, office accomplishes a great deal in the area of advocacy for mathematics and science more broadly, and serves as the liaison with the AMS Committees on Education and Science Policy. The AMS hosted a Congressional Briefing on Capitol Hill in early December 2011, at which Suncica Canic of the University of Houston presented "Mathematics: Leading the Way for New Options in the Treatment of Coronary Artery Disease." George Andrews, AMS Past President, presented testimony to the House Appropriations Commerce, Justice, Science and Related Agencies Subcommittee, on the National Science Foundation FY2012 Budget Request. The AMS 2011-2012 Congressional Fellow, Richard Yamada, is serving in the Office of Senator John Boozman (R-AR). The annual AMS Department Chairs Workshop, held at JMM 2012, had the largest attendance ever, with sixty chairs participating.

Reaching young mathematicians in the pipeline is the *Who Wants to Be a Mathematician* game for talented high school students, developed by AMS Public Awareness Officer Mike Breen and volunteer William Butterworth of DePaul University. The third national game was held at JMM 2012. Rhode Island Governor Lincoln Chafee attended the regional game held in Providence on Pi Day 2011. The game is a highlight of many other events including the annual AAAS meeting, the Arnold Ross Lecture, and the annual SACNAS conference.

The AMS Public Awareness Office expanded its programs to promote awareness of mathematics among several target populations, and led the effort to increase the AMS presence on Facebook, LinkedIn, Twitter, and YouTube, the primary social networks to communicate with and engage our several thousand followers worldwide.

Notably in 2011, the AMS established a Development Office. Director Robin Marek embarked on both short term and long term plans to get to know the mathematical community, many of the Society's most loyal donors, and potential supporters of AMS programs and services. She was and will continue to be another important voice of the Society.

Though not without challenges facing all professional societies, the Society continued to fulfill its mission, maintaining excellence in mathematical sciences research, advancing the mathematics profession, supporting mathematics education at all levels, and fostering awareness and appreciation of mathematics. In 2013 the AMS will celebrate a milestone—the 125th anniversary of its founding in 1888.

Donald E. McClure, Executive Director
April 2012

To: Executive Committee and Board of Trustees (ECBT) of the AMS
From: Edward Aboufadel, Secretary of AAAS Section A (Mathematics)
Subject: Symposia at the 2012 AAAS Annual Meeting
Date: April 2, 2012

Overview: The 2012 AAAS Annual Meeting featured a variety of presentation formats. In addition to more than one hundred and fifty symposia on themes of contemporary interest, spread over 13 tracks, there were individual topical area lectures and plenary lectures. There was also a graduate student poster session, with nearly a half-dozen posters in the area of applied mathematics. More than 11,000 people attended, including more than 6000 Family Science Days registrants.

The generous support of the AMS continues to be centrally important in enabling Section A to offer programs and speakers that communicate to general scientific audiences and the press (and by extension, the public at large) the nature, excitement, and usefulness of mathematics. The 2012 meeting was held February 16-20 in Vancouver, BC. The support of the AMS was acknowledged on page 118 in the meeting program.

We appreciate the efforts by the AMS to report on the AAAS meeting, such as at this URL: http://www.ams.org/meetings/aaas-2012. In addition, an article on the quantum computing symposium appeared in the *Economist*: http://www.economist.com/node/21548151.

Below are summaries of the four symposia that were sponsored this year by section A. Included with each report is a list of AAAS Sections (other than Section A) that indicated in the program their interest in the symposium. The mathematics section makes up a bit more than 1% of the AAAS membership, so we are certain that the symposia speakers are reaching a broad audience of scientists and the media. All of the reports this year were written by Edward Aboufadel. In addition, Mike Breen's "Who Wants to Be a Mathematician" was featured again as part of the the AAAS' Family Science Days program at the meeting.

1. Analogy in Applications of Mathematics and Statistics to Other Disciplines
Friday, February 17, 2012: 1:30 PM-4:30 PM
Organized by Benjamin Mann (Ayasdi Inc.) and Jack Morava (Johns Hopkins University).

The speakers were Robert Calderbank (Duke University), Gunnar Carlsson (Stanford University), Michael Deem (Rice University), Richard Lenski (Michigan State University), and Konstantin Mischaikow (Rutgers University).

The theme of this symposium was that "Every model of a complex situation is an analogy, highlighting one set of features while suppressing others with the goal of gaining

understanding." The first speaker to address this theme was Robert Calderbank, with his talk "Reaching Consensus". In this talk, Calderbank described a model of group decision making in which pairs in the group interact (a so-called "gossip algorithm"). He described how this can be set up as a linear algebra problem, and gave an example where several wireless signals are received practically simultaneously by an antenna and a "consensus" needs to be reached on how to process those signals. This eventually led to a general discussion of "distributed consensus", where "who can talk when" is managed. In this model, we have to worry about fairness, where we don't want a gossip, or a sensor, to dominate.

"Topology as an Organizing Principle for Biomedical Data" was the title of Gunnar Carlsson's talk. The goal of this talk was to put together two ideas: That data has shape (normally defined in terms of pair-wise distances) and that topology is formalism to represent shape. The three key ideas from topology that Carlsson hoped to exploit are the ideas of a coordinate-free representation, invariance under transformation, and compressed representations (e.g. triangulations). He described topological analyses of the Miller-Reaven diabetes dataset and cell-cycle microarray data that involved covering each data set and then clustering the cover. Connections between hierarchical clustering (e.g. dendograms) and topology were explored, and the talk concluded with a topological analysis of Netflix data (image from AMS online article):
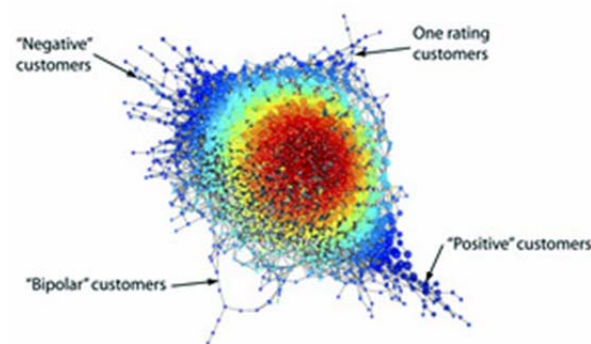
Mike Deem spoke on "The Emergence of Modularity in Biology". The talk included results from his paper, "Mathematical Adventures in Biology", which appeared in *Physics Today*. The basic idea is this: modules (clusters) appear in proteins, genes, biological interaction networks, even economic systems. Why? He identified three conditions for modularity (that can be modeled mathematically): the environment is changing, horizontal gene transfer exists, and evolution occurs slowly. Modularity promoted survivability in biology, because then systems are more stable while simultaneously "evolvability" increases. He eventually came to this question: Do we get biology (i.e. modularity) out of chemistry (i.e. interaction of nearby molecules)? Through a numerical analysis of one of his mathematical "spin-glass" models, he showed that, starting with a random distribution of amino acids, if the environment doesn't change or there is no horizontal gene transfer, then there is no evolution.

Richard Lenski represented the fitness of a species as a multivariable function of genotype, in order to investigate evolution in his talk, "Exploring Adaptive Landscapes in a Long-term Experiment with Bacteria". The basic analogy is this: imagine a smooth function of two variables with more than one local maximum. Through natural selection, a population climbs a local peak (as fitness rises). This prevents that population from going to higher maximum elsewhere, unless something occurs to push the population off of one peak, temporarily making the population less fit. Lenski demonstrated how this dynamic can occur in describing an experiment that has been in progress since 1988, analyzing more than 54,000 generations of bacteria. His lab takes a frozen "fossil record" every 500 generations. In the experiment, a mutation occurred where the bacteria began eating citrate and not just glucose, and this mutation caused the population to become less fit at first (falling off of one of the peaks, and then climbing another one).

The final talk in this session was entitled, "Database Schema for the Global Dynamics of Multiparameter Nonlinear Systems". Konstantin Mischaikow began by criticizing a bifurcation diagram that arose from a 2-age class Leslie model, noting that the diagram is an "overload of useless information", focusing on one parameter. It is difficult to extract information for such a diagram. Instead, he proposed a "dynamics database" which he has instantiated through software. During his talk, he demonstrated his software and described how the dynamics of that Leslie model are more complicated than period-doubling bifurcations of fixed points.

Attendance ranged from about 60 to over 80 throughout this symposium.

Other sections that listed interest in this symposium in the printed program: Biological Sciences, Engineering, Industrial Science and Technology, Statistics, and General Interest in Science and Engineering.

2. Quantum Computing: Current Status and Future Prospects
Saturday, February 18, 2012: 8:30 AM-11:30 AM
Organized by John Preskill (California Institute of Technology).

The speakers were John Preskill (California Institute of Technology), Scott Aaronson (MIT), Michael Freedman (Microsoft Station Q), Charles Marcus (Harvard University), and John Martinis (University of California).

This was a very popular symposium, with over 120 people in attendance, and many people standing in the back.

The session began with John Preskill's talk "The Entanglement Frontier", giving an overview of the key ideas and history of quantum computing. It is widely believed that classical systems

cannot simulate quantum systems effectively, due to the need to master decoherence. We cannot clone quantum states, and there are issues of quantum entanglement. Basically, we need to prevent the environment from learning about the state of quantum bits (qubits), and he suggested that "topological media" could be used to store quantum information.

Scott Aaronson then turned to the idea of using models of quantum computing to prove facts about classical computing. (This is analogous to using the complex numbers to prove facts about the real numbers.) For instance, due to Shor's quantum computing algorithm, at least one of the following is true: (1) quantum computing is impossible and quantum mechanics needs revision; (2) it is possible to build a fast, classical computer to simulate quantum mechanics – and factor large numbers; (3) it is possible, in principle, to build quantum computers and refute the extended Church-Turing thesis. Other insights of his approach are: (1) that quantum computing would have significant limitations – you would have to exploit the structure of an NP-complete problem in order to solve it quickly, as opposed to an exponential speed-up in the search for a solution; and (2) there is a quantum analogue to simulated annealing, which can <u>almost</u> solve any NP-complete problem in polynomial time. The title of this talk was "Quantum Computing and the Laws of Physics."

The third talk was by Michael Freedman, speaking on "Topological Quantum Computing". This was a complicated talk revolving around the idea that instead of a 50-year effort to find a mathematical foundation for field theory in physics, we should look for a field-theoretic foundation for mathematics. This led to a discussion of the prospects for quantum computing in the real world, and Freedman asserted that nearly all good ideas on the subject go back to A. Kitaev. Mathematical topology might be able to help in the development of a quantum computer, because of the part of quantum physics resistant to deformation.

Charles Marcus then spoke on "Semiconductor Quantum Computing". This talk went into the variety of options for encoding quantum information in semiconductors, such as electron spins, nuclear spins, or collective excitations in quantum wires. He used the term "mesoscopic semiconductor devices" to describe materials that occupy the middle ground between the quantum and classical worlds. Marcus and his colleagues are using the trick of creating a qubit out of two elections with semiconducting crystals. The superposition of the two electrons' spins produces the qubit, and so far they have been able to connect four qubits together for about ten microseconds.

The final talk, "Quantum Computing with Superconducting Circuits" was given by John Martinis. Following up on Marcus' talk, Martinis focused on the surprising robustness of superconducting electrical circuits when it comes to the potential to encode quantum information. His team is also working on superconducting qubits with pairs of electrons, and they have been able to create five at a time. He discussed what the architecture of large systems

might look like, how information would be transferred, creating quantum memory. These systems are very fragile though, and Martinis' team is exploring error-correcting codes with qubits.

Other sections that listed interest in this symposium in the printed program: Physics, Chemistry, Engineering, Industrial Science and Technology, and Social Impacts of Science and Engineering.

3. Excursions into the Mathematics of Medical Imaging
Sunday, February 19, 2012: 3:00 PM-4:30 PM
Organized by Jonathan Taylor (Stanford University).

The speakers were Michael Lustig (University of California), Robert Adler (Technion), and Jonathan Taylor (Stanford University).

Michael Lustig began the session describing how compressive sensing can be used to revolutionize medical imaging. The standard approach to medical imaging (particularly with MRIs) is to first collect the data, and then compress it. The data collection can take a long time, though, which is a problem for certain patients, such as children, who cannot sit still or hold their breath sufficiently long in MRI machines. With compressive sensing, a smaller data set is collected, exploiting redundancies in the data. Images are created from the data through solving non-linear convex optimization problems. Donoho's CLEAN algorithm is an example. Lustig then demonstrated several examples.

Robert Adler spoke second, demonstrating how clever representations of astronomical data (specifically, background cosmic radiation) look suspiciously similar to similar representations of EEG cortical data from mapping the brain, so researchers of these two areas should be able to share tools. This is reflected in the title of his talk, "A Common Topological Approach to Randomness in the Structure of Brains and the Cosmos". He then described models to simulate astronomical data and explored the randomness of the distribution of radiation in the universe. This is related to a problem about the brain – when activity in the brain is detected above a certain level, is it real or random? What is the probability of detecting such activity at the level, despite the fact that the activity might be random? Adler concluded with two analyses of these questions, one which appeared to show that background cosmic radiation is random, and a second which appeared to show that is isn't.

Support vector machines (SVM) were used by Jonathan Taylor in his talk, "Predicting Behavior from Functional Magnetic Resonance Imaging". His research team tackled the following problem: subjects were given a task that involved shopping for projects (in a virtual environment), where a product (e.g. chocolates) were shown for four seconds, a price for four seconds, and then four more seconds were given for a choice to be made of whether or not to

purchase the product. Fractional MRI data of the brain was being collected during the twelve-second trials, and the goal of the project was to determine if the MRI data could predict if the product was bought or not. With the SVM model, Taylor and his colleagues could correctly predict a buying decision 73% of the time.

Attendance at this symposium fluctuated between 25 and 50 throughout the time for this Sunday afternoon session.

Other sections that listed interest in this symposium in the printed program: Engineering, Statistics.

4. Illuminating the Obesity Epidemic with Mathematics
Monday, February 20, 2012: 9:45 AM-11:15 AM
Organized by Carson Chow (NIH).

The speakers were Boyd Swinburn (World Health Organization Collaborating Center for Obesity Prevention) and Kevin Hall and Carson Chow (both of NIH).

[I was only able to attend the first 20 minutes of the first talk, as I had to catch my flight back to Michigan. The notes from the other Section A officer in attendance were incomplete, so the following is adapted from the AMS web site report on this session (written by Public Awareness Officers Mike Breen and Annette Emerson), and the session abstracts.]

Boyd Swinburn began the symposium with the talk, "Can Mathematics Help Answer the Big Questions about Global Obesity". The talk dealt with the three big questions about the global obesity epidemic: what are the current and projected burdens of obesity; what has driven the simultaneous, global rise in obesity and what explains the variation in the trajectories of countries, and; what are effective and cost-effective interventions to reduce prevalence? The questions can in part be answered using descriptive, explanatory and evaluative mathematical models, respectively. The models explaining the rise in obesity consistently point to a dominant driver effect of increasing energy intake. Breen and Emerson write, "He noted that obesity has increased in almost all countries, but at different rates, due to physical, economic, and socio-cultural reasons. He modeled the effects of different interventions and said that those by governments, such as putting nutrition labels on the front of packages, are cost-saving, whereas individual actions, such as taking weight-loss drugs, cost more than they accomplish."

The second talk, "The Calculus of Calories: Mathematical Modeling of Body Weight Dynamics", was by Kevin Hall. Quantifying the relationship between calories eaten and expended has been difficult, since diet changes lead to complex adaptations that alter metabolism

and body composition. Recently, Hall and his colleagues have developed several mathematical models to predict what happens when people of varying weights, diets, and exercise habits try to change their weight. Some models incorporate the complex interactions between carbohydrate, fat, and protein metabolism and others focusing on energy imbalance. There is a myth that eating 3500 calories a day will result in one pound of weight gain, but metabolism must also be taken into account. Using a mathematical model which has a significant number of differential equations, Hall drew the following conclusion about the situation where people on diets lose weight initially, then plateau and eventually gain the weight back. As Breen and Emerson write, "The traditional explanation is that the plateau occurred only because of a slowdown in metabolism. Hall's model contradicts this and shows that the plateau is because people are going off their diets much earlier than thought."

Carson Chow of NIH finished the symposium with "Dispelling the Myths of Obesity". He described a simplified mathematical model which brings together basic facts of physics and physiology to describe weight change. Breen and Emerson write, "He demonstrated that some traditional explanations are true (it is easier for heavy people to gain weight) but others aren't (the assumption that thin people have higher metabolisms is not backed up by data). Chow concluded by saying that random daily fluctuations in food intake don't have much effect on weight change, but if those fluctuations are correlated then they will have an effect."

Attendance at this symposium was around 50 for this Monday morning session.

Other sections that listed interest in this symposium in the printed program: Pharmaceutical Sciences, Statistics, and General Interest in Science and Engineering.

AMS Long-term Investments
Cliffs Notes

(*For details, see section D of Fiscal Reports*)

OPERATIONS

DONORS

SHORT-TERM
INVESTMENTS
(OPERATING ASSETS)

PERIODIC
TRANSFER

3.2.1

LONG-TERM INVESTMENTS

ECONOMIC
STABILIZATION
FUND
(ESF)

OPERATIONS
SUPPORT
FUND
(OSF)

UNRESTRICTED
ENDOWMENT

RESTRICTED
ENDOWMENT

3.2.2

3.2.3

3.2.4

3.2.5

SPENDING
RATE 5%

SPENDING
RATE 5%

SPENDING
RATE 5%

**3 ITEMS IN
OPERATING
BUDGET**   – · – >

OPERATING
REVENUE
"OSF spendable
income" and "Young
Scholars spendable
income"

BOARD
DESIGNATED
PROJECTS
"Assets released
from restrictions"

PRIZES &
PROGRAMS
"Assets released
from restrictions"

ESF = 75% annual operating expenses + unfunded medical liability (APBO)
OSF = remainder of quasi-endowment (spending on 3-yr rolling average)
     Rebalanced annually, December 31
Note: Spendable income from true endowment funds held in Temp Restricted net assets and
     'released' to operations as related expenses are incurred.

Values as of:	12/31/11	12/31/10
ESF	$24.4 M	$23.7 M
OSF	45.0 M	43.6 M
Unrestricted	5.6 M	5.9 M
Restricted	4.4 M	4.5 M

AMERICAN MATHEMATICAL SOCIETY

To: Board of Trustees   **Date**: April 23, 2012
From: Emily Riley, CFO
Subject: Operating Fund Portfolio Management Report

SUMMARY RETURNS

The purpose of this memorandum is to summarize the Society's cash management policies and report on the operating portfolio's investment income performance during 2011. There are no proposals for changes in authorized investment limits or additional investment vehicles presented.

Investment earnings results by type and in total and other pertinent portfolio information for 2011 and the preceding six years are as follows:

	2011	**2010**	**2009**	**2008**	**2007**	**2006**	**2005**
Money Market Funds	0.05%	0.16%	1.0%	2.9%	5.0%	4.8%	2.8%
Vanguard Fixed Income Mutual Funds:							
Short Term Corporate Bond Fund	2%	5.3%	14.2%	(4.7%)	6.0%	5.1%	2.3%
GNMA Fund	7.8%	7.1%	5.4%	7.3%	7.1%	4.4%	3.4%
Long Term US Treasury Fund	29.4%	9.1%	(11.9%)	22.7%	9.4%	1.9%	6.8%
Fidelity Floating Rate Bond Fund (12/04)	1.7%	7.8%	28.9%	(16.5%)	2.7%	6.4%	4.2%
Vanguard Convertible Securities	(6.8%)	19.2%	40.8%	(29.8%	10.6%	13.0%	6.6%
TIPs (April 2005)			7.4%	(1.3%)	8.9%	0.9%	0.9%
Certificates of Deposit	1%	1.3%	2.7%	4.0%	5.2%	4.7%	3.1%
Common Stock	12%	3.0%	23.3%	(24.4%)	(1.4%)	22.4%	0.0%
Annual total portfolio return	2.2%	4.5%	7.1%	(0.7%)	5.8%	5.2%	3.3%
AMS benchmark - Avg 6 month CD							
rate per Federal Reserve Bank	0.42%	0.44%	0.8%	3.1%	5.2%	5.2%	3.7%
AMS returns versus benchmark	1.78%	3.86%	6.3%	(3.8%)	0.6%	0%	(0.4%)
Wkly Average Operating Portfolio (in 000's)	$13,245	$13,866	$13,858	$15,525	$15,459	$14,578	$15,223
Annual Investment Income (in 000's)	$270	$626	$984	($105)	$895	$757	$503

At December 31, 2011 operating fund investments equaled $13,739,319, which is a decrease of approximately $2,100,000 from the previous year. In addition to the operating portfolio investments, there was an increase in cash available for operations of $674,000 in 2011.

The return for 2011 was 2.2% for the operating investments as a whole, despite the drop in interest rates on money market funds and certificates of deposit. This 2.2% return was 1.8% over the benchmark used for the operating portfolio, the average annual 6-month CD rate per the Federal Reserve Bank. The decreasing return on the certificates of deposits and money market funds was expected for 2011. These low rates are expected to continue throughout 2012. The weekly average balance in the operating portfolio dropped in 2011 from $13,866,000 in 2010 to $13,245,000. Part of the reason for the average balance decrease was that $2,000,000 was transferred to the long-term portfolio in June 2011. However, offsetting the $2,000,000 loss in cash through the transfer to the long-term portfolio is the cash provided by operations as a result of a high net operating income for the year.

History of Authorized Investment Vehicles and Limits.

At the May 1996 ECBT meeting it was agreed that the Society should have as a goal an accumulation of current assets such that they exceed current liabilities. To help achieve this objective, at the May 1997 ECBT meeting a plan for the creation of an intermediate term investment portfolio was adopted. Increased limits of $1,000,000 (to $4,000,000) in our money market funds, $1,000,000 (to $2,000,000) in our Vanguard fixed income funds, and $500,000 (to $1,500,000) in Treasury Notes were approved. In addition, a $1,500,000 combined limit for other mutual funds, consisting of high yield and convertible bond funds, was established at this time.

In May 2000, the limits for money market funds, fixed income funds and the high yield/convertible funds were each increased by $500,000. At the May 2002 ECBT meeting, the limit on the money market fund was increased to $5,500,000, primarily to accommodate the larger investment balance carried in the operating portfolio. In May 2004, The Board of Trustees added floating rate bond funds to the authorized investments, with an investment limit of $2,000,000. In May 2005, the Board changed the limit on money market investments to be 50% of the operating portfolio balance at any point in time, again to accommodate the larger portfolio balance and liquidity needs of the Society.

The strategy of using an intermediate portfolio has occasionally resulted in greater volatility, but overall has generated an increase in the earnings of our operating fund investments. By shifting a portion of operating fund investments into slightly riskier investment vehicles we have, on average, increased the earnings compared to those that would have been achieved in low risk, short term investments.

Recent Portfolio Adjustments.

Finding suitable banks with higher-than-average rates of returns on certificates of deposits has become increasingly difficult over the past few years. Accordingly, the certificates of deposit portfolio has been reduced and the money market funds have been used to 'stockpile' the funds needed to support operations for the near term.

Changes in the Cash Management Environment.

In the past rising inflation, as we are experiencing now, has correlated with rising interest rates, but rates have remained low. Inflation is on an upward trend now at an annual rate of 3% for 2011 as compared to 1.5% for 2010. The Federal Reserve has signaled that it is not ready to start raising interest rates. Higher rates will return, but not in the near future.

Cash Management at the AMS.

The following rules govern AMS's management of cash:

1. *Availability and Liquidity.* The placement of investments in the operating portfolio is coordinated with the Society's immediate and estimated future cash requirements, which are based on actual and projected revenue and disbursement streams. Cash needs to be available at the appropriate times to cover the operating expenses of the Society as they are incurred - payroll, payroll taxes and other withholdings, and vendor liabilities comprise the bulk of our cash needs. Adequate portfolio liquidity is the ability to turn investments readily into cash without suffering undo loss of principal.

2. *Income.* Cash in excess of immediate operating needs should be invested so as to optimize returns. The Society has intentionally accreted such excess cash, so that the ratio of current assets to current liabilities remains at least 1 to1. This ratio was 1.2 at December 31, 2011, and 1.3 as December 31, 2010.

3. *Preservation of principal.* Safety is of prime concern in investments of operating capital. Diversifying investment vehicles and monitoring investment maturity dates and market value fluctuations greatly reduces an investment portfolio's exposure to risk. Maximum allowable positions should and have been established for different types of investments.

Authorized Investments.

The investment vehicles authorized by the Board of Trustees for the operating portfolio are as follows:

• *Certificates of Deposit.* As in prior years, a large percentage of the Society's operating investment portfolio has been invested in certificates of deposit, although it has declined in recent years for the reasons discussed above. The weekly balance in certificates of deposit averaged 16% of the total portfolio during 2011, about the same in 2010, and 28% of the portfolio in 2009.

   We generally purchase "jumbo" CD's of federally insured savings institutions and commercial banks that are assigned an acceptable safety rating by a weekly bank rating newsletter. Current investment policies limit the amount of investment in each bank

issuing CDs to the Federal Insurance Deposit limit of $250,000 (exclusive of accrued interest) for Savings and Loan institutions and smaller banks and $400,000 per large commercial bank. There is no limit to the total amount of CDs that can be held by the operating investment portfolio.

Issuer	Banks & Savings and Loans
Risk of default	None - federally insured
Risk of market decline	None
Maximum Amount	$250,000 per bank or S&L, $400,000 in large cap banks, unlimited in total

Most often we intentionally accumulate the CD portfolio (generally for one-year terms, shorter terms are used to take advantage of rising interest rates) in order to increase the yield on the portfolio, even if slightly. However, the typical CD rates are now so low and the cash flow needs of the Society have been greater in recent years because of planned investments in plant and equipment, that accumulating the money market funds is more efficient to do.

- **_Treasury Bills._** T-Bills are convenient to use when we have a large planned expenditure for a predetermined future date, such as contributions to the Economic Stabilization Fund; however, better rates are available on alternative forms of short-term operating investments. Treasury Bills have no market risk associated with them because they are backed by the full faith and credit of the US government, are issued for short durations and are highly liquid. Accordingly, there is no limit to the total amount of T-Bills we may hold in our portfolio.

Issuer	U.S. Government
Risk of default	None
Risk of market decline	None if held to maturity
Maximum Amount	Unlimited

- **_Cash and repos (repurchase agreements)._** The AMS uses a concentration account at Citizens Bank - Massachusetts into which all receipts are automatically deposited and from which all disbursements are made. Under a repurchase agreement, cash above an established minimum balance is "swept" on a daily basis and invested overnight in repurchase agreements. Under a repurchase agreement, the customer (AMS) purchases government securities and the bank agrees to "repurchase" them the following day. The rate earned on these depends on the dollar amount of the repo; it is generally very low in comparison to rates available on other investment vehicles. Interest rates on repurchase agreements have been extremely low for a number of years. Unless one is sweeping large amounts of cash throughout the year, the interest earned does not justify the fees charged to maintain the agreement in place. The AMS has not used this investment vehicle since 1999 and it is not expected to be used in the near future.

Issuer	Citizens Bank - Massachusetts
Risk of default	Minimal
Risk of market decline	None
Maximum Amount	$1,000,000
Comments	Collateralized by US Gov't securities

- ***Money market funds.*** The Board of Trustees has authorized a maximum investment of 50% of the balance in the operating portfolio at any point in time. At the end of 2011 the balance in money markets was $4,930,839 or 36% of the entire portfolio, principally in Vanguard's Money Market Prime portfolio. Yields on the funds averaged .05% in 2011, and will likely not increase significantly anytime soon. There is little risk to principal because the valuation of the initial investment is generally not subject to change because of its short-term duration. However, given the tenuous economic situation domestically, defaults could occur. A few money market funds 'broke the buck' during the worst of the economic crisis. The US Government offered a program to ensure the valuation of money market funds at $1 per share, and large money market managers have signed on to the program. Balances in these funds are usually maintained only at levels needed for short-term operating needs in excess of short-term maturities, or for planned investments to be made in the near future (which avoids the administrative costs of 3 month CD's or T-bills), or to take advantage of rising interest rates, since they generally under-perform alternative authorized investment vehicles.

Issuer	Vanguard and Fidelity
Risk of default	Minimal
Risk of market decline	Very Low
Maximum Amount	50% of operating portfolio balance

- ***US Treasury Notes.*** The Board of Trustees has authorized a maximum investment of $1,500,000 in US Treasury Notes. A loss of market value may be incurred on these investments in a rising interest rate environment if funds are needed before maturity and have to be sold; however this risk is slight as the Society's liquidity is deemed extremely adequate. Treasury Notes can be an attractive investment when interest rates are expected to decline and the yield curve is fairly steep. This has not been the case in recent history.

Issuer	U.S. Government
Risk of default	None
Risk of market decline	None if held to maturity, otherwise value moves inversely to interest rate changes
Maximum Amount	$1,500,000
Comments	Best used just before interest rates decline

In April 2005, $500,000 of inflation-protected Treasury notes (TIPS), which pay a stated rate of interest, plus inflation over the period outstanding (by adjusting the principal), were purchased. These investments have no risk of default and no risk of market decline if held to maturity, which is what was done. In addition to the interest payment received during the five years these were held by the Society, the redemption value received upon maturity was over $575,000 in April 2010.

- **_Fixed Income (Bond) Mutual funds._** The Board of Trustees has authorized a maximum investment of $2,500,000 in fixed income mutual funds (initial investment, exclusive of reinvested income and share price increases, with appropriate disclosure to Treasurers and Board), and at the end of 2011 we had $3,952,676 invested. The initial investment amount is well below the limit. All of these investments are with the Vanguard Group of Valley Forge, PA. A combination of three funds is used: the High Grade Short-Term Corporate Bond portfolio, the GNMA portfolio, and the Long-Term US Treasury portfolio.

Issuer (currently used)	The Vanguard Group
Risk of default	Minimal
Risk of market decline	The longer the maturities of underlying investments, the higher the risk.
Maximum Amount	$2,500,000
Comments	Market value will decline as interest rates rise and increase as rates fall.

Historically, most of the volatility in the Society's short-term portfolio has been the result of market valuation adjustments on these investments (they are marked to market monthly); however, gains or losses technically are not realized on these funds until they are redeemed. The GNMA fund is less affected by interest rate volatility than the Long-Term US Treasury, despite similarity in term length of the underlying securities, as these debt instruments support the housing industry (and are unrelated to the problems at FNMA and FreddyMac).

Since these funds are different in nature, it is helpful to look at their characteristics separately, keeping in mind that the limit applies to the combined total.

Vanguard High Grade Short-Term Corporate Bond Fund:

Issuer (currently used)	The Vanguard Group
Risk of default	Low, due to quality of underlying debt instruments and borrowers
Risk of market decline	Low, due to short duration of underlying investments

Comments	Share price is usually relatively stable; return is determined by recent interest rates, as underlying debt is short duration
2011 return	2%

Vanguard GNMA Fund:

Issuer (currently used)	The Vanguard Group
Risk of default	Low – while not backed by the full faith and credit of the US government, it isn't likely that the US government would allow GNMA to default on its obligations
Risk of market decline	Medium, as duration is longer
Comments	Since the GNMA obligations are linked to collateralized mortgage obligations, and mortgage rates tend to change more slowly than other long term rates, this fund is a bit less volatile when interest rates change.
2011 return	7.8%

Vanguard Long-Term US Treasury Fund:

Issuer (currently used)	The Vanguard Group
Risk of default	Low, as most underlying securities are US government direct issues
Risk of market decline	Highly sensitive to interest rate changes, as duration of underlying securities is long-term
Comments	This fund has caused most of the volatility in the Intermediate portfolio; staff mitigates some risk by adjusting investment amount
2011 return	29.4%

- *__High Yield and Convertible Bond Mutual funds.__* The Board of Trustees has authorized a maximum investment of $2,000,000 in any combination of high yield bond and convertible securities accounts. At December 31, 2011 we had $1,428,241 invested in these vehicles, in one convertible securities mutual fund managed by the Vanguard Group. Gains or losses technically are not realized on these funds until they are redeemed, although, for financial statement purposes, the Society records these investments at market. It is not anticipated that further investments in this group of investment vehicles will be made in the near future.

Issuer (currently used)	The Vanguard Group
Risk of default	Medium to High
Risk of market decline markets	Sensitive to movements in the equity
Maximum Amount	$2,000,000
Comments	Total returns often parallel those of equity markets
2010 Return	19.2%

- **_Floating Rate Income funds._** The Board of Trustees has authorized a maximum investment of $2,000,000 in Floating Rate funds. $1,000,000 was invested in the Fidelity Floating Rate High Income Fund in December 2004. The return for 2011 was 1.7%. Gains or losses technically are not realized on these funds until they are redeemed, although, for financial statement purposes, the Society records these investments at market.

Issuer	Fidelity
Risk of default	Low
Risk of market decline significantly	Low, possibly medium if economy falters
Maximum Amount	$2,000,000
Comments	The fund is expected to have a relatively stable NAV with yield providing most of the return
2011 Return	1.7%

Summary of Operating Portfolio Investments, December 31, 2011.

Description	Value at 12/31/11	Current Board Limit	Excess over Limit
Money Market Funds	$4,930,839	36% of total portfolio	NA
Certificates of Deposit	2,064,000	$100,000 per inst.	NA
Treasury Notes		1,500,000	NA
Vanguard Bond Funds:			
GNMA Fund	1,651,144		
Short-Term Corp Bond Fund	1,456,172		
LT US Treasury Fund	845,360		
Subtotal	3,952,676	2,500,000 (1)	NA
High Yield and Convertible Funds:			
Vanguard Convertible			
Subtotal	1,428,241	2,000,000	NA
Floating Rate Funds:			
Fidelity Floating Rate High Inc			
Subtotal	1,349,234	2,000,000	NA
Common Stock	14,329	Unrestricted gifts	
Total	$13,739,319		

(1) Limit is exclusive of reinvested dividends and share price increases. See discussion above.

Progress continues on the implementation of the Personify association management software from TMA Resources (TMAR) with a targeted "Go Live" date of August 2012. After consulting with TMAR staff and AMS staff, it was determined that the initial runs of 2013 dues renewals and subscription renewals should be performed using the existing system, before conversion to Personify. These renewals will run in June and July and implementation is scheduled for August.

There are a large number of tasks to be completed before Personify can be used in production. A list of highlighted tasks, by status, includes:

- Completed:
    o Crystal Reports training
    o Cycle 4 database conversion
    o Personify batch process training
    o Accounting setup
    o Country-specific address structure setup
    o eBusiness Web Services proof -of-concept
    o Initial reports analysis
- In Progress:
    o Back Office customizations
    o Addition of AMS-specific fields to the Personify database and application (50% complete)
    o Internal technical review of TMAR developed customizations (4 of 12 remaining)
    o eBusiness customizations, using Personify login and checkout process
    o Data synchronization process between Ingres applications (PUBL) and Personify
    o Internal technical testing of TMAR customizations
    o Reports development (Invoices, Packing Slips, Statements, etc.)
    o 3rd party credit card processing software
- Coming Soon
    o End-to-end system validation (by TMA)
    o End-user acceptance training and testing of TMAR customizations
    o Analysis and setup of Personify security and system access
    o Analysis and setup of Personify's automatic notification system for staff, members and customer
    o Daily, monthly and yearly workflow analysis & setup
    o Web account data migration to Personify Single Sign-On
    o AMS Points data migration

The August implementation will encompass those functions included in our current systems. After the Personify is running smoothly for those functions, new functions will be rolled out to staff. With the exception of the additional development support purchased from TMAR, which was offset by the unused salary of an AMS programmer who left, the project continues to remain within its original budget.

Tom Blythe
Chief Information Officer
April 2012

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REPORT TO THE PRESIDENT

ENGAGE TO EXCEL: PRODUCING ONE MILLION ADDITIONAL COLLEGE GRADUATES WITH DEGREES IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS

Executive Office of the President

President's Council of Advisors on Science and Technology

FEBRUARY 2012

About the President's Council of Advisors on Science and Technology

The President's Council of Advisors on Science and Technology (PCAST) is an advisory group of the nation's leading scientists and engineers, appointed by the President to augment the science and technology advice available to him from inside the White House and from cabinet departments and other Federal agencies. PCAST is consulted about and often makes policy recommendations concerning the full range of issues where understandings from the domains of science, technology, and innovation bear potentially on the policy choices before the President.

For more information about PCAST, see www.whitehouse.gov/ostp/pcast.

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EXECUTIVE OFFICE OF THE PRESIDENT
PRESIDENT'S COUNCIL OF ADVISORS ON SCIENCE AND TECHNOLOGY
WASHINGTON, D.C. 20502

President Barack Obama
The White House
Washington, D.C. 20502

Dear Mr. President,

We are pleased to present you with this report, *Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics*, prepared for you by the President's Council of Advisors on Science and Technology (PCAST). This report provides a strategy for improving STEM education during the first two years of college that we believe is responsive to both the challenges and the opportunities that this crucial stage in the STEM education pathway presents.

In preparing this report, PCAST assembled a Working Group of experts in postsecondary STEM teaching, learning-science research, curriculum development, higher-education administration, faculty training, educational technology, and successful interaction between industry and higher education. The report was strengthened by input from additional experts in postsecondary STEM education, STEM practitioners, professional societies, private companies, educators, and Federal education officials.

PCAST found that economic forecasts point to a need for producing, over the next decade, approximately 1 million more college graduates in STEM fields than expected under current assumptions. Fewer than 40% of students who enter college intending to major in a STEM field complete a STEM degree. Merely increasing the retention of STEM majors from 40% to 50% would generate three-quarters of the targeted 1 million additional STEM degrees over the next decade.

PCAST identified five overarching recommendations that it believes can achieve this goal: (1) catalyze widespread adoption of empirically validated teaching practices; (2) advocate and provide support for replacing standard laboratory courses with discovery-based research courses; (3) launch a national experiment in postsecondary mathematics education to address the mathematics-preparation gap; (4) encourage partnerships among stakeholders to diversify pathways to STEM careers; and (5) create a Presidential Council on STEM Education with leadership from the academic and business communities to provide strategic leadership for transformative and sustainable change in STEM undergraduate education.

Implementing these recommendations will help you achieve one of the key STEM goals you stated in your address to the National Academy of Sciences in April 2009: "American students will move from the middle to the top of the pack in science and math over the next decade. For we know that the nation that out-educates us today—will out-compete us tomorrow." The members of PCAST are grateful for the opportunity to provide our input on an issue of such critical importance to the Nation's future.

Sincerely,

John P. Holdren
PCAST Co-Chair

Eric Lander
PCAST Co-Chair

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Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics

Executive Report

Economic projections point to a need for approximately 1 million more STEM professionals than the U.S. will produce at the current rate over the next decade if the country is to retain its historical preeminence in science and technology. To meet this goal, the United States will need to increase the number of students who receive undergraduate STEM degrees by about 34% annually over current rates.

Currently the United States graduates about 300,000 bachelor and associate degrees in STEM fields annually. Fewer than 40% of students who enter college intending to major in a STEM field complete a STEM degree. Increasing the retention of STEM majors from 40% to 50% would, alone, generate three-quarters of the targeted 1 million additional STEM degrees over the next decade. Many of those who abandon STEM majors perform well in their introductory courses and would make valuable additions to the STEM workforce. Retaining more students in STEM majors is the lowest-cost, fastest policy option to providing the STEM professionals that the nation needs for economic and societal well-being, and will not require expanding the number or size of introductory courses, which are constrained by space and resources at many colleges and universities.

The reasons students give for abandoning STEM majors point to the retention strategies that are needed. For example, high-performing students frequently cite uninspiring introductory courses as a factor in their choice to switch majors. And low-performing students with a high interest and aptitude in STEM careers often have difficulty with the math required in introductory STEM courses with little help provided by their universities. Moreover, many students, and particularly members of groups underrepresented in STEM fields, cite an unwelcoming atmosphere from faculty in STEM courses as a reason for their departure.

Better teaching methods are needed by university faculty to make courses more inspiring, provide more help to students facing mathematical challenges, and to create an atmosphere of a community of STEM learners. Traditional teaching methods have trained many STEM professionals, including most of the current STEM workforce. But a large and growing body of research indicates that STEM education can be substantially improved through a diversification of teaching methods. These data show that evidence-based teaching methods are more effective in reaching all students—especially the "underrepresented majority"—the women and members of minority groups who now constitute approximately 70% of college students while being underrepresented among students who receive undergraduate STEM degrees (approximately 45%). This underrepresented majority is a large potential source of STEM professionals.

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ENGAGE TO EXCEL: PRODUCING ONE MILLION ADDITIONAL COLLEGE GRADUATES
WITH DEGREES IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS

The Need for an Improved STEM Student Recruitment and Retention Strategy for the First Two Years of Postsecondary Education

The first two years of college are the most critical to the retention and recruitment of STEM majors. These two years are also a shared feature of all types of 2- and 4-year colleges and universities—community colleges, comprehensive universities, liberal arts colleges, research universities, and minority-serving institutions. In addition, STEM courses during the first two years of college have an enormous effect on the knowledge, skills, and attitudes of future K-12 teachers. For these reasons, this report focuses on actions that will influence the quality of STEM education in the first two years of college.

Based on extensive research about students' choices, learning processes, and preparation, three imperatives underpin this report:

- Improve the first two years of STEM education in college.

- Provide all students with the tools to excel.

- Diversify pathways to STEM degrees.

Our recommendations, described below, detail how to convert these imperatives into action.

The title of this report, "Engage to Excel," applies to students, faculty, and leaders in academia, industry, and government. Students must be engaged to excel in STEM fields. To excel as teachers, faculty must engage in methods of teaching grounded in research about why students excel and persist in college. Moreover, success depends on the engagement by great leadership. Leaders, including the President of the United States; college, university and business leadership; and others, must encourage and support the creation of well-aligned incentives for transforming and sustaining STEM learning. They also must encourage and support the establishment of broad-based reliable metrics to measure outcomes in an ongoing cycle of improvement.

Transforming STEM education in U.S. colleges and universities is a daunting challenge. The key barriers involve faculty awareness and performance, reward and incentive systems, and traditions in higher education. The recommendations in this report address the most significant barriers and use both tangible resources and persuasion to inspire and catalyze change. Attacking the issue from numerous angles and with various tools is aimed at reaching a point at which the movement will take on a momentum of its own and produce sweeping change that is sustainable without further Federal intervention.

Recommendations

The President's Council of Advisors on Science and Technology (PCAST) proposes five overarching recommendations to transform undergraduate STEM education during the transition from high school to college and during the first two years of undergraduate STEM education:

1. **Catalyze widespread adoption of empirically validated teaching practices.**

2. **Advocate and provide support for replacing standard laboratory courses with discovery-based research courses.**

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3. **Launch a national experiment in postsecondary mathematics education to address the math preparation gap.**

4. **Encourage partnerships among stakeholders to diversify pathways to STEM careers.**

5. **Create a Presidential Council on STEM Education with leadership from the academic and business communities to provide strategic leadership for transformative and sustainable change in STEM undergraduate education.**

Each of these recommendations will be explained in more detail below.

Recommendation 1.
Catalyze widespread adoption of empirically validated teaching practices.

Learning theory, empirical evidence about how people learn, and assessment of outcomes in STEM classrooms all point to a need to improve teaching methods to enhance learning and student persistence. Classroom approaches that engage students in "active learning" improve retention of information and critical thinking skills, compared with a sole reliance on lecturing, and increase persistence of students in STEM majors. STEM faculty need to adopt teaching methods supported by evidence derived from experimental learning research as well as from learning assessment in STEM courses. Evidence-based teaching methods have proven effective with a wide range of class sizes and increase learning outcomes even as enhancements of traditional lectures.

A significant barrier to broad implementation of evidence-based teaching approaches is that most faculty lack experience using these methods and are unfamiliar with the vast body of research indicating their impact on learning. The Federal Government could have a major impact by providing substantial support for programs that provide training for current and future faculty in evidence-based teaching methods and provide materials to support the application of such methods. Established programs run by the National Academies and the American Physical Society (APS) have trained many faculty, and evaluations of these programs have demonstrated that they change the participants' teaching methods and have positive effects on student achievement and engagement. These programs provide successful models for replication and expansion.

Although evidence-based teaching methods do not necessarily require more resources than traditional lectures, the transition requires time and effort that can be costly for colleges and universities. Given the Federal Government's interest in maintaining a strong STEM workforce, Federal support, in partnership with private and academic institutional investment, will be needed to initiate these changes, after which they can be sustained over the long term without external assistance.

Ongoing change toward the goal described here requires the ability to measure progress. Metrics for excellence in undergraduate STEM education would provide tools for institutions, departments, funding agencies, external evaluators, accreditation agencies, students choosing where to study STEM subjects, and those designing innovative programs. Flexible criteria are needed to account for the wide range of institutions and disciplines that will use these tools to direct change.

ENGAGE TO EXCEL: PRODUCING ONE MILLION ADDITIONAL COLLEGE GRADUATES
WITH DEGREES IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS

Actions to achieve Recommendation 1.

1-1 **Establish discipline-focused programs funded by Federal research agencies, academic institutions, disciplinary societies, and foundations to train current and future faculty in evidence-based teaching practices.**

Successful programs should be expanded to reach 10% to 20% of the nation's 230,000 STEM faculty over the next five years. The expansion should make training available to faculty from diverse backgrounds to provide role models for all students and from all disciplines and types of institutions. Based on data from existing teaching training programs, it is reasonable to expect trained faculty to influence the teaching of 10 colleagues, making it possible to reach a substantial proportion of the STEM faculty through programs targeted at a subset of faculty. Moreover, approximately 10% of the STEM faculty teach the introductory courses to first- and second-year college students. Therefore, the goal of reaching 10% to 20% of the STEM faculty directly could result in training most of those who teach in the first two years of college.

A total of $10-15 million per year over 5 years will be required for the training of 23,000 to 46,000 STEM faculty. Funds for this training should be derived from a combination of Federal programs academic institutions, disciplinary societies, and foundations. To train future faculty, Federal research agencies should require all graduate students and postdoctoral fellows supported by federal training grants to receive instruction in modern teaching methods. A combination of training grant and institutional funds should be dedicated to this training effort.

1-2 **Create a "STEM Institutional Transformation Awards" competitive grants program at NSF.**

A competitive grants program should be designed to provide incentives for and facilitate teaching innovations at 2- and 4-year institutions. Grants should support model programs and electronic dissemination of successful practices. The grants program should have funding of $20 million per year, to support approximately 100 multi-year projects with average total support of $1 million over a 5-year period. Funding could come from enactment of NSF's proposed Widening Implementation and Demonstration of Evidence-Based Reforms (WIDER) program at the Presidents' Fiscal Year 2012 requested level of $20 million annually.

1-3 **Request that the National Academies develop metrics to evaluate STEM education.**

To evaluate progress toward the goals presented in this report, campuses, funders, students, and accreditation agencies need a meaningful set of criteria by which to measure excellence in STEM education. NSF and the U.S. Department of Education should request The National Academies to lead an effort to develop metrics supported by empirical evidence that encourage and assess faculty practices and student learning.

Recommendation 2.
Advocate and provide support for replacing standard laboratory courses with discovery-based research courses.

Traditional introductory laboratory courses generally do not capture the creativity of STEM disciplines. They often involve repeating classical experiments to reproduce known results, rather than engaging

EXECUTIVE REPORT

students in experiments with the possibility of true discovery. Students may infer from such courses that STEM fields involve repeating what is known to have worked in the past rather than exploring the unknown. Engineering curricula in the first two years have long made use of design courses that engage student creativity. Recently, research courses in STEM subjects have been implemented at diverse institutions, including universities with large introductory course enrollments. These courses make individual ownership of projects and discovery feasible in a classroom setting, engaging students in authentic STEM experiences and enhancing learning and, therefore, they provide models for what should be more widely implemented.

Actions to achieve Recommendation 2.

2-1 Expand the use of scientific research and engineering design courses in the first two years through an NSF program.

The National Science Foundation should provide initial funding to replicate and scale-up model research or design courses, possibly through the existing Transforming Undergraduate Education in STEM (TUES) program or the Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP). On the order of 30% of the existing programs across STEM disciplines could be focused on funding implemention of research courses at postsecondary academic institutions at an annual cost of approximately $12.5 million dollars (based on Fiscal Year 2010 funding levels). Based on the range of funding for Type 3 TUES grants and Type 1 STEP grants, about 10 proposals per year at an average level of $1.2 million could be awarded, in order to impact 100 campuses over the next 10 years.

Colleges and universities should seek to match NSF funding with private and philanthropic sources. Research courses should be an encouraged element of STEM Institutional Transformation Awards. Because research courses will replace expensive introductory laboratory courses, they should not require ongoing external support once the transition is accomplished.

2-2 Expand opportunities for student research and design in faculty research laboratories by reducing restrictions on Federal research funds and redefining a Department of Education program.

Independent research on faculty projects is a direct way for students to experience real discovery and innovation and to be inspired by STEM subjects. All relevant Federal agencies should examine their programs which support undergraduate research and where there exists prohibitions, either in policy or practice, which would interfere with the recommendations of this report to support early engagement of students in research, these should be changed. Federal agencies should encourage projects that establish collaborations between research universities and community colleges or other institutions that do not have research programs. Cross-institutional research opportunities could be funded through redefinition of the Department of Education's $1 billion Carl D. Perkins Career and Technical Education program and by sharpening the focus of Federal investments in minority institutions.

Recommendation 3.

Launch a national experiment in postsecondary mathematics education to address the mathematics-preparation gap.

College-level skills in mathematics and, increasingly, computation are a gateway to other STEM fields. Today many students entering college lack these skills and need to learn them if they are to pursue STEM majors. In addition, employers in the private sector, government, and military frequently cite that they cannot find enough employees with needed levels of mathematics skills. This lack of preparation imposes a large burden on higher education and employers. Higher education alone spends at least $2 billion per year on developmental education to compensate for deficiencies. Also, introductory mathematics courses often leave students with the impression that all STEM fields are dull and unimaginative, which has particularly harmful effects for students who later become K-12 teachers. Reducing or eliminating the mathematics-preparation gap is one of the most urgent challenges—and promising opportunities—in preparing the workforce of the 21st century.

Closing this gap will require coordinated action on many fronts starting in the earliest grades. PCAST's earlier report on K-12 STEM education, *Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math (STEM) for America's Future*, contains several recommendations that involve colleges and universities in this effort. In particular, it calls for the Federal Government to establish the objective of recruiting, preparing, and providing induction support for at least 100,000 new STEM middle and high school teachers who have majors in STEM fields and strong content-specific pedagogical preparation. This Administration has embraced this goal, and production of 1 million additional STEM graduates over the next decade could contribute substantially to meeting it.

The Federal Government has a critical role in supporting the development of a knowledge base to close the mathematics-preparation gap. For example, research into the best ways to teach math to older students so they can pursue STEM subjects in the first two years of college is badly needed. Some developmental mathematics courses have demonstrated effectiveness in increasing math proficiency among those not ready for college-level math and even in encouraging students intending to major in STEM subjects to persist to graduation and a STEM degree. Mathematics education research should explore the attributes of these successful classes and ways to disseminate best practices.

In the *Prepare and Inspire* report, PCAST also called for the creation of a mission-driven, Advanced Research Projects Agency for Education (ARPA-Ed) that would propel and support (1) the development of innovative technologies and technology platforms for learning, teaching, and assessment across all subjects and ages, and (2) the development of effective, integrated, whole-course materials for STEM education. Many of these advances would benefit not only K-12 education but also the developmental courses that many students need to pursue STEM fields during the first two years of college.

Actions to achieve Recommendation 3.

3-1 Support a national experiment in mathematics undergraduate education at NSF, the Department of Labor, and the Department of Education.

The National Science Foundation and the Departments of Labor and Education should support a multi-campus 5-year initiative aimed at developing new approaches to remove or reduce the mathematics bottleneck that is currently keeping many students from pursuing STEM majors.

This national experiment should fund a variety of approaches, including (1) summer and other bridge programs for high school students entering college; (2) remedial courses for students in college, including approaches that rely on computer technology; (3) college mathematics teaching and curricula developed and taught by faculty from mathematics-intensive disciplines other than mathematics, including physics, engineering, and computer science; and (4) a new pipeline for producing K-12 mathematics teachers from undergraduate and graduate programs in mathematics-intensive fields other than mathematics. Diverse institutions should be included in the experiment to assess the impact of the intervention on various types of students and schools. Outcome evaluations should be designed as a collective effort by the participating campuses and funding agencies.

Approximately 200 experiments at an average level of $500,000 should be funded at institutions across the county, at an annual cost of $20 million per year for 5 years. As mathematics preparation issues vary across the postsecondary spectrum, a variety of sources will be needed to fund experiments at diverse institution types. Funds for these experiments could be derived from a combination of the Department of Education's proposed First in the World Initiative, possibly the Department of Labor's Career Pathways Innovation Fund or Trade Adjustment Assistance Community College and Career Training initiative, and a strategic focus on mathematics of NSF's Transforming Undergraduate Education in STEM (TUES) program or Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP) for the next 5 years.

Recommendation 4.
Encourage partnerships among stakeholders to diversify pathways to STEM careers.

To take advantage of the breadth of available talent, non-traditional students should receive special attention. Adult and working students and those from backgrounds atypical of traditional STEM students may need alternative pathways to be successful in STEM disciplines. The concept of a "pipeline" to STEM competency and accomplishment needs to be superseded by the image of multiple pathways to these goals. All colleges and universities, including 2- and 4-year institutions, need better connections among themselves and with other institutions to provide more entry points and pathways to STEM degrees.

Actions to achieve Recommendation 4.
Establishing and supporting pathways will require a coordinated effort among diverse institutions. The Federal Government can lead this effort and encourage the necessary partnerships through strategic planning, reallocation of funds, and leadership.

4-1 **Sponsor at the Department of Education summer STEM learning programs for high school students.**

The Department of Education should roll-out the summer learning programs authorized in the 2007 America Competes Act (in an amendment introduced by then-Senator Obama) to provide mathematics instruction and hands-on STEM experiences for rising high school juniors and seniors. The programs should be funded by partnerships among the Federal Government, states, local entities, and private industry. Based on the size of National Science Foundation's

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ENGAGE TO EXCEL: PRODUCING ONE MILLION ADDITIONAL COLLEGE GRADUATES
WITH DEGREES IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS

former Young Scholars Program for summer institutes, we recommend an investment of $10 million to fund approximately 100 projects reaching on the order of 5000 students, annually, with significant cost sharing with academic institutions and private investors.

4-2 Encourage pathways from 2- to 4-year institutions through an NSF program and expanded definition of a Department of Labor Program.

The mission of the Department of Labor's Trade Adjustment Assistance Community College and Career Training initiative should be expanded beyond development of important partnerships between community and technical colleges and employers in the private sector to encourage scientific research and engineering design exchanges across two- and four-year institutions. Alternatively, these activities could be funded through a strategic focus of the Department of Labor's Career Pathways Innovation Fund on research partnerships. NSF's Advancing Technical Education program could also be focused on cross institutional collaborations. The bridges described here should provide authentic STEM experiences for community college students on the four-year campus and allow students to develop relations with faculty and the college or university community to ease the potential transition from a 2- to 4-year institution or to provide advanced experiences for students who do not pursue a four year degree.

4-3 Establish public-private partnerships to support successful STEM programs.

To enhance students' STEM readiness, the Federal Government should engage private industry and foundations to support successful programs that create bridges between high schools and colleges and between 2- and 4-year institutions and ensure that programs incorporate learning standards and content consistent with industry-recognized skills.

4-4 Improve data provided by the Department of Education and the Bureau of Labor Statistics to STEM students, parents, and the greater community on STEM disciplines and the labor market.

To promote pathways to STEM careers for non-traditional students, the Federal Government should provide current and comprehensive data on STEM jobs. Today, public and private employers of STEM professionals lack data about the skills, choices, and availability of STEM workers. To produce needed information, the 1988 cohort and the *High School and Beyond* cohort should be resurveyed; the Department of Education should devote more resources to tracking students from high school into their careers; and the Bureau of Labor Statistics should redefine employment categories to include in "STEM" the breadth of jobs that require STEM skills, such as medical careers and advanced manufacturing professions.

Recommendation 5.
Create a Presidential Council on STEM Education with leadership from the academic and business communities to provide strategic leadership for transformative and sustainable change in STEM undergraduate education.

The leadership of higher education and STEM-enabled businesses needs to be inspired to generate sweeping changes in higher education to produce the workforce America needs. Toward this end, we recommend that the President, via Executive Order, form a Presidential Council on STEM Education to

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provide advice and leadership on postsecondary STEM education. The council should include members that represent the breadth of academic institutions, professional societies, businesses, and private foundations involved in the development and use of human capital in STEM fields. Based on the guidance provided in this report, the council should make recommendations that advance the quality of postsecondary STEM education through all mechanisms available to the President. The council could provide a forum for leaders in the public and private sectors to weigh in on the development and deployment of metrics to evaluate STEM departments (Recommendation 1) and to design collaborative coalitions to support initiatives in STEM education (Recommendation 4), including expanding internship programs in industry and connecting industrial research agendas with research courses (Recommendation 2). In addition, it could provide advice and review for the National Experiment in Math Undergraduate Education (Recommendation 3) and could conduct further study of the math education issue, if necessary.

**OVERVIEW OF PCAST RECOMMENDATIONS
TO ENGAGE AND EXCEL IN UNDERGRADUATE SCIENCE, TECHNOLOGY,
ENGINEERING, AND MATHEMATICS (STEM) EDUCATION**

Recommendation 1: Catalyze widespread adoption of empirically validated teaching practices.

1-1 Establish discipline-focused programs funded by Federal research agencies, academic institutions, disciplinary societies, and foundations to train current and future faculty in evidence-based teaching practices.

1-2 Create the "STEM Institutional Transformation Awards" competitive grants program at NSF.

1-3 Request that the National Academies develop metrics to evaluate STEM education.

Recommendation 2: Advocate and provide support for replacing standard laboratory courses with discovery-based research courses.

2-1 Expand the use of scientific research and engineering design courses in the first two years of postsecondary education through an NSF program.

2-2 Expand opportunities for student research and design in faculty research laboratories by reducing restrictions on Federal research funds and redefining a Department of Education program.

Recommendation 3: Launch a national experiment in postsecondary mathematics education to address the mathematics-preparation gap.

3-1 Support a national experiment in mathematics undergraduate education at NSF, the Department of Labor, and the Department of Education.

Recommendation 4: Encourage partnerships among stakeholders to diversify pathways to STEM careers.

4-1 Sponsor at the Department of Education summer STEM learning programs for high school students.

4-2 Expand the scope of a Department of Labor Program and focus an NSF program to encourage pathways from 2-to 4-year institutions.

4-3 Establish public-private partnerships to support successful STEM programs.

4-4 Improve data provided by the Department of Education and the Bureau of Labor Statistics to STEM students, parents, and the greater community on STEM disciplines and the labor market.

Recommendation 5: Create a Presidential Council on STEM Education with leadership from the academic and business communities to provide strategic leadership for transformative and sustainable change in STEM undergraduate education.

ENGAGE TO EXCEL: PRODUCING ONE MILLION ADDITIONAL COLLEGE GRADUATES
WITH DEGREES IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHMATICS

Engage to Excel: Summary of Recommendations, Actions, and Estimated Costs

1. Catalyze widespread adoption of empirically validated teaching practices.

Action	Agency and Estimated Cost
Establish discipline-focused programs funded by Federal agencies, academic institutions, professional societies, and foundations to train (1) current and (2) future faculty in evidence-based teaching practices.	1. NSF and other agencies should partner with foundations and disciplinary societies to expand existing teacher training programs ($10-$15 M per year over five years to train 23,000 to 46,000 STEM faculty). 2. All agencies that provide training grants for graduate students and postdocs, through a combination of training grants and institutional funds.
(1) Create a "STEM Institutional Transformation Awards" competitive grants program at NSF. (2) Develop an online presence to share data and best practices.	1. NSF's proposed Widening Implementation and Demonstration of Evidence-based Reforms (WIDER) program. $20 M per year over five years to fund 100 multi-year projects. 2. Education through proposed First in the World Initiative or ARPA-Ed.
Request that the National Academies develop metrics to evaluate STEM education.	NSF and Education to request this study, with cost to be determined.

2. Advocate and provide support for replacing standard laboratory courses with discovery-based research courses.

Action	Agency and Estimated Cost
Expand the use of scientific research and engineering design courses in the first two years through an NSF program.	NSF, with initial funding possibly through Transforming Undergraduate Education in Science (TUES) or Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP) at $12.5 M, annually (i.e. 10 Type 3 TUES or Type 1 STEP proposals per year at an average of $1.2M).
Expand opportunities for student research in faculty laboratories by (1) reducing restrictions on Federal research funds, (2) giving special consideration to training grants that establish collaborations between research universities and other institutions, and (3) redefining a Department of Education program.	1. All Federal agencies should make it possible to use undergraduate research program funds for first- and second-year students. 2. Federal agencies that fund programs for minority institutions could encourage cross-institution research partnerships. 3. Include research opportunities as technical education, such as that supported by the Department of Education's Carl D. Perkins CTE program.

3. Launch a national experiment in postsecondary mathematics education to address the mathematics-preparation gap.

Action	Agency and Estimated Cost
Support a national experiment in mathematics undergraduate education focused on: (1) summer programs; (2) remedial courses including use of technology; (3) discipline-based mathematics instruction, and (4) new pathways for K-12 mathematics teachers.	Fund 200 sites at an average of $500,000 over five years, or $20 M per year for five years, with funds from: NSF's TUES or STEP programs, DOL's Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant Program or Career Pathways Innovation Fund, and Education's proposed First in the World Initiative.

4. Encourage partnerships among stakeholders to diversify pathways to STEM careers.

Action	Agency and Estimated Cost
Sponsor summer STEM learning programs for high school students.	Education as authorized in the America Competes Act ($10m to fund about 100 projects reaching on the order of 5000 students, annually).
Expand the scope of a DOL program and focus an NSF program to encourage pathways from 2-4 year institutions.	DOL's TAACCCT Grant Program initiative or Career Pathways Innovation Fund or NSF's Advancing Technical Education program to support community college-university or college research and design partnerships.
Establish public-private Agency-Institution-Industry partnerships to support successful STEM programs.	All STEM and education-focused Federal agencies.
Improve data provided to STEM students, parents, and the greater community on STEM education disciplines and the labor market.	Department of Education should devote more resources to tracking students from high school into their careers. Bureau of Labor Statistics should redefine employment categories to include in "STEM" the breadth of jobs that require STEM skills.

5. Create a Presidential Council on STEM Education with leadership from the academic and business communities to provide strategic leadership for transformative and sustainable change in STEM undergraduate education.

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Presidential Commitments in Support of PCAST Recommendations on Science, Technology, Engineering, and Mathematics Education

February 7, 2012

A number of commitments announced by President Obama today in conjunction with the White House Science Fair respond directly to recommendations in two reports by the President's Council of Advisors on Science and Technology.

In September 2010, PCAST released *Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math (STEM) for America's Future*, which, among other recommendations, called for a major push to recruit and train 100,000 great STEM teachers over the next decade able to prepare and inspire students. In support of that goal, the President announced today:

- **A new $80 million investment to help prepare effective STEM teachers**: The President's upcoming budget will request $80 million for a new competition by the Department of Education to support effective STEM teacher preparation programs, such as those that allow students to simultaneously earn both a STEM degree and a teaching certificate, and provide undergraduates with early and intensive experiences in the classroom honing their skills.

- **A new $22 million investment from the philanthropic and private sector to complement the Administration's efforts**: After the President issued his call to action to recruit and prepare 100,000 effective STEM teachers, over 115 organizations, led by Carnegie Corporation of New York and Opportunity Equation, came together to form a coalition called "100Kin10" to help reach the President's goal. Today, 14 of those organizations – including Carnegie, Google, the S.D. Bechtel, Jr., Bill & Melinda Gates, Freeport McMoran, and Michael and Susan Dell Foundations – are announcing a $22 million fund to invest in STEM teacher preparation. In addition, several other 100Kin10 partners are making over 100 individual commitments, such as:

  o **Citizen Schools** will bring 10,000 additional STEM professionals into classrooms to teach part-time over the next 10 years;

  o **National Math and Science Initiative** will prepare 4,000 new STEM teachers from 31 UTeach sites by 2015;

  o **Teach for America** will recruit 11,000 STEM Corps members by 2015 and connect other qualified applicants to additional STEM teaching opportunities;

  o **Donors Choose** will inspire 50,000 citizens to sponsor projects in math and science classrooms over the next two years, delivering $15M in critical classroom resources and helping 600,000 students nationwide;

  o **Google** will share its talent management practices to help find, grow, and retain outstanding STEM teachers by partnering with districts and organizations for comprehensive reform and hosting talent academies with administrators and decision-makers; and,

    o **University of Chicago** will create a framework for organizing the learning that results from "100Kin10" investments and coordinate research among partners on key questions about STEM teacher recruitment, preparation, induction, and development.

A complete list of partners, their commitments, and general information about 100Kin10 is available at their website: www.100Kin10.org.

- **New policies and investments to recruit, support, retain and reward excellent STEM teachers:** To improve the teaching and learning of STEM and encourage our best STEM teachers to stay in the profession, we must implement a system that recognizes and rewards teacher excellence. That's why, this year, the Department of Education will devote a portion of its upcoming $300 million Teacher Incentive Fund competition to support state and local efforts to improve compensation, evaluation, and professional development systems for STEM educators. In addition, the Department of Education will provide new incentives to improve the quality of teacher preparation programs by targeting TEACH Grants to students attending top-tier schools, and focusing on a smaller number of more meaningful outcome indicators about their quality and impact on teacher performance. Concurrently, the National Science Foundation will continue to emphasize the quality of teacher preparation programs and plans for innovation in its Robert Noyce Scholarship program.

Today, the President announced his support for the goal of producing, over the next decade, 1 million more STEM professionals than are projected to graduate at current rates—a goal at the core of PCAST's newest report, *Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics*, released today. In support of that goal, the President committed to:

- **A priority on undergraduate STEM education reform in the President's upcoming budget:** The President announced more than $100 million in investments by the National Science Foundation to improve undergraduate STEM education practices through its programs such as Widening Implementation and Demonstration of Evidence-based Reforms (WIDER), Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics (TUES), and programs that impact community colleges and minority-serving institutions. This will support the development, identification, and scale-up of educational practices that increase the number of STEM graduates and the quality of their preparation. In addition, the Department of Education's proposed First in the World competition will include a STEM priority.

- **A new K-16 education initiative jointly administered by the Department of Education and the National Science Foundation**: To support comprehensive reform efforts in K-16 education, the President's FY 2013 budget will fund a jointly administered initiative to improve mathematics education, with $30 million from the Department of Education and $30 million from the National Science Foundation. This initiative will develop, validate, and scale up evidence-based approaches to improve student learning at the K-12 and undergraduate levels through a "tiered-evidence framework" to maximize the impact of mathematics education investments.

###

AMS Committee on Meetings and Conferences

Highlights of 2012 Meeting

The Committee on Meetings and Conferences (CoMC) held its annual meeting on March 24, 2012, at the AMS Headquarters in Providence, RI. David Farmer, chair, presided over the meeting

Introductory items

The meeting began with a round of introductions. Time was then devoted to discussing the components that play roles in AMS meetings: the Secretariat, the Meetings and Conferences Department, and CoMC. The history of some decisions made by CoMC was reviewed. Secretary Robert Daverman, Associate Secretaries Georgia Benkart and Steven Weintraub, and AMS staff members AED Ellen Maycock and Director of Meetings and Conferences Penny Pina answered questions posed by CoMC members.

Reports

- *Secretariat*. Robert Daverman reported on the March 23, 2012, Secretariat meeting.

    o **Upcoming Joint International Meetings:**

        ▪ Romania, June 27-30, 2013, in Alba Iulia.
        ▪ Israel, June 16-19, 2014, in Tel Aviv.
        ▪ Portugal, June 11-14, 2015, in Porto.
        ▪ Tentative: meeting to be held in India in 2016.

    o **2012-2013 Einstein Lectures.** Gunther Uhlmann gave the 2012 Einstein Lecture on March 17, 2012, at George Washington University. The 2013 Einsterin Lecutre will be given by Jon Kleinberg at Washington University in St. Louis.

    o **2012-2013 Erdős Lectures.** The 2012 Erdös Memorial Lecture will be held during the Sectional Meeting at the University of Arizona, October 27-28, 2012. Ken Ono has accepted an invitation to give this lecture. The 2013 Lecutre will be held at Temple University on October 12, 2013. The lecturer will be Barry Mazur.

    o Matthew Miller has resigned as Associate Secretary of the Southeastern Section. A search committee has been formed, consisting of Ruth Charney, Carla Savage, Joe Silverman and Robert Daverman (chair).

- *CoMC Focus Group Breakfast*. David Farmer chaired the Focus Group at the 2012 JMM. The participants discussed a variety of topics related to the Joint Mathematics Meetings. Many made helpful comments about the new JMM Personal Scheduler and the Employment Center. All enjoyed Boston as a location and encouraged the Joint Meetings Committee to consider Boston again for the JMM.

- ***Boston Questionnaire.*** The responses from the Boston questionnaire were reviewed. Once again, the AMS used an electronic survey form and sent email to all participants after the meeting with a link to the survey. Over 2400 participants responded to the survey.

- ***Review of the Joint International Meetings.*** Paul Muhly and Steven Weintraub (chair) formed the subcommittee that carried out this review. The subcommittee gathered information from the AMS Associate Secretaries, who are involved in planning these meetings.

  Overall, the report was very positive. In summary, the report stated:

  > *The AMS international meetings program is working very well, producing meetings of high quality that are a service to the mathematical community and a benefit to the AMS as an institution. In general, these meetings attracted wide participation from mathematicians from the host country, from North America, and from other countries as well. Mathematicians in the host countries were in general very enthusiastic and all participants greatly appreciated the opportunity provided by the meetings.*

  > *We recommend that the program continue along its current lines and with its current frequency, approximately one international meeting per year.*

  The subcommittee also recommended that the AMS-SMM special joint meetings be discontinued, and rolled into the regular schedule of Joint International Meetings. CoMC members discussed this recommendation carefully, and determined that nothing should be decided on this topic until after the first meeting of the Mathematical Congress of the Americas, to be held in August 2013. CoMC will consider this again at its meeting of 2014.

  CoMC voted to accept the report of the subcommittee.

- ***Report from the Subcommittee on Guidelines for Exposition***

  At its March 2011 meeting, CoMC created a subcommittee on Guidelines for Exposition. Members of this subcommittee were Estelle Basor, Laura De Carli (co-chair), Benson Farb (co-chair), David Farmer and Ellen Maycock. This subcommittee was charged to write a set of guidelines for selecting invited plenary speakers for AMS meeting. Additionally, the subcommittee was charged with drafting guidelines that would help a speaker as he or she prepares a plenary lecture. CoMC discussed the two sets of guidelines, made some revisions and then approved the revised guidelines. The guidelines for choosing speakers will now be considered by the Council. The guidelines for speakers are posted on the AMS web site. Both sets of guidelines are included at the end of this report.

Old business

- *AMS Activity Groups.* At the CoMC meeting of March 2010, a proposal for AMS Activity Groups was introduced by chair Loek Helminck. A subcommittee was charged with considering this possibility and writing a proposal for such a program, which was presented at the March 2011 meeting. There was considerable discussion about the proposal at that meeting. However, CoMC felt that there needed to be more consideration of alternatives to meetings and charged the subcommittee to review and revise the proposal. A revised proposal for Activity Groups was written by a new subcommittee, whose members were Bob Daverman, Laura De Carli, Benson Farb, David Farmer, Eric Friedlander, Bus Jaco, Ellen Maycock and Janet Talvacchia (chair) and presented at the CoMC meeting. The new proposal called for the creation of AMS Activity Groups that would be primarily electronic in nature. CoMC endorsed the revised proposal and has recommended it to the Committee on the Profession (CoProf).

- *Joint Prize Session at the Joint Mathematics Meetings*. At its January 2011 meeting, the Council approved the following recommendation from the Task Force on Prizes that was endorsed by the Executive Committee and Board of Trustees:

    The appropriate policy committees should undertake a review of the current prize ceremony at the Joint Meetings and include in their review that
    - **i.   some prizes be associated with talks (possibly at Sectional Meetings);**
    - **ii.   the AMS hold a separate prize ceremony at the Joint Meetings; or**
    - **iii. some prizes be announced and awarded outside of meeting.**

    At the recommendation of CoMC, a joint CoMC-CoProf committee was formed, with Georgia Benkart and Don McClure as CoMC representatives and Jennifer Shultens and Abigail Thompson as CoProf representatives. CoMC endorsed the following principle proposed by Don McClure:

    To award only prizes and awards at the JMM that are highly selective and truly national in scope.

New business:

- *Handicap accessible venues*. Associate Secretary Steven Weintraub proposed the following policy:

    All AMS meetings and AMS-sponsored conferences held in the US shall be held in venues that are fully accessible to the physically handicapped.

    CoMC approved the policy and recommended it to the Council.

Information items

- ***Mathematics of Planet Earth 2013.*** Mathematics of Planet Earth 2013 (MPE2013) is a worldwide, year-long project supported by a large number of mathematics institutes and societies around the globe. The mission of MPE2013 is to increase the engagement of mathematicians, researchers, teachers, students, and the public with the role of mathematics in issues affecting Planet Earth and its future. In the United States, the launch of MPE2013 will occur at the Joint Mathematics Meetings in San Diego. (*adapted from the home page of MPE2013*)

- ***Mathematical Congress of the Americas.*** The first Mathematical Congress of the Americas (MCA) will be held at CIMAT (Centro de Investigación en Mathemáticas) in Guanajuato, Mexico on August 5 – 9, 2013. The goal of the Congress is to highlight the excellence of mathematical achievements in the Americas within the context of the international arena and to foster the scientific integration of all mathematical communities in the continent. The AMS will support the MCA in the following ways:

  - Provide support for three plenary speakers
  - Provide infrastructure and support for abstracts
  - Submit a proposal to the NSF for travel grants to the MCA
  - Help advertise and promote the MCA 2013

2013 CoMC Meeting.

- The committee approved the suggested date of March 23, 2013 for its next meeting, to be held at Hilton Chicago O'Hare Airport.
- For the 2013 meeting, the topic to be reviewed will be: National Meetings (overall program, including governance meetings).

Ellen Maycock
Associate Executive Director
April 5, 2012

The following was approved by CoMC at its March 24, 2012 meeting and has been recommended to the Council for consideration during its meeting of April 21, 2012.

How to choose plenary speakers

It should be remembered that giving a plenary AMS talk is a privilege, not a right. Proving an excellent theorem is necessary but not sufficient for an invitation.
Each of the following criteria should be considered when choosing plenary speakers:

1. Committee members are encouraged to look outside their departments and their fields when they choose speakers.

2. Each speaker should have made a recent notable contribution to mathematics.

3. The committee should have evidence that the proposed speaker is a good (preferably excellent) expositor.

4. Speakers should have the ability to explain their areas and their contributions to a general audience. For example, a talk on the details of a hard technical advance is not appropriate for a plenary AMS talk.

5. The list of all plenary speakers should represent the full diversity of mathematics, in terms of fields, career stages, and membership in underrepresented groups.

****

The following was approved by CoMC at its March 24, 2012 meeting and is now posted on the AMS web site:

Guidelines for the preparation of a good AMS invited address.

Being an invited speaker at an AMS meeting is a privilege and a responsibility.
The charge to invited speakers is to describe recent significant advances in their field to a national audience. Their talks are meant to inspire graduate students and young researchers, and should be accessible to a general mathematical community. Accordingly, AMS invited addresses require more care and attention than invited lectures for a smaller or more specialized audience.

Basic Guidelines:

1) Make your talk as self-contained as possible.

For a 50-minute talk, a good rule of thumb is: 20 minutes for a basic introduction, notation and preliminaries; 15 minutes for stating your results and for examples and counterexamples, and 15 minutes for extra details or for a sketch of proof.

2) Include at least one example.

3) Prepare clear and legible slides using large fonts.

Your slides should be readable from the back rows of a large auditorium. 35 words per page should be the absolute maximum. If your material is hand-written, write large, clear and legible formulas.

4) Practice your talk for time.

AMS meetings are highly structured, and no talk can take longer than the allotted time.

5) Speak clearly and slowly.

6) Give people time to read each slide.

Every part of your slide should stay visible for at least one minute. Refrain from distracting gimmicks such as twirling page transitions and excessive clicking to reveal or hide parts of a slide.

Additional helpful hints:

1) Be sure to check that the appropriate media are available for your talk.

2) Know the exact phrasing of your opening sentence.

3) It is better to outline or sketch your talk in words facing the audience, and not use a non-informative outline slide.

4) Have a clear idea of the transitions between different parts of your talk.

At various points throughout the talk give a brief summary of what has already been said and explain how the next part fits into the overall picture.

5) Consider using explanatory pictures.

6) Remember to address the silent questions: Why are you doing what you are doing? What are the long-term and short-term goals of this research topic? Of your project? Why is this interesting?

7) It is often helpful to have an "extra section" if there is enough time to add material and an "optional take out" section if one is running late.

The following changes for fees for MathJobs.org, MathPrograms.org, EIMS, the Employment Center and the AMS Short Course have been approved by the Executive Director.

Fee changes for MathJobs.org

The following fees will go into effect for 2012/13 Mathjobs.org employer registrations (from July 1, 2012 through June 30, 2013). Employers located in North America will be allowed to open regular accounts. All employers will be allowed to open advertising-only accounts. The service is free to applicants.

The fee structure allows for one-ad (but otherwise full service) accounts to be purchased by North American employers for a slight discount. This offer is meant to accommodate the needs of smaller schools and to encourage employers from outside academia to try using MathJobs.org.

Proposed employer fees:
Regular account (for up to seven ads), 12 months from date of sign up: **$585**
Regular account (for one ad only), 12 months of usage from date of sign-up: **$395**
Advertising-only account (for one ad), 12 months from date of sign up: **$285**

Previous fees:

| | Regular accounts | | Ad-only accounts |
	(up to 7 ads)	(one ad)	(one ad)
2011/12	$550	$385	$275
2010/11	$525		$260
2009/10	$500		$250
2008/09	$450		
2007/08	$400		
2006/07	$350		
2005/06	$300		

Fee changes for MathPrograms.org

Academic institutions and nonprofit and government organizations who are seeking applications from the mathematical sciences community for programs or funding may create a 12-month account. They may post program announcements, accept applications and confidential letters of reference, assign access to those who will evaluate the applications, respond to applications, and store the applications in the system.

Twenty organizations have created accounts on the system, in addition to various AMS programs and the Duke University Department of Mathematics.

The following fees will go into effect for 2012/13 MathPrograms.org registrations. The fees will be in effect from July 1, 2012 through June 30, 2013. A one-program fee allows smaller programs to benefit from the service. The service is free to applicants.

Proposed organization fees:

	2011/12	**2012/13**
Regular account, up to 7 programs, 12 months from date of sign up:	$500	**$525**
Regular account, 1 program, 12 months from date of signup:	$250	**$260**

Fee changes for Employment Information in the Mathematical Sciences (EIMS)

This electronic job ad system, aimed at a general mathematical audience as well as the PhD market, utilizes software and web hosting provided by Boxwood Technology. This service has the appearance of being housed on the AMS website. Note that the paper version of EIMS was discontinued in July, 2009. The "Featured Job" functionality allows employers to have their job featured more prominently in search results, and has been quite popular.

As more and more job ads are migrating to MathJobs.org, we are attempting to maintain EIMS as a simpler, lower cost alternative.

The following fees will go into effect for the 2012/13Employment Information in the Mathematical Sciences.

 Proposed listing fees for July through June:

	2009/10	2010/11	2011/2012	**2012/2013**
60 day listing, unlimited size	200	210	215	**220**
120 day listing, unlimited size	275	285	290	**300**
180 day listing, unlimited size	350	360	365	**375**
"Featured Job" add-on	75	75	75	**80**

Fee changes for the Employment Center

In 2011, the AMS switched the Employment Center software from the Boxwood Technologies product connected to our EIMS job ads to a new module in the MathJobs.org software. This was done by user request since the Boxwood product was found to be poorly suited to our needs. Costs of running this program vary widely from one JMM site to another, due to space charges and other factors. Typically, income from employer fees does not cover costs. The new electronic functionality, while very much needed, involves fees to Duke University and necessitates costly equipment rental and internet access on site.

The fees below include use of a table, the web information system, wireless internet, and the web appointment scheduling system. Computer work stations are provided onsite for use of participants, although ideally most contact will be made before the meeting begins. Employment Center registration on the new software includes a temporary job ad on MathJobs.org.

Applicants pay no fees but are required to have a meeting badge.

Although computers, printers and electrical outlets are provided in an employer lounge, for those who would like power to run a laptop at their own table, outlets can now be provided, for a fee.

The fees listed in the chart below will be in effect for the 2013 Employment Center in San Diego, California.

Summary of recent and proposed fees

	2008	2009	2010	2011	2012	**2013**
Quiet Area table (1-2 int)	245	250	265	295	285	**310**
Second Quiet Area table	95	100	100	105	110	**125**
Committee table (3-6 int)		350	365	400	365	**385**
Second Committee table				100	105	110	**135**
Electricity, per table						**50**

2013 Short Course Fees

The following chart indicates the history of fees for the Short Course since 2005 and the fees that have been set for 2013.

*S/U/E: Student/Unemployed/Emeritus

Year	Name of Course	Preregister-member/non	On-site-member/non	S/U/E-prereg*	S/U/E-onsite*
2005	The Radon Transform and Appl. to inverse Probability.	$85/$108	$115/$140	$37	$55
2006	Modeling and Simulation of Biological Networks	$87/$115	$118/$148	$38	$57
2007	Aspects of Statistical Learning	$90/$120	$120/$151	$40	$60
2008	Applications of Knot theory	$94/$125	$125/$155	$42	$63
2009	Quantum Computation and Quantum Information	$96/$130	$130/$160	$44	$65
2010	Markov Chains and Mixing Times	$98/$135	$132/$165	$46	$67
2011	Computational Topology Evolutionary Game Dynamics	$100/$140 $100/$140	$134/$170 $134/$170	$48 $48	$69 $69
2012	Random Fields and Random Geometry Computing with Elliptic Curves using Sage	$102/$145 $102/$145	$136/$175 $136/$175	$50 $50	$71 $71
2013	Random Matrices	$104/$150	$138/$180	$52	$73

Ellen J. Maycock
Associate Executive Director
April 9, 2012

Report to the AMS on the Mathematics activities at the 2011 SACNAS conference

Prepared by Ricardo Cortez

The success of Research Experiences for Undergraduate programs (REU) has shown a persistent need for minority undergraduate students to be exposed to areas of active research in mathematics, and in particular to enhance the opportunities available to them to present their research findings at national venues such as the SACNAS conference. Mathematics has always been a part of SACNAS and together with our partnering and sponsoring agencies and organizations such as the National Security Agency (NSA), National Geospatial Intelligence Agency (NGA), National Science Foundation (NSF), American Mathematical Society (AMS), and 8 NSF-funded Mathematics Institutes we continue to sponsor a coordinated effort to both increase and sustain the pipeline of underrepresented mathematicians through a strong presence at the SACNAS conference.

There was funding from NSA and NSF for 150 students (undergraduate and graduate) to attend the SACNAS conference in San Jose, CA on October 27-30, 2011. Additional funding was provided by AMS support. SACNAS effectively implemented a broad range of educational, and professional and leadership development activities for undergraduate, graduate, post-doctoral and young professionals. These provided critically important opportunities for mathematics students and professionals to establish and maintain contact with a strong network who, as mentors and role models, have and will support them throughout their college and university years and their professional lives. Students' oral or poster presentations, attendance at mathematics focused symposia and mini-courses addressed current research in mathematics. The events are captured beautifully by AMS Public Awareness Officer, Annette Emerson at: http://www.ams.org/meetings/sacnas2011-mtg

 The 2011 SACNAS national conference offered the following activities and events:

<u>PRECONFERENCE ACTIVITIES</u>

Undergraduate Mini courses in Mathematics

This session ran in parallel with the Modern Mathematics Workshop (MMW) organized by the Mathematics Institutes. While the MMW highlights programs for graduate students, postdocs and professionals, the institutes are also interested in reaching undergraduate students by organizing two mini courses in different mathematics topics and combining the audiences of the MMW with the undergraduates during a keynote speech.

1. **Math Mini Course I: Optimal Control of Ordinary Differential Equations**

Sponsored by Math Institutes, NSF and NGA

The goal of this mini-course was to introduce optimal control for ordinary differential equations— including background on the theory and basic techniques, have the students solve a simple problem in groups and formulate a more complicated problem for a model of their own interest. The course also included demonstrations of user-friendly MATLAB codes.

Speaker: <u>Suzanne Lenhart</u>, PhD, Associate Director for Education, Outreach and Diversity at the National Institute for Mathematical Biological Synthesis (NIMBioS).

2. Math Mini Course II: Counting Lattice Points in Polytopes

Sponsored by Math Institutes, the National Science Foundation, and the National Geospatial-Intelligence Agency

A polytope is the higher-dimensional generalization of a polygon. After discussing some basic facts about them, we'll study the problem of measuring a polytope by counting the lattice points inside it. This problem arises very naturally in several areas of mathematics and leads to some beautiful combinatorics.
Speaker: <u>Federico Ardila</u>, PhD, Assistant Professor, San Francisco State University

Math Institutes Modern Mathematics Workshop: Session I (Continues on Thursday)

Sponsored by Math Institutes, the National Science Foundation, and the National Geospatial-Intelligence Agency

Eight national mathematics and statistics institutes offer this session to invigorate the research careers of minority mathematicians and mathematics faculty at minority-serving institutions. We highlight presentations on topics drawn from the institutes' upcoming programs, a keynote speaker, and an informative panel presentation on the 2012-13 programs and workshops.
Speakers:

<u>Sonja Petrovic</u>, PhD, Research Assistant Professor, University of Illinois at Chicago - *Cluster Algebra*
<u>Juan Gutierrez</u>, PhD, Postdoctoral Fellow, Mathematical Biosciences Institute, Ohio State University - *Autocidal Individuals: Genetic Control of Invasive Species*
<u>Jose Blanchet</u>, PhD, Assistant Professor, Columbia University - *Monte Carlo Methods for Risk Analysis*
<u>Adrian Sandu</u>, PhD, Professor and Director, Computational Science Laboratory, Virginia Polytechnic Institute & State University - *Data Assimilation and Its Applications*
<u>Mladen Bestvina</u>, PhD, Distinguished Professor, University of Utah - *Using Geometry to Study Groups*
<u>Kara Maki</u>, PhD, Postdoctoral Research Fellow, Institute for Mathematics and its Applications, University of Minnesota - *Skin Formation in Drying Droplets of Colloidal Suspensions*
<u>Ronnie Shepherd</u>, Scientist, Lawrence Livermore National Laboratory - *Computational Methods in High Energy Density Plasmas*
<u>Sharon Bewick</u>, PhD, Postdoctoral Fellow, National Institute of Mathematical and Biological Synthesis (NIMBioS), University of Tennessee-Knoxville - *Tropical Biodiversity: New Models for an Old Problem*
Math Institutes Modern Mathematics Workshop: Session 2 (Continued from Wednesday)

Keynote Speaker: <u>Ivelisse Rubio</u>, PhD, University of Puerto Rico at Rio Piedras
Panel of all the Institute Representatives
<u>**CONFERENCE ACTIVITIES**</u>

Breakfast & Mathematics Game

Who Wants to Be a Mathematician? This session is a fun and exciting contest for undergraduates. All contestants win prizes, with a top prize of $2,000. Chairs: <u>Michael Breen</u>, PhD, Public Awareness Officer, American Mathematical Society, and <u>Bill Butterworth</u>, PhD, Associate Professor, DePaul University.

SCIENTIFIC SYMPOSIA

Interdisciplinary Algebra

What is Algebra? Is it polynomials and polygons? Number Theory, Algebraic Geometry, Galois theory, Representation Theory, Algebraic Statistics, and Algebraic Combinatorics are all related in deep ways. This symposium introduces many areas of current research and discusses connections among them. Undergraduate students, graduate students, and faculty are encouraged to attend!

Chairs: Dagan Karp, PhD, Assistant Professor, Harvey Mudd College; Robin Wilson, PhD, Assistant Professor, California State Polytechnic University, Pomona

Speakers:

Federico Ardila, PhD, Assistant Professor, San Francisco State University - CAT(0) Cube Complexes: From Geometric Group Theory to Moving Robots
Rosa Orellana, PhD, Associate Professor, Dartmouth College - Applied Representation Theory
Edray Goins, PhD, Associate Professor of Mathematics, Purdue University - An Introduction to Dessins d'Enfants: The Intersection of Graph Theory, Group Theory and Differential Geometry
Carmen Wright, MS, Graduate Fellow, Department of Mathematics, University of Iowa - The Twisted Group SL*(2,A) and How It Helps with Representation Theory

Mathematical Modeling as a Collaborative Discipline

Supported by the American Mathematical Society

Mathematical Modeling implies writing down equations that describe a physical, social, or biological phenomenon. Solving them might require a variety of methods, including statistical and computational. The far-reaching possibilities of mathematical modeling are highlighted in this session with applications to cardiac dynamics, drug therapy, imaging, and data classification.

Chair: Ricardo Cortez, PhD, Professor, Tulane University

Speakers:
Angel Pineda, PhD, Assistant Professor, California State University, Fullerton - Statistical Modeling of Chemical Species Separation in Magnetic Resonance Imaging (MRI)
Helen Moore, PhD, Senior Scientific Consultant, Pharsight Corporation - Mathematical and Statistical Modeling for FDA Drug Approval Submissions
Raquel Romano, PhD, Scientist, Google, Inc. - Data Clustering and Classification
Juan G. Restrepo, PhD, Assistant Professor, University of Colorado - Dynamic Range in Networks of Coupled Excitable Systems

Discrete Systems Biology

Mathematics has proved to be a rich resource for the biological sciences. While discrete mathematics has influenced other fields, its use in biology is modest. We aim to showcase its impact in biology, the potential for biology to transform it, and how the relationship between these fields can be strengthened.

Chairs: <u>Brandilyn Stigler</u>, PhD**,** Assistant Professor, Southern Methodist University; and <u>Alan Veliz-Cuba</u>, PhD**,** Research Assistant Professor, University of Nebraska-Lincoln

Speakers:
<u>Alan Veliz-Cuba</u>, PhD, Research Assistant Professor, University of Nebraska-Lincoln - Connections Between Discrete and Continuous Modeling of Biological Systems
<u>Ruisheng Wang</u>, PhD, Associate Professor, Pennsylvania State University - Boolean Approaches in Modeling Transcriptome Data and Signal Transduction Networks
<u>Gheorghe Craciun</u>, PhD, Assistant Professor, University of Wisconsin-Madison - Chemical Reaction Networks in the Life Sciences
<u>Franziska Hinkelmann</u>, PhD, Research Fellow, Mathematical Biosciences Institute, Ohio State University - Mathematics and Cancer Systems Biology

How Statistics Can (and Really Does) Improve Your Life

Statistical methodology is used in all areas of science and technology. From manufacturing to biology to social science, data and its inherent uncertainty are keys to understanding. In this session, learn about applications of statistics to problems in medicine, public health, and (social) network analysis.

Chair: <u>Keith Crank</u>, PhD**,** Manager of Research and Graduate Education, American Statistical Association

Speakers:
<u>Raul Aguilar Schall</u>, PhD, Postdoctoral Scholar, Center for Environmental Research and Children's Health, University of California, Berkeley - How Statistics Help Improve Public Health
<u>Raquel Prado</u>, PhD, Associate Professor, University of California, Santa Cruz - Statistics and the Brain
<u>Abel Rodriguez</u>, PhD, Assistant Professor, University of California, Santa Cruz - Is the Friend of Your Friend Your Friend? An Introduction to Statistical Network Analysis

Mathematical Models: Current Research of Present-Day Role Models of the Underrepresented

Our present-day role models in the mathematical sciences are known for their efforts in making significant strides in changing the face of mathematics. This symposium highlights the research they do beyond their central role as mentors. The topics are diverse, reflecting the variety of fields contributed by underrepresented mathematical scientists.

Chair: <u>Rebecca Garcia</u>, PhD**,** Associate Professor, Sam Houston State University

Speakers:
<u>William Ryan</u>, PhD, Professor, University of Arizona - Error-Correction Codes in Modern Technological Devices
<u>Ivelisse Rubio</u>, PhD, Professor, University of Puerto Rico at Rio Piedras - Diagonal Equations and Waring Numbers over Finite Fields
<u>Herbert Medina</u>, PhD, Professor, Loyola Marymount University - New Arctangent-Based Approximations to Pi
<u>Silvia Fernandez</u>, PhD, Professor, California State University, Northridge - Research Problems on Points and Lines

Modern Statistical Approaches in the Context of High Dimensional and Spatio-temporal Data

The advent of high throughput and high-dimensional data has provided excellent opportunities for statisticians to develop new methodologies to address issues of dimension reduction and spatio-temporal effects in these large data sets. Examples form microarray data, biomarkers in oncology, and forest fires will be discussed.

Chair: Javier Rojo, PhD**,** Professor of Statistics, Rice University

Speakers:
Irma Hernandez Magallanes, PhD, Postdoc, Texas A&M University - Stochastic Processes: Volatility and Aggregation Problems
Tuan Nguyen, PhD, Research Scientist, Eli Lilly and Company - Shrinkage Approaches for Analyzing Censored Biomarker Data
Josue G. Noyola Martinez, PhD, Assistant Professor of Biostatistics, Texas A&M University - Use of Multiple Singular Value Decompositions to Analyze Complex Calcium Ion Signals
Javier Rojo, PhD, Professor of Statistics, Rice University - Dimension Reduction in the Context of Microarray Censored Survival Data

Statistical and Mathematical Modeling of Rainfall, Stars, and Social Networks

Modeling natural and social sciences phenomena using statistics and applied mathematics is a powerful tool. This session will show, in an accessible manner, how to deal with complex problems in precipitation, laser fibers, star spectra, nonparametric regression, and social networks.

Chair: Alejandro Villagran, PhD**,** Assistant Professor, University of Connecticut

Speakers:
Simon Lunagomez, PhD, Postdoctoral Research Associate, Harvard University - A Geometric Approach for Inference on Graphical Models and Social Networks
Alvaro Nosedal, PhD, Assistant Professor, Indiana University of Pennsylvania-Main Campus - Reproducing Kernel Hilbert Spaces for Penalized Regression: A Tutorial
Gabriel Huerta, PhD, Associate Professor, University of New Mexico - Time-varying and Spatial Modeling of Precipitation Extremes
Alejandro Villagran, PhD, Assistant Professor, University of Connecticut - Bayesian Source Separation in Astronomy

PROFESSIONAL DEVELOPMENT SESSIONS

Advancing Mathematics Education for Our Communities: Combining Strengths of Mathematicians and Mathematics Educators

In this town-hall–style meeting, session speakers represent a panel charged with preparing a new funding agency program solicitation for mathematicians and mathematics educators to improve mathematics education in our communities. The audience is invited to advise them on what they consider the most important elements of the collaboration.

Chairs: Julia Aguirre, PhD**,** Assistant Professor, University of Washington-Tacoma; and Ricardo Cortez, PhD**,** Professor, Tulane University

Speakers:
Rochelle Gutierrez, PhD, Associate Professor, University of Illinois at Urbana-Champaign
Guadalupe Lozano, PhD, Visiting Assistant Professor of Mathematics, University of Arizona
James A. Mendoza Epperson, PhD, Associate Professor, University of Texas at Arlington

MENTORING SESSIONS

Math Institutes Reception (Thursday 6:30-8:00pm)

Sponsored by the Mathematical Sciences Institutes in North America, the National Science Foundation, and the National Geospatial-Intelligence Agency

Insights to Success: Real-life adventures of SACNAS scientists

SACNAS supports and encourages our members to complete their undergraduate degrees; get connected to, attend, and complete a meaningful graduate/doctoral program; and go on to a successful doctoral career in the sciences. The panelists represent a spectrum of possible science educational paths and career outcomes, and also serve as role models. The panelists included Prof. Erika Camacho, Assistant Professor, Mathematical and Natural Sciences Division at Arizona State University West Campus.

Conversations with Scientists

Representing the spectrum of science disciplines, SACNAS professionals renowned for their scientific and mentorship activities gather with student attendees to engage in informal roundtable discussions about careers in the sciences. Conversations are intended to break down the barriers that often exist between students and professionals. Through Conversations with Scientists interactions, mentors share their personal experiences and insights offering students guidance and inspiration regarding educational and career choices. The personal connections made during Conversations with Scientists set the stage for ongoing mentorship and support throughout the conference. We had tables for Mathematics and Mathematics Education.

Mathematics Student Presentations

This year there were nearly 80 poster presentations in the mathematical sciences (compared to 55 last year) poster and oral presentations. SACNAS considers this opportunity to be an important feature of the conference. All student presentations are judged by at least two professionals and the judges give students helpful supportive feedback about their work and presentation style. This is an important way in which students are initiated into the world of scholarship, preparing them to present at professional conferences within their discipline in the future.

Mathematics & Statistics Graduate Oral Winners

- Juan Ramirez, Jr.
- Mela Hardin

Mathematics & Statistics Undergraduate Poster Winners

- Mauricio Flores
- David Jones
- Dayanara Lebron
- Gabriel Porrata
- Perla Salazar
- My Huynh
- Maxsimino Montes
- George Shakan
- Shanise Walker
- Bethany Vohlers

CONFERENCE ATTENDANCE

Table 1: Mathematics Representation at SACNAS Conferences

Year	Number of Total Math Students	Total Math Attendance	Location
2002	109	147	Anaheim, CA
2003	129	234	Albuquerque, NM
2004	124	249	Austin, TX
2005	164	312	Denver, CO
2006	169	276	Tampa, FL
2007	152	271	Kansas City, MO
2008	150	269	Salt Lake City, UT
2009	146	235	Dallas, TX
2010	170	293	Anaheim, CA
2011	212	326	San Jose, CA

The total attendance at the 2011 SACNAS conference was 3,653. This was one of the largest conference attendance in SACNAS history. The overall attendance of mathematics students and professionals in the last several years is shown in Table 1. The table shows the number of conference participants that identified themselves in the area of mathematics. The totals include student participants, postdocs, faculty, teachers and professionals and illustrate our strong commitment not only to maintaining a strong mathematics presence at the SACNAS conference, but also to increase our mathematics attendance at future conferences. Additional statistics on the conference are found in http://sacnas.org/events/national-conf/past/2011.

Overall, the 2011 SACNAS national conference provided a broad range of highly effective educational, mentoring and networking activities that supported and served the minority scientific community at all levels of the higher education pipeline. These activities benefited all conference attendees and certainly impacted mathematics students equally included opportunities to:

- Engage via Scientific Symposia and Keynote Addresses with nationally recognized scientific and mathematic role models and mentors.

- Gain professional skills essential for advancement in the sciences and mathematics, including professional development workshops that focused on communication of scientific and mathematical research methods and findings.

- Receive feedback from faculty judging poster and oral presentations and in the process make meaningful connections with prospective mentors.

- Make informed decisions about their professional future and to establish lasting connections with university, government agency, industry, and research organization representatives.

- Engage in structured mentoring activities such as the Conversations with Scientists and the Mathematics Institutes Reception, where professional scientists, mathematicians and administrators provided essential information to students at all stages of the higher education pipeline, and assisted them to develop an academic and career roadmap that will guide effectively as they navigate their way to professional success in the science and mathematics world.

FISCAL REPORT

The $5,000 of AMS sponsorship was used to fund speakers for one session and student participants as indicated below.

	airfare	lodging	registration	
Ricardo Cortez	460.60	640.00	400.00	
Juan G. Restrepo	285.63	320.00	600.00	
Raquel Romano	0.00	0.00	600.00	
Angel Pineda	167.50	480.00	600.00	
Helen Moore	0.00	0.00	300.00	
TOTAL	**913.73**	**1440.00**	**2,500.00**	**4,853.73**

Epsilon Awards 2012

Program	Award Amount
Canada/USA Mathcamp Reed College Portland, OR	**$10,000**
Governor's Institutes of Vermont: Mathematical Sciences University of Vermont Burlington, VT	**$7,500**
Hampshire College Summer Studies in Mathematics (HCSSiM) Hampshire College Amherst, MA	**$7,500**
Lamar Achievement in Mathematics Program (LAMP) Lamar University Beaumont, TX	**$7,500**
MathPath Mount Holyoke College South Hadley. MA	**$7,500**
Mathworks Honors Summer Math Camp Texas State University San Marcos, TX	**$7,500**
PROMYS Boston University Boston, MA	**$7,500**
PROTaSM **(Puerto Rico Opportunities for Talented Students in Mathematics)** University of Puerto Rico, Mayagüez Mayagüez, PR	**$7,500**
Research Science Institute **(**Center for Excellence in Education**)** MIT Cambridge, MA	**$7,500**

Ross Mathematics Program Ohio State University Columbus, OH	**$7,500**
Stanford University Mathematics Camp (SUMaC) Stanford University Stanford, CA	**$7,500**
Summer Program in Mathematical Problem Solving Bard College Annandale-on-Hudson, NY	**$7,500**
Young Scholars Program University of Chicago Chicago, IL	**$7,500**

TOTAL = $100,000

SECOND AMENDMENT
TO THE
AMERICAN MATHEMATICAL SOCIETY RETIREMENT PLAN

WHEREAS, American Mathematical Society (the "Institution") adopted the American Mathematical Society Retirement Plan (the "Plan") for the benefit of its employees, originally effective as of January 1, 1989; and

WHEREAS, the Plan was thereafter amended from time to time, including a complete restatement effective as of January 1, 2009; and

WHEREAS, the Institution wishes to further amend the Plan, to ratify and confirm the intent of the Institution and to document the operation of the Plan;

NOW, THEREFORE, pursuant to the power reserved to the Institution in Article IX of the Plan, the Plan is hereby amended as follows:

FIRST: Section 1.9 of the Plan is amended in its entirety, effective as of January 1, 2009, to read:

"1.9 *Eligible Employee* means all employees who have completed a Year of Participation Service. Eligible Employee does not include any of the following: any employee whose employment is incidental to his or her educational program, student interns, Leased Employees, or individuals who are deemed to be independent contractors as determined by the Plan Administrator in its sole discretion.

"Leased Employee" shall mean any person (other than an Employee of the Institution) who pursuant to an agreement between the Institution and any other person ("leasing organization") has performed services for the Institution (or for the Institution and related persons determined in accordance with Section 414(n)(6) of the Code) on a substantially full-time basis for a period of at least one year, and such services are performed under primary direction or control by the Institution. Contributions or benefits provided a Leased Employee by the leasing organization which are attributable to services performed for the Institution shall be treated as provided by the Institution.

A person will not be considered a Leased Employee if the total number of Leased Employees does not exceed 20% of the Non-highly Compensated Employees employed by the Institution, and if any such person is covered by a money purchase pension plan providing: (a) a nonintegrated employer contribution rate of at least 10% of compensation, as defined in Section 415(c)(3) of the Code, but including amounts contributed pursuant to a salary reduction agreement which are excludable from the employee's gross income under Section 125, 132(f)(4), 402(e)(3), 402(h)(1)(B), 403(b), or 457 of the Code; (b) immediate participation; and (c) full and immediate vesting.

The provisions of this Section 1.9 regarding Leased Employees are effective for Plan Years beginning after December 31, 1996."

SECOND: Section 1.28 of the Plan is amended in its entirety, effective January 1, 2009, to read:

"1.28   *Year of Participation Service* means a 12 consecutive month period during which the Employee is credited with 1,000 or more Hours of Service with the Society or any Affiliated Institution. The initial twelve month period shall be the period commencing on the date the Employee first performs an Hour of Service. If the Employee is credited with 1,000 or more Hours of Service in that computation period, he will be credited with a Year of Service for eligibility as of the last day of the twelve (12)-month computation period. If the Employee does not complete 1,000 or more Hours of Service in that computation period, he shall be credited with a Year of Service for eligibility when he completes 1,000 or more Hours of Service in any Plan Year which commences on or after the date he first performs an Hour of Service."

THIRD: Section 1.29 of the Plan is amended in its entirety, effective July 1, 2012, to read:

"1.29   *Year of Vesting Service* means a Plan Year in which the Employee is credited with at least 1,000 Hours of Service. Service with any educational institution while assigned to work for the Institution shall be treated as service with the Institution. Notwithstanding the foregoing, in no event will an Employee's Years of Vesting Service for periods prior to this Amendment be fewer than the Years of Vesting Service credited to the Employee immediately prior to this Amendment.

For purposes of vesting computation, service with the Institution shall include the Employee's service, if any, with members of a controlled group of corporations (within the meaning of Section 1563(a) of the Code, determined without regard to Section 1563(a)(4) and 1563(e)(3)(C)) and trades or business (whether or not incorporated) which are under common control, and organizations that are part of an affiliated service group with the Institution under Section 414(m) of the Code. Years of Service shall include service with a predecessor employer which maintained the Plan and service with a predecessor employer as required under Section 414(a)(1) of the Code."

FOURTH: Section 4.2 of the Plan is amended in its entirety, effective as of January 1, 2009, to read:

"4.2   *When Contributions Are Made*. Plan Contributions will begin as of the Participant's Plan entry date set forth in Section 3.1, and are based on Compensation that was paid (or would have been paid to the Participant, in absence of a salary reduction agreement) on and after the Participant's Plan entry date. Contributions will be made within the time required by law."

FIFTH: Section 6.1 of the Plan is amended in part by deleting the last paragraph thereof and by adding the following new paragraphs at the end of Section 6.1, effective as of January 1, 2009, to read:

"The nonvested portion of a Participant's Accumulation Account shall be forfeited as of the earlier of the date on which the Participant receives a complete distribution of his vested Accumulation Account or the last day of the Plan Year in which the Participant incurs five (5) consecutive Breaks in Service. The amount forfeited shall be used to reduce Institution contributions.

If the Participant returns to the employment of the Institution prior to incurring five (5) consecutive Breaks in Service and prior to receiving a distribution of his vested Accumulation Account the nonvested portion shall be restored. However, if the nonvested portion of the Participant's Accumulation Account was allocated as a forfeiture as the result of the Participant receiving a distribution of his vested Accumulation Account balance, the nonvested portion shall be restored if:

(a)   the Participant resumes employment prior to incurring five (5) consecutive Breaks in Service; and

(b)   the Participant repays to the Plan, as of the earlier of (i) the date which is five (5) years after his reemployment date or (ii) the date which is the last day of the period in which the Participant incurs five (5) consecutive Breaks in Service following the date of distribution, an amount equal to the total distribution derived from Institution contributions.

The nonvested amount shall be restored to the Participant's Accumulation Account, without interest or adjustment for interim Trust valuation experience, by a special Institution contribution or from the next succeeding Institution contribution and forfeitures, as appropriate.

A zero percent vested Participant shall be considered to have received a complete distribution of his vested Accumulation Account as of the date of his first Break in Service, and if he returns to the employment of the Institution prior to incurring five (5) consecutive Breaks in Service, he shall be considered to have repaid such distribution as of his completion of one Year of Service after his resumption of employment.

An Employee who separates from Service with the Institution and is reemployed by the Institution prior to incurring a Break in Service shall continue to vest in his Accumulation Account, commencing with the vested percentage (as determined under Section 6.1) he had at the time of his separation from Service.

If distribution is made to an Employee of less than the Employee's entire vested Accumulation Account, and if the Employee returns to Service, a separate record shall be maintained of said Accumulation Account balance. The Employee's vested interest at any time in this separate Accumulation Account shall be an amount equal to the formula $P(AB+D)-D$, where P is the vested percentage at the relevant time, AB is the Accumulation Account balance at the relevant time, and D is the amount of the distribution made to the Employee."

SIXTH: Section 6.2 of the Plan is amended in its entirety, effective as of January 1, 2009, to read:

"6.2   *Termination of Service; Reinstatement.* An Employee who returns to employment after a Break in Service shall retain credit for his pre-Break Years of Vesting Service, subject to the following rules:

(a)   If a Participant incurs five or more consecutive Breaks in Service, any Years of Vesting Service performed thereafter shall not be used to increase the vesting in his Institution-

derived Accumulation that was accrued prior to such five or more consecutive Breaks in Service. Separate accounting shall be maintained thereafter with respect to that portion of such Participant's Institution-derived Accumulation accrued before and after such Breaks in Service occurred.

(b)   If when a Participant incurred a Break in Service, he had not completed sufficient Years of Vesting Service to be vested in his Institution-derived Accumulation, his pre-Break Years of Vesting Service shall be disregarded for vesting purposes if his consecutive Breaks in Service equal or exceed the greater of five or the aggregate number of pre-Break Years of Vesting Service."

SEVENTH: Section 6.3 of the Plan is amended in its entirety, effective as of January 1, 2009, to read:

"6.3   ***Computation Period for Vesting.*** For purposes of determining Years of Vesting Service and Breaks in Service, the computation period is the Plan Year."

IN WITNESS WHEREOF, the Institution, by its duly authorized officer, has caused this Amendment to be executed this _____ day of _____, 2012.

AMERICAN MATHEMATICAL SOCIETY

By: _____

Tammy King Walsh
Director, Human Resources
04/16/2012

**THIRD AMENDMENT
TO THE
AMERICAN MATHEMATICAL SOCIETY TAX-DEFERRED ANNUITY PLAN**

WHEREAS, American Mathematical Society (the "Institution") adopted the American Mathematical Society Tax-Deferred Annuity Plan (the "Plan") for the benefit of its employees, originally effective as of June 8, 1975; and

WHEREAS, the Plan was thereafter amended from time to time, including a complete restatement effective as of January 1, 2009; and

WHEREAS, the Institution wishes to further amend the Plan, to ratify and confirm the intent of the Institution and to document the operation of the Plan;

NOW, THEREFORE, pursuant to the power reserved to the Institution in Article IX of the Plan, the Plan is hereby amended as follows, effective as of January 1, 2009:

FIRST: Section 1.8 of the Plan is hereby amended in its entirety to read as follows:

"1.8   ***Eligible Employee*** means any common law employee of the Institution. However, (1) an independent contractor is not an Eligible Employee; and (2) a Leased Employee cannot be a Participant in his or her capacity as a Leased Employee, and Compensation the leasing organization pays to the Leased Employee is not Compensation for purposes of contributions under the Plan.

Notwithstanding the foregoing, employees who normally work fewer than 20 hours per week are excluded from participation in the Plan; provided: (1) for the employee's initial eligibility computation period, the Institution reasonably expected the employee to work less than 1,000 Hours of Service in such period; and (2) for each subsequent eligibility computation period, the employee worked fewer than 1,000 Hours of Service in all preceding eligibility computation periods. The eligibility computation periods for this purpose are as set forth under Section 1.26.

For purposes of Mandatory Plan Contributions, the following employees are excluded: (1) any employees who are customarily employed on a part-time, temporary, or irregular basis, provided the employee has never completed a Year of Participation Service under Section 1.26; (2) any employee whose employment is incidental to his or her educational program; and (3) student interns.

"Leased Employee" means an individual (who otherwise is not an Employee of the Institution) who, pursuant to an agreement between the Institution and any other person (the "leasing organization"), has performed services for the Institution (or for the Institution and any persons related to the Institution within the meaning of Code §144(a)(3)) on a substantially full time basis for at least one year and who performs such services under primary direction or control of the Institution within the meaning of Code §414(n)(2). Except as described below, a Leased Employee is an Employee for purposes of nondiscrimination testing under the Plan and the "Compensation" of the Leased Employee includes Compensation from the leasing organization which is attributable to services performed for the Institution.

A Leased Employee is not an Employee if the leasing organization covers the employee in a safe harbor plan and, prior to application of this safe harbor plan exception, 20% or fewer of the NHCEs, excluding those NHCEs who do not satisfy the "substantially full-time" standard of Code §414(n)(2)(B), are Leased Employees. A safe harbor plan is a Money Purchase Pension Plan providing immediate participation, full and immediate vesting, and a nonintegrated contribution formula equal to at least 10% of the employee's compensation, without regard to employment by the leasing organization on a specified date. The safe harbor plan must determine the 10% contribution on the basis of compensation as defined in Code §415(c)(3) including Elective Contributions.

The Plan must apply the provisions of this Section 1.8 concerning Leased Employees in a manner consistent with Code §§414(n) and 414(o) and the regulations issued under those Code sections."

SECOND: Section 1.26 of the Plan is hereby amended in its entirety to read as follows:

"1.26   *Year of Participation Service* means a 12 consecutive month period during which the Employee is credited with 1,000 or more Hours of Service with the Society or any Affiliated Institution. The initial twelve month period shall be the period commencing on the date the Employee first performs an Hour of Service. If the Employee is credited with 1,000 or more Hours of Service in that computation period, he will be credited with a Year of Service for eligibility as of the last day of the twelve (12)-month computation period. If the Employee does not complete 1,000 or more Hours of Service in that computation period, he shall be credited with a Year of Service for eligibility when he completes 1,000 or more Hours of Service in any Plan Year which commences on or after the date he first performs an Hour of Service."

THIRD: Section 4.2 of the Plan is hereby amended in its entirety to read as follows:

"4.2   *When Contributions Are Made*. Plan Contributions will begin as of the Participant's Plan entry date set forth in Section 3.1, and are based on Compensation that was paid (or would have been paid to the Participant, in absence of a salary reduction agreement) on and after the Participant's Plan entry date. Contributions will be made as soon as it is administratively feasible for the Institution to segregate the contributions from its general assets and within the time required by law."

IN WITNESS WHEREOF, the Institution, by its duly authorized officer, has caused this Amendment to be executed this _____ day of _____, 2012.

                                                        AMERICAN MATHEMATICAL SOCIETY

                                                        By: _____

Tammy King Walsh
Director, Human Resources
04/16/2012

AMERICAN MATHEMATICAL SOCIETY

To: Investment Committee

From: Emily Riley

Subject: Spending Rate Five Year Review

Date: May 7, 2012

Summary and Recommendation

According to the Uniform Prudent Management of Institutional Funds Act (UPMIFA), a board must consider the following in making spending decisions regarding endowments:

- the duration and preservation of the endowment fund;
- the purposes of the institution and the endowment fund;
- general economic conditions;
- the effect of inflation or deflation;
- the expected total return from income and the appreciation of investments;
- other resources of the institution; and
- the investment policy of the institution.

The UPMIFA instructions are important to keep in mind while making decisions regarding AMS spending rates. The UPMIFA guidelines apply only to the permanently restricted endowment or true endowment portion of the long-term portfolio. The board-designated or quasi-endowment funds are not governed by UPMIFA.

The AMS should have a spending rate that is high enough to provide a reasonable level of income for supported projects, that compares favorably with spending rates of other endowments, and that is not so high as to prevent the endowment from growing at least as fast as inflation. College and university endowments in 2011 had calculated spending rates that average 4.6%. There are conflicting data on the reasonable expectation for long-term real returns. If one reviews data over approximately 80 years, a reasonable expectation for long-term real returns in an investment pool with an asset allocation and risk profile similar to that of the AMS is 5% or more (with a standard deviation in the high teens). Reviewing data for 50 years, a 4 to 4.5% return seems reasonable.

Based on an analysis of portfolio returns and spending rates, reviews of literature on current spending rate practices, and Society's quantifiable needs for spendable income, it seems prudent to implement a different spending practice. The following are staff's recommendations for a change in the spending rate:

- reduce the spending rate from 5% to 4.5%;
- designate an income stabilization reserve of $1,500,000 from the board-designated funds to be invested in the long-term portfolio,
    - to be taken from operations at year-end 2012 from amounts left in the long-term portfolio that are technically owed to operations,

    o and from which investment gains or principal, when necessary, will be used with Board of Trustees approval to fund shortages in any permanently restricted or quasi-endowment fund not providing enough spendable income to cover the stated objective of the fund;
- reduce the stated goal of the long-term portfolio to a total return (net of investment fees) of at least 5% to at least 4.5% over the long-term.

Background

"The trustees of endowed institutions are the guardians of the future against the claims of the present. Their task is to preserve equity among generations." –James Tobin, Yale University

The AMS has been following the Total Return Concept for approximately 23 years. This concept provides for investment management that concentrates on higher returns over the long-term combined with spending policies intended to provide a reasonably predictable level of funding for support activities. Endowment managers often refer to "intergenerational equity" as one of the benefits of this approach. If a constant spending rate can be applied to an endowment whose net growth (total return less spending) matches inflation, then the beneficiaries in the next generation will receive a benefit from the endowment that is equitable when compared to the benefits received by the current generation.

Fluctuations in income are dampened somewhat by computing spendable income using a spending rate applied to a moving average of recent endowment fund balances. The Society uses the most recent four year-end balances for this purpose.

Details of how the long-term investments of the Society are managed and how the total return concept is applied to them may be found in, "The Long-Term Investment Portfolio, Endowment Funds and Spendable Income", which is attached as Exhibit 1and also appears in Section D of the Green Pages.

Currently, the Society's stated spending rate is 5%. Table 1 shows the effective rate of spending, which is the spendable income divided by the market value of the endowment on January 1. For 2012, the effective rate of spending on the entire long-term portfolio is 2.75%. The effective rate of spending on the quasi-endowment or board-restricted endowment is 2.5%. The effective rate of spending on the permanently restricted or true endowment is currently 4.5%. The permanently restricted or true endowment is an area of concern, because with the current spending rate, some of the funds are not building a healthy market value under the current spending rate, so spendable income for future years is at risk.

American Mathematical Society Spendable Income Analysis						
(in 000's)						
Year	2007	2008	2009	2010	2011	2012
Permanently Restr Endwmnt Spendable Income						
Income Restricted Endowment	154	164	223	200	198	195
% Growth	21%	6%	35%	-10%	-1%	-1%
Income Unrestricted Endowment	283	311	277	266	266	260
% Growth	8%	10%	-11%	-4%	0%	-2%
Subtotal Permanently Restricted Endowment	**437**	**476**	**500**	**466**	**464**	**455**
Quasi-Endowment Spendable Income						
Young Scholars Fund			30	29	29	28
% Growth				-3.2%	-0.2%	-2.4%
Operations Support Fund (OSF)	724	1,039	1,400	1,451	1,645	1,744
% Growth	13.7%	43.5%	34.7%	3.7%	13.4%	6.0%
Total Spendable Income	**1,161**	**1,515**	**1,929**	**1,946**	**2,138**	**2,228**
Long-term Portfolio YE Balance	73,821	52,034	68,943	79,253	81,031	
Effective Rate* of Spending for whole portfolio	**1.70%**	**2.05%**	**3.71%**	**2.82%**	**2.70%**	**2.75%**
Quasi-endowment YE Balance	63,524	43,970	59,543	68,885	71,018	
Effective Spending Rate for the Quasi-Endwment	**1.25%**	**1.64%**	**3.25%**	**2.49%**	**2.43%**	**2.50%**
Permanently Restricted Endowment YE Balance	10,298	8,064	9,400	10,368	10,013	
Effective Rate of Spending - Permanently Restricted Endowment	**4.4%**	**4.6%**	**6.2%**	**5.0%**	**4.5%**	**4.5%**
NACUBO Endowment Study Effective Rate of Spending	**4.6%**	**4.3%**	**4.4%**	**4.5%**	**4.6%**	
*The "effective rate" is used for the NACUBO Endowment Study,and is calculated by dividing the spendable income by the endowment market value on January 1.						

TABLE 1

NACUBO Study – Spending Rates and Spending Rules

There are a couple of reasons to look at what other institutions are doing. First, looking at what other institutions are doing provides a reality check on our own policies. In other words, if we were to follow a course that is radically different from what other institutions are doing, we would want to be very confident that we understood why. A second reason relates to marketing. Potential major donors may be concerned with both investment policies (they want to be sure their money will be safe and generate a good return) and the potential benefits accruing to program activities. The spending rate relates to both of

these and could be a factor in comparing one institution to another. In general, we would not want to compete on the basis of spending rates but rather on the basis of the ability to meet the donor's philanthropic goals.

NACUBO (National Association of College and University Business Officers) publishes an Endowment Study annually. Its report for the fiscal year ended June 30, 2011, is now available. In addition to annual investment returns, the Study reports spending rates and spending rules.

According to NACUBO:
> In fiscal year 2011, spending rates averaged 4.6 percent. Twenty-five percent of study participants reported an increased effective spending rate in FY2011, 49 percent of the Study participants reported a decrease in the rate and 24 percent reported no change. The decline in effective spending rates at these institutions is due in part to the inverse relationship between spending rates and growth in endowment market values.

NACUBO reports effective spending rates. This is the institution's spendable income (determined by the institution) divided by the market value of the endowment at the beginning of the year. NACUBO uses this sort of approach because the variations in the methods of computing spendable income make it difficult to directly compare stated spending rates.

The average calculated spending rate in the NACUBO study is currently 4.6% and has been as high as 5.1% during the past 10 years. The current AMS calculated spending rate is 4.5% for the permanently restricted endowment.

The most common spending rule is that used by AMS; it is used by about 75% of institutions, and provides that spendable income is computed by applying a spending rate to a moving average of endowment balances for the past three years. This is explained in more detail in Exhibit 1.

Currently, the AMS calculated spending rate for the permanently restricted endowment funds is comparable to and slightly less than the NACUBO sample. This supports either leaving the stated spending rate unchanged or increasing it slightly. However, as shown in Table 1, in 2009 and 2010, the AMS spending rates exceeded those of the NACUBO sample. Also as shown in Exhibit 2, some of the AMS endowment funds do not have enough market value to produce predictable spendable income, and the 5% spending rate is using more income than some funds can generate.

Long-term Investment Returns and Inflation

As stated at the beginning of this review, UPMIFA suggests that people making decisions about spending on endowments should consider the effects of inflation or deflation. There is much confusing data regarding the effects of inflation on endowments, and the data are highly influenced by the time period being examined. Table 2 below shows a very long view (1926 to 2010) of historical returns for portfolios similar to the AMS's. The AMS's asset allocation is most similar to the second and third rows in the table. Average inflation over this period was 2.99%. Over the very long-term of 85 years, a portfolio similar to the AMS's experienced returns that beat inflation. The table data are from the *Ibbotson SBBI 2011 Classic Yearbook.*

Table 2-6			
Summary Statistics of Annual Returns (in percent)			
from 1926 to 2010			
Portfolio (Always Rebalance)	**Geometric Mean**	**Arithmetic Mean**	**Standard Deviation**
100% Large Company Stocks	9.9	11.9	20.4
90% Stocks/l 0% Bonds	9.6	11.3	18.4
70% Stocks/30% Bonds	9.0	10.0	14.6
50% Stocks/50% Bonds	8.2	8.8	11.4
30% Stocks/70% Bonds	7.2	7.6	9.2
10% Stocks/90% Bonds	6.1	6.4	8.9
100% Long-Term Govt. Bonds	5.5	5.9	9.5

Table 2

The chart below shows AMS total return from 1992 to 2011 and CPI plus 5% over the same period. CPI plus 5% represents the effect of inflation plus the use of 5% of endowment balance as spendable income. The bars between the lines represent the annual change in the endowment balance resulting from inflation and spending.
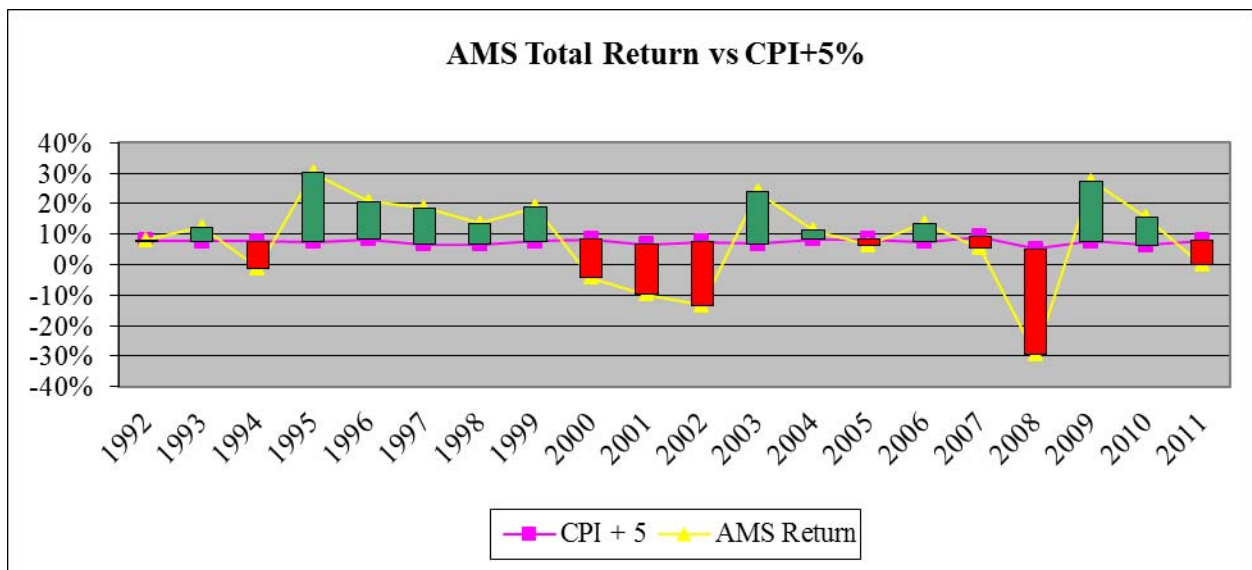
The next chart shows real growth that would have occurred in an endowment of $1000 given the same inflation and spending used in the chart above. Over this period, a stated spending rate of 5% was not a good strategy. Of course, this conclusion is a bit sensitive to the choice of beginning and end points.

Theoretical "Real" Growth of $1000 Endowment with a 5% Spending Rate (Averaging Ignored)
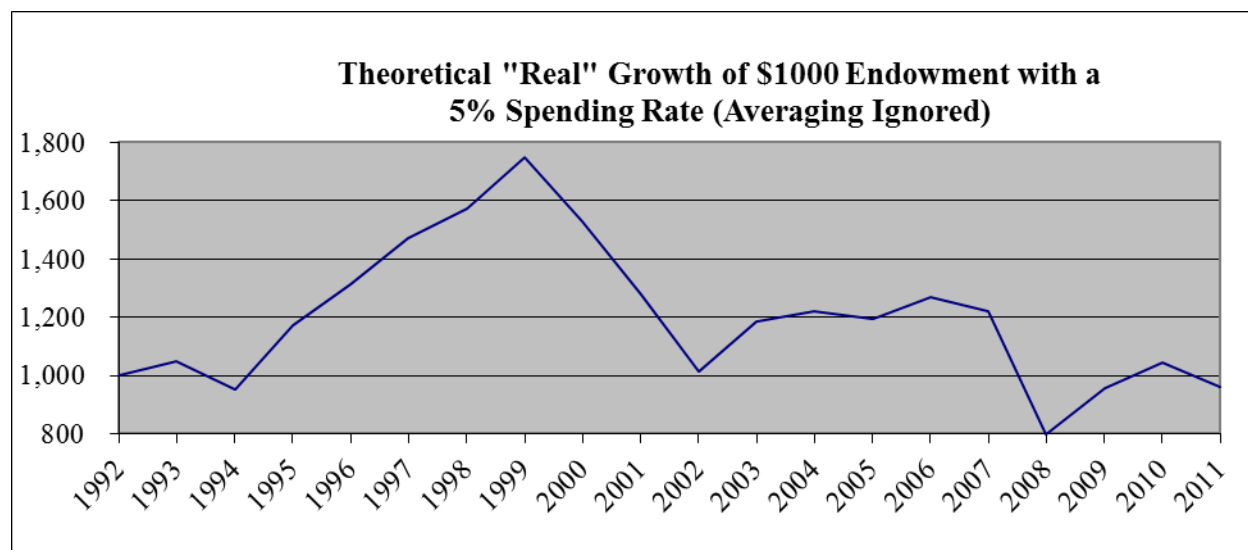
Based on this review of long term returns, asset allocation, and inflation a stated spending rate of around 5% does not appear justified.

In January 2011, the Commonfund Institute did a study of the cumulative inflation-adjusted performance of a portfolio of 70% S&P 500 stocks and 30% Barclays U.S. Aggregate Bonds with a 5% spending rate over a period of 45 year beginning with 1965. The study showed that for the 45 year period beginning with 1965, this portfolio out-performed inflation for only a four-year period from 1997 to 2000.

In October 2011, Vanguard published a research paper entitled, "Is 5% the Right Return Target for Institutional Investors?" This paper presents a model of investment return results of a traditional 60/40 portfolio (60% U.S. Stocks/40% U.S. bonds) with various spending rates. The 60/40 portfolio with a spending rate of 4% or 4.5% had returns that exceeded inflation during that time period, while a portfolio with a 5% return did not. The Vanguard's conclusion is that institutional investors should keep their spending low, and that 4% is a reasonable starting point. Vanguard also concluded that with a lower spending rate, savings can compound year over year creating a larger portfolio, which leads to historically more overall spending.

Effect of a Change in Spending Rate on Spendable Income

The largest amounts of spendable income for endowments funds with restrictions on the use of income are associated with the following funds:
- Prize funds
- Trjitzinsky
- Ky Fan China Fund
- Epsilon

These and a few others generated spendable income of about $195,000 in 2012 with a 5% spending rate. The endowments that have no restrictions on the use of income generate about $260,000 of spendable income in 2012. Board designated funds (quasi-endowment funds) generated about $1,744,000 in 2012 for the Operations Support Fund (OSF) and about $28,000 to the Young Scholars Fund. Table 4 shows

the effect of changing the spending rate on spendable income.

Effect of Actual 5% Spending Rate vs. 4.5% and 4% on 2012 Spendable Income

	Actual 5% spending rate	4.5% spending rate	4% spending rate	Quantified Measure of Spendable Income Needed 1/1/2012
Restricted Income Endowment	$195,000	$175,000	$156,000	$174,000
Unrestricted Income Endowment	$260,000	$234,000	$208,000	$234,000
Operations Support Fund (OSF)	$1,744,000	$1,570,000	$1,395,000	$1,570,000
Young Scholars Fund	$28,300	$25,500	$22,600	$29,000

Table 4

During the November 2012 Investment Committee meeting, the Committee requested the following:

As part of the May 2012 review of spending rate, the Committee will review the Vanguard best practice for the committee to provide "A quantified measure of the amount of money to be spent (from the endowment) in any given period."

In order to create a quantified measure of the amount of money to be spent in any given period, it is important to look at what level of spendable income is needed to support the endowment purposes. Exhibit 3 shows that on average the spendable income required to fund the income restricted portion of the true endowment funds is about $174,000. The Young Scholars fund needs to produce about $29,000 in spendable income. However, it is difficult to quantify exactly how much OSF spendable income and unrestricted spendable income from true endowments are required. The fact that the publishing arm of the organization is producing enough net margin to help to support membership and professional services programs suggests that a somewhat lower spendable income from these sources could be tolerated.

Table 4 shows that a 4.5% spending rate would provide enough spendable income for the restricted income portion of the true endowment funds, although initially, some individual prize funds may fall short of the income required to fund a few prizes or lectures. Considering the current net income experienced by the AMS over the past few years, a 4.5% spending rate would provide enough spendable income from the unrestricted income portion of the true endowment and the OSF to support operations. The 4.5% spending rate would not provide enough spendable income needed to supplement the Epsilon fund, and would fall a few thousand short. The last column of Table 4 gives a quantified measure of the amount of money to be spent in any given period, although each year some of the funds must be adjusted for inflation.

The Case for an Endowment Income Stabilization Reserve

The recommendation of staff in this review is that an Endowment Income Stabilization Reserve of $1,500,000 be established at the end of 2012. The funds that are owed to operations from the long-term portfolio at year end should remain in the portfolio, and $1,500,000 should be used as a board-designated, income stabilization reserve to fund endowment and quasi-endowment projects that are not receiving enough revenues from the spendable income. Although operations already funds any shortages in spendable income, it is important for the Board of Trustees to keep track of these shortages to evaluate whether or not the spending rate is appropriate. If there is an income stabilization reserve, the board of trustees would be asked to approve funding for those funds that fall short. For example, in recent years, the Veblen and Wiener research prizes did not produce enough spendable income to support the 5,000 prizes that are awarded every few years. In addition, the costs of some of the lectures and symposium awards are no longer covering as much of the direct costs of the specific events they fund as they did in the past. Some of the permanent endowment funds need to recover market value through a lower spending rate. Exhibit 2 shows those funds that need to recover market value.

The Need for a Lower Long-Term Return Target

According to Vanguard's recent publication, "Is 5% the Right Return Target for Institutional Investors?":

> We found that there is no specific asset allocation that would have continually enabled investors to meet the 5% target. Adding alternative investments did not change these results. Instead we found that what affects investors the most is spending. Both the type of spending rule and overall spending rate are crucial to an investor's success.

Table 5 shows that in recent years, the AMS portfolio has achieved a real five year average return of at least 5% in only 5 of the last 15 years. Reducing the targeted rate to 4.5% is more realistic.

Five Year Average AMS Long-Term Portfolio Returns (December 31 Year-End)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
AMS 5- year return	15.7%	15.9%	20.3%	13.1%	6.7%	0.2%	2.0%	0.6%	2.8%	7.6%	11.9%	-.03%	2.7%	4.4%	1.79%
AMS 5- year real return	**13.1%**	**13.5%**	**17.9%**	**10.5 %**	**4.5%**	**-2.1%**	**-0.4%**	**-1.9%**	**0.3%**	**4.9%**	**8.9%**	**-2.7%**	**0.2%**	**2.3%**	**-.5%**

Table 5 – 5 year nominal and real average annual returns for fiscal years ending 12/31.

The Long-Term Investment Portfolio, Endowment Funds and Spendable Income

This memo describes how the Society accounts for the 'ownership' of the long-term investment portfolio by the true and quasi-endowment funds, the determination of spendable income available to support operations and the circumstances under which spendable income is recorded as operating revenue.

The long-term investment portfolio is operated like a mutual fund, whereby the underlying funds that own the investments are allocated shares in the total pool of investments. Share values rise and fall with the underlying market values of the investments; shares are 'purchased' when contributions are made to funds and shares are 'sold' when spendable income is transferred to temporarily restricted or operating activities. The Society performs this 'mutual fund' accounting on a monthly basis.

Rather than using the historical trust doctrine, whereby only interest, dividends and transaction gains are available to spend on the donors' intended purposes, the long-term investment portfolio is managed using the total return concept. Under this concept, there is no distinction made between the yield, realized gains and unrealized gains in the portfolio, and a predetermined spending rate is used to determine the amount available to be used to spend on the donors' or Board of Trustees' intended purposes. The spending rate is generally considered to be the amount available from the expected long-term total return of the investment portfolio after maintaining the purchasing power of the funds *over the long term.* Using the total return concept and a spending rate allows management of the investments to maximize return at a given risk profile instead of maximizing yield, while smoothing the effects of individual periods' market ups and downs on the amount available to spend each period.

With respect to both true and quasi endowment funds, under the Uniform Prudent Management of Institutional Funds Act ("UPMIFA", adopted by the District of Columbia effective for calendar year 2008), the Board of Trustees is responsible for determining what portion of the entire total return is available to be spent by the Society. In doing so, the Board must consider various factors related to the prudent management of institutional funds, as enumerated in UPMIFA. However, with respect to the quasi-endowment or Board-designated funds, the entire amount of the fund can be used to support the Society, there being no outside legal restrictions applicable. Any use of the Board-designated funds, including spendable income derived therefrom, requires Board approval. This approval is a component of the annual budgeting process.

The funds that own the long-term investment portfolio are categorized as follows:

1. True endowment funds whose income must be used for a specified purpose ('restricted true endowments');
2. True endowment funds whose income is not restricted for any specific purpose (other than general Society activities in the mathematical community) ('unrestricted true endowments'); and

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Exhibit 1
Page 2 of 6

3. Quasi-endowment funds established under the authority of the Board of Trustees for specific purposes ('Board-designated' or 'reserve" funds).

All the true endowment and certain of the Board-designated funds generate spendable income that either directly or indirectly flows through as revenue in the Society's operations, under policies established by the Board. The Board-designated funds that produce spendable income included in the operating activities of the Society are the Operations Support Fund and the Young Scholars Fund.

Prior to the change in policy adopted by the Board in May 2006 whereby the Economic Stabilization Fund (ESF) and Operations Support Fund (OSF) are rebalanced at each year end, approximately 60% of the Board-designated funds did not produce spendable income. At December 31, 2010, this percentage has dropped to approximately 32%. They are, by their nature, true reserve funds, of which the largest is the ESF.

Pages D-1 and D-2 show the original gift amount and historical and current investment values owned by all funds. Page D-3 shows the current and estimated balance required in the ESF for the succeeding five years. Page D-4 shows the activity in the ESF and OSF since December 31, 2000.

For those funds that do produce spendable income, how is it calculated, where does it go and how is it used? Prior to the enactment of UPMIFA and the related Financial Accounting Standards Board Staff Position (FSP) 117-1, the answer was different for each of the three categories of funds outlined above. Under the revised accounting rules, the spendable income from all true endowment funds is treated in the same manner.

In general, spendable income is calculated using a three year moving average of the long-term investment portfolio value (the most recent four year-end values are averaged). To this average is applied the spending rate (currently authorized at 5%) and a dollar figure for total spendable income results. This total spendable income figure is then divided by the total shares in the portfolio as of the most recent year end to obtain a spendable income per share figure. This figure is then applied to the shares owned by each of the funds that generate spendable income as of the most recent year-end, resulting in the amount available from that individual fund. For the true endowment funds, the year-end allocated values are 'normalized' for contributions and withdrawals that occurred in a subsequent year. This puts each fund that owns the long-term investment portfolio on equal footing with respect to each other for the time period used as the basis for determining spendable income. Normalization is not used for determining the spendable income available from Board-designated funds.

The spendable income available from each of the true endowment funds and the Board-designated Young Scholars fund computed as of the end of Year 1 is the spendable income available from these funds in Year 2. The spendable income available from the Operations Support Fund (OSF) computed as of the end of Year 1 is the spendable income available from this fund in Year 3. This year's lag for the OSF allows staff to know for certain the amount available from this fund during the planning and budget processes for each year.

As to where the spendable income goes and how it is used, the answers are slightly different for true versus quasi-endowment funds. The chart on page D-8 shows how the spendable income from each category of funds is recognized as revenue in the Society's operating results, commencing with 2008.

Before looking at the differences and similarities of the categories of spendable income and how and when they are recognized as operating revenues, one point should be made. The total change in unrestricted net assets in any given year is unaffected by the amount of spendable income from the Board-designated funds that is included in operating revenues. Recording this spendable income as operating revenue simply includes a portion of the income from unrestricted long-term investments in the determination of operating income. There is a corresponding decrease in the income from unrestricted long-term investments, which is reported below net operating income, but is still a component of the change in unrestricted net assets each year.

Restricted True Endowment Spendable Income: Since the income from restricted true endowment funds is restricted by the donors for specific purposes (prizes, scholarships, etc.), the spendable income generated can not flow directly through the operating activities of the Society (which affect unrestricted net assets). Therefore, the spendable income from restricted true endowments goes into a 'holding area' called temporarily restricted net assets. Temporarily restricted net assets are restricted to be used, in their entirety, for specific purposes or at certain times. Once the operating activities of the Society incur the costs associated with the specific endowment purpose, the spendable income from these funds that has been accumulated in temporarily restricted net assets moves out of that net asset classification and into operations as revenue, thereby becoming an increase in unrestricted net assets. This movement is called 'assets released from restrictions' in the language of accounting.

Since all the costs associated with accomplishing the specified purposes are recorded in operations (all the awards, scholarships, etc.), the use recorded as a reduction of the temporarily restricted net assets essentially moves the 'used' portion of spendable income to operations by recording an equal amount of revenue in operations. This is recorded as 'assets released from restrictions,' a revenue item in operations. Shares of the "AMS mutual fund' are sold to generate that year's spendable income from restricted true endowments, and this remains a separate component of temporarily restricted net assets which has already been authorized to be spent via the spending rate policy and annual budgets.

Unrestricted True Endowment Spendable Income: Under the revised accounting rules, the accounting for the spendable income from these funds is now the same as for the restricted true endowment funds. In accordance with policies adopted by the Board, the spendable income generated by the unrestricted true endowment funds is used to support specific projects or activities of the Society, as proposed by staff and approved by the Board during the annual budgeting process. Operating revenues include 'assets released from restrictions' revenue to the extent planned costs are incurred. Unspent spendable income remains in temporarily restricted net assets until spent.

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Exhibit 1
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Sources of Spendable Income and their Recognition as Operating Revenue

Spendable Income from All True Endowment Funds

Income-Restricted True Endowment: Excess of fund value over original gift amount

Temporarily Restricted Net Assets

Income-Unrestricted True Endowment: Excess of fund value over original gift amounts

Assets released to operating revenue as costs are incurred for both the income- restricted spendable income and income-unrestricted spendable income

Spendable Income from Board-Designated Funds

Revenue included in operations with or without regard to specific costs incurred (OSF – without regard, Young Scholars – with regard)

Operating Revenues (Increase in Unrestricted Net Assets)

The Society's activity in temporarily restricted net assets for the year ended December 31, 2011 is as follows:

Beginning balance, temporarily restricted net assets	**$6,207,920**
Contributions	172,731
Spendable income from restricted true endowment funds	199,724
Spendable income from unrestricted true endowment funds	266,400
Net investment gain on segregated investments (Beal)	1,678
Assets released from restrictions:	
Income-restricted funds	(403,653)
Income-unrestricted funds (Board approved)	(204,110)
Transfer (deficiencies funded by operations)	13,113
Net long-term investment gain on true endowment funds	
in excess of spendable income	(486,048)
Change in temporarily restricted net assets	(440,165)
Ending balance, temporarily restricted net assets	**$5,767,756**

The activities of the Society that 'own' temporarily restricted net assets are as follows at December 31, 2011:

Accumulated unspent spendable income from restricted true	
endowment funds	$ 293,449
Accumulated unspent spendable income from unrestricted	
true endowment funds	97,372
Beal Prize (to be entirely awarded when a specific	
mathematical problem is solved	139,712
Centennial Fellowship	53,396
Graduate students travel grants	132,681
Book Journal Donation Program	10,493
UNSCM/CIMPA	10,000
Other miscellaneous programs	1,944
Subtotal	**739,047**
Accumulated return in excess of spendable income on	
unrestricted true endowment funds	4,052,944
Accumulated return in excess of spendable income on	
restricted true endowment funds	975,585
Subtotal	**5,028,529**
Total temporarily restricted net assets	**$5,767,756**

Spendable Income from Board-Designated Funds. The recognition of spendable income in operating revenues from these funds is dependent upon the purpose of each of these funds. The spendable income from the Young Scholars Fund is directly correlated

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with the expenses of that specific project. It is recognized directly in the income of that project if needed to cover related expenses. 2009 was the first year this spendable income was used to support the project.

The spendable income from the Operations Support Fund is recognized as income in operations, and, unlike all the types of spendable income discussed previously, is not related to incurring any specific cost or accomplishing any specific purpose.

Note 1: The Society budgets an operating profit that staff and the Board believe is appropriate for the long-term financial health and security of the Society. The primary purpose of the Society is not to make an operating profit; however, even not-for-profit organizations must make operating profits over the long run in order to survive and continue to accomplish missions.

Including this spendable income in operating revenues allows the Society to be more flexible in the way it sets prices for its publications products, establishes dues rates and meetings fees, conducts its services and outreach activities and responds to events in the mathematical community.

Emily D. Riley
Chief Financial Officer
Spring 2012

Endowment and Board Restricted Funds and the Activities they Support
SPRING 2012

Shading indicates a fund that is not producing enough spendable income or market value of gift is dangerously low.

Endowment Funds:		12/31/2011	
		Per Share price	
Income Restricted:	Original Gift	of 65.02950	
Research Prize Funds	at 12/31/2011	Total Value	
Steele	145,009	552,719	3 annual awards of $5,000 each
Birkhoff	50,112	69,424	Award of $5,000 every three years, next award in 2012
Veblen	29,773	36,824	Award of $5,000 every three years, next award in 2013
Wiener	29,773	36,824	Award of $5,000 every three years, next award in 2013
Bocher	32,557	37,409	Award of $5,000 every three years, next award in 2014
Conant	9,477	36,862	Annual award of $1,000
Cole Number Theory	33,063	38,136	Number Theory - award of $5,000 every 3 years, next award in 2013
Cole Algera	33,063	38,136	Algebra - award of $5,000 every three years, next award in 2012
Satter	43,212	55,091	Award of $5,000 every other year, next award in 2013
Doob Prize	45,000	45,572	Award of $5,000 every three years, next award in 2014
Robbins Prize	41,250	42,408	Award of $5,000 every three years, next award in 2013
Eisenbud Prize	40,000	40,000	Award of $5,000 every three years, next award in 2014
Moore	0	0	Award of $5,000 every three years for research article in AMS journal
			No specific restricted endowment fund supports this prize (see unrestricted
Other Prize and Award Funds			endowment), next award in 2013
Morgan	25,000	40,114	Annual award of $1,000
Albert Whiteman	93,618	95,893	Award of $5,000 every four years, next award in 2012
Arnold Ross Lectures	70,000	71,401	Partially supports annual Arnold Ross Lecture
Trjitzinsky	196,030	444,400	Annual scholarships for undergrads, amount and number depends upon funds
C.V. Newsom	100,000	206,799	Supports von Neumann Symposium, usually every four years (2014 scheduled)
Centennial	56,100	106,033	Partially supports annual Centennial Fellowships
Menger	97,250	100,473	Supports annual awards at the International Science Fair ($ also held by Duke)
Ky Fan (China)	366,757	366,757	Supports Ky Fan China Program
2011 Addition	10,000	10,000	To be determined
Epsilon	1,652,259	1,698,148	Partially supports Young Scholars Program
Einstein Lecture	100,000	102,836	Supports the Einstein Lecture
Exemplary Program	100,000	102,207	Supports the annual $1,200 Exemplary Program Prize awarded to Math Depts
Mathematical Art	20,000	20,441	Supports the prizes for mathematical art at the Joint Mathematical Meeting
Total (Income Restricted)	**3,419,303**	**4,394,907**	
Income Unrestricted:			
Endowment	100,310	681,420	In total, the spendable income from income unrestricted true endowment funds is
Morita	100,000	122,449	used to support certain annual activities of the AMS in the operating budget which
Henderson	548,223	3,651,371	are specifically approved by the BT during the budget approval process.
Schoenfeld/Mitchell	573,447	692,284	
Laha	189,309	232,581	
Ritt	51,347	217,543	
Moore	2,575	20,506	
Total (Income Unrestricted)	**1,565,211**	**5,618,154**	
Total Endowment Funds	**4,984,514**	**10,013,061**	
Quasi-Endowment Funds:			
Journal Archive Fund		920,784	Income not used - available for future use when changes to electronic
			archive formats are necessary
Young Scholars		614,005	Partially supports Young Scholars Program (use of spendable income was budgeted
			and used for the first time in 2009)
Economic Stabilization Fund		24,430,891	Income not used - a true reserve fund that is adjusted annually to a target
			balance
Operations Support Fund		45,052,392	Partially supports annual AMS operations - receives excess or makes up for shortfall
			in Economic Stabilization fund annually
Total Quasi-			
Endowment Funds		**71,018,071**	
Total All Funds		**81,031,132**	**This is the total amount of the long-term investment portfolio 'owned'**
			by these funds (excluding segregated accounts, see below)

Note: The Beal Prize is not included above, as the entire amount held in a segregated investment will be given out upon solution of the
stated problem. In the meantime, the actual earnings in the segregated investment account are used to partially support the
Erdos lecture.

Operations transferred $13,113 to the long-term investment portfolio at 12/31/11 to maintain the value of certain true endowment funds
above at their original gift value. The effect of this transfer was to increase the unrestricted loss on the long-term portfolio by the amount
transferred and to decrease the restricted loss on the long-term portfolio by the same amount.

Exhibit 3
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American Mathematical Society
Endowment Analysis
Quantified Measure of Amount of Money to be Spent in any Given Period
May 2012

	Year 1	Year 2	Year 3	Year 4	Average
Permanently Restricted					
Income Restricted:					
Steele	15,000	15,000	15,000	15,000	**15,000**
Birkhoff	5,000			5,000	**2,500**
Veblen		5,000			**1,250**
Wiener		5,000			**1,250**
Bocher			5,000		**1,250**
Conant	1,000	1,000	1,000	1,000	**1,000**
Cole Number Theory		5,000			**1,250**
Cole Algera	5,000			5,000	**2,500**
Satter		5,000		5,000	**2,500**
Doob Prize			5,000		**1,250**
Robbins Prize		5,000			**1,250**
Eisenbud Prize			5,000		**1,250**
Moore		5,000			**1,250**
Morgan	1,000	1,000	1,000	1,000	**1,000**
Albert Whiteman		5,000			**1,250**
Arnold Ross Lectures	4,500	4,500	4,500	4,500	**4,500**
Trjitzinsky	21,000	21,000	21,000	21,000	**21,000**
C.V. Newsom			35,000		**8,750**
Centennial	5,050	5,050	5,050	5,050	**5,050**
Menger	4,500	4,500	4,500	4,500	**4,500**
Ky Fan (China)	16,300	16,300	16,300	16,300	**16,300**
2011 Addition					
Epsilon	71,000	71,000	71,000	71,000	**71,000**
Einstein Lecture	5,000	5,000	5,000	5,000	**5,000**
Exemplary Program	1,200	1,200	1,200	1,200	**1,200**
Mathematical Art	1,000	1,000	1,000	1,000	**1,000**
Total Required Restricted*	156,550	181,550	196,550	161,550	**174,050**

*The spendable income from each fund is not always used each year. The average amount required
would suffice to cover spending needs each year as long as it is adjusted by an inflation factor each year.
Some prizes are exact amounts each year, there are a few prizes that cover costs or they are
expected to increase over time. They represent 20% of the portfolio, so 20% must be inflation-adjusted
each year.

	Year 1	Year 2	Year 3	Year 4	Average
Income Unrestricted:					
Four-year average spending	277,000	266,446	266,400	260,300	**267,537**

This is the amount we have been spending each year for the past four years 2009 - 2012,
but it is not necessarily the amount of spendable income needed.

Quasi Endowment (Board-designated funds, not governed by UPMIFA)

	Year 1	Year 2	Year 3	Year 4	Average
Young Scholars Fund	30,000	29,051	29,000	28,300	**29,088**

This is the amount we have been spending each year for the past four years 2009-2012,
but we need this fund to grow, not decrease as it is doing.

	Year 1	Year 2	Year 3	Year 4	Average
Operations Support Fund	1,399,500	1,451,000	1,645,000	1,744,100	**1,559,900**

This is the amount we have been spending each year for the past four years 2009-2012,
but it is not necessarily the amount of spendable income needed.

Potential 2015 Summer Institute in Algebraic Geometry

The AMS has been approached to handle a Summer Institute in Algebraic Geometry in summer 2015. This memo will provide background so that the Board of Trustees can make an informed decision about this request.

During the period 1953 – 1999, the AMS held a series of yearly Summer Research Institutes supported by grants from the National Science Foundation. Each was a 3-week long institute focused on one (relatively broad) area of mathematics. Typically, the scientific program was arranged by a group of volunteer organizers. The logistics were handled by the AMS Meetings Department. The grant provided travel funds for some of the participants, and also covered the expenses of the AMS staff members. Algebraic Geometry was the topic in 1954, 1964, 1974, 1985, and 1995. In 2005, the AMS agreed to continue the tradition of managing a Summer Institute for Algebraic Geometry once every ten years, even though the NSF-supported series had been discontinued. Attendance at these Summer Research Institutes in Algebraic Geometry grew significantly, from 28 in 1954 (which was joint with Several Complex Variables) to 83 (1964), 270 (1974), 310 (1985), 430 (1995) and 518 (2005).   The program for the 2005 Summer Institute is still on the web site of one of the organizers:
http://www.math.columbia.edu/~thaddeus/seattle/program.html

For AMS staff members, the work is divided. First of all, the AMS must submit the grant proposal to NSF. Although the mathematicians who approached us would write up the scientific part of the proposal, the other aspects of the proposal, including the budget, would need to be prepared by AMS staff. The work for the Summer Institute itself would be similar to other summer conferences, such as the previous Summer Research Institutes, the Summer Research Conferences, the Von Neumann Symposia or the Mathematics Research Communities conferences (but not similar to a Sectional Meeting). A site (probably on a university campus) would have to be chosen, after some site visits.   A contract would need to be drawn up and signed. One staff member from the AMS Meetings Department would handle the arrangements prior to the conference, and one or two staff members would be on site throughout the Summer Institute. Because the growth of the Algebraic Geometry Summer Institute has been significant over the decades, we would anticipate at least 500-600 mathematicians to attend. After the Summer Institute, AMS staff members in the Meetings and Fiscal Departments would process the travel vouchers. All of this work falls within the expertise of AMS staff members; we would expect the time and expenses of the AMS staff to be reimbursed. We are on schedule to have another Von Neumann Symposium in 2015; we hope that the MRC program will continue.

The 2005 Summer Institute was supported in three ways. The grant from the National Science Foundation for the 2005 Summer Institute was $135,000. Of this, $103,497.20 was dispersed for participant travel, housing and meal expenses ($82,572.90 went to junior mathematicians and graduate students). Approximately $30,000 was used to pay the expenses of AMS staff. The National Security Agency provided $15,000 (its usual amount of support for an individual conference), and the Clay Foundation reimbursed the expenses of several speakers each week (for a total of around $20,000).

At the request of the Committee on Meetings and Conferences in 2010, I asked Dr. Dean Evasius, head of the Infrastructure Program in DMS at NSF, to find out if NSF might consider renewing a continuing series of Summer Research Institutes. Dr. Evasius said that no, NSF was no longer interested in funding such a series, but they were always open to funding individual conferences or institutes. When we were approached for the 2015 Summer Institute, I spoke again with Dr. Evasius. He said that this would be considered by the Algebra and Number Theory program. He also reassured me that getting support for this Summer Institute in Algebraic Geometry would not negatively affect proposals considered by the Infrastructure program.

Ellen Maycock
December 28, 2011

Financial Statements

American Mathematical Society

December 31, 2011 and 2010

MHM

Mayer Hoffman McCann P.C.
An Independent CPA Firm
Tofias New England Division

AMERICAN MATHEMATICAL SOCIETY

Financial Statements

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Financial Statements:

Mayer Hoffman McCann P.C.
An Independent CPA Firm
Tofias New England Division

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Independent Auditors' Report

The Board of Trustees
American Mathematical Society
Providence, Rhode Island

We have audited the accompanying balance sheet of the American Mathematical Society (the "Society") as of December 31, 2011, and the related statement of activities and cash flows for the year then ended. These financial statements are the responsibility of the Society's management. Our responsibility is to express an opinion on these financial statements based on our audit. The financial statements of the Society as of and for the year ended December 31, 2010 were audited by other auditors whose report dated June 20, 2011 expressed an unqualified opinion on those statements.

We conducted our audit in accordance with U.S. generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and the significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the 2011 financial statements referred to above present fairly, in all material respects, the financial position of the American Mathematical Society as of December 31, 2011, and the changes in its net assets and its cash flows for the year then ended in conformity with U.S. generally accepted accounting principles.

Mayer Hoffman McCann P.C.

May 18, 2012
Providence, Rhode Island

AMERICAN MATHEMATICAL SOCIETY

Balance Sheets

		December 31,		
		2011		*2010*
Assets				
Cash and cash equivalents	$	1,753,474	$	1,084,237
Certificates of deposit		2,064,000		2,090,000
Short-term investments		11,675,319		13,807,241
Accounts receivable, net of allowances of $344,066 and				
$347,279 in 2011 and 2010, respectively		470,880		853,254
Deferred prepublication costs		765,162		632,570
Completed books		1,453,931		1,328,076
Prepaid expenses and deposits		1,677,164		1,256,912
Land, buildings and equipment, net		4,828,711		5,031,887
Long-term investments		81,186,072		79,406,346
Total assets	$	**105,874,713**	$	**105,490,523**
Liabilities and Net Assets				
Liabilities:				
Accounts payable and accrued expenses	$	3,128,241	$	2,960,535
Accrued study leave pay		741,400		829,582
Deferred revenue		12,515,534		12,822,888
Postretirement benefit obligation		5,994,557		4,770,464
Total liabilities		**22,379,732**		**21,383,469**
Net assets:				
Unrestricted:				
Undesignated		1,739,111		4,146,972
Designated		71,018,071		68,885,038
		72,757,182		73,032,010
Temporarily restricted		5,753,285		6,207,920
Permanently restricted		4,984,514		4,867,124
Total net assets		**83,494,981**		**84,107,054**
Total liabilities and net assets	$	**105,874,713**	$	**105,490,523**

See accompanying notes to financial statements.

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AMERICAN MATHEMATICAL SOCIETY

Statements of Activities

		Years Ended December 31,	
		2011	*2010*
Changes in unrestricted net assets:			
Operating revenue, including net assets released from restrictions:			
Mathematical Reviews	$	10,735,499	$ 10,307,693
Journals		4,822,189	4,716,428
Books		3,982,668	4,093,467
Dues, services, and outreach		3,688,175	3,885,074
Investment returns appropriated for spending		1,674,100	1,480,151
Other publications-related revenue		450,928	372,322
Grants, prizes and awards		1,083,719	1,101,874
Meetings		1,034,109	1,143,373
Short-term investment income		270,132	626,227
Other		47,853	60,299
Total operating revenue		**27,789,372**	**27,786,908**
Operating expenses:			
Mathematical Reviews		6,807,854	6,855,152
Journals		1,421,642	1,523,701
Books		3,395,094	3,791,325
Publications indirect		1,062,353	904,832
Customer services, warehousing and distribution		1,313,110	1,363,163
Other publications-related expense		192,610	216,322
Membership, services and outreach		3,842,817	4,116,641
Grants, prizes and awards		1,300,955	1,198,463
Meetings		950,212	1,181,320
Governance		432,498	428,949
Member and professional services indirect		714,527	569,596
General and administrative		3,593,104	3,752,580
Other		60,302	75,839
Total operating expenses		**25,087,078**	**25,977,883**
Excess of operating revenue over operating expenses		**2,702,294**	**1,809,025**
Investment returns less investment returns available for spending		(1,874,771)	7,493,555
Postretirement benefit-related changes other than net periodic cost		(1,102,350)	(119,765)
Change in unrestricted net assets		(274,827)	9,182,815

See accompanying notes to financial statements.   3

AMERICAN MATHEMATICAL SOCIETY

Statements of Activities (Continued)

		Years Ended December 31,	
		2011	*2010*
Changes in temporarily restricted net assets:			
Contributions	$	172,731 $	271,547
Investment returns less investment returns appropriated			
for spending		(19,603)	1,322,495
Net assets released from restrictions		(607,763)	(732,496)
Change in temporarily restricted net assets		(454,635)	861,546
Change in permanently restricted net assets:			
Contributions		117,390	114,475
Change in permanently restricted net assets		117,390	114,475
Change in net assets		**(612,072)**	**10,158,836**
Net assets, beginning of year		84,107,054	73,948,218
Net assets, end of year	$	**83,494,982** $	**84,107,054**

AMERICAN MATHEMATICAL SOCIETY

Statements of Cash Flows

| | *Years Ended December 31,* | |
	2011	2010
Cash flows from operating activities:		
Change in net assets	$ (612,072)	$ 10,158,836
Adjustments to reconcile change in net assets to net cash		
and cash equivalents provided by operating activities:		
Depreciation	633,395	626,672
Net realized and unrealized losses (gains) on long-term		
investments	2,229,723	(8,017,363)
Contributions restricted for permanent investment	(117,390)	(114,475)
Loss on disposal of equipment	-	1,076
Changes in assets and liabilities:		
Accounts receivable, net	382,374	(109,139)
Deferred prepublication costs	(132,592)	16,844
Completed books	(125,855)	80,797
Prepaid expenses and deposits	(420,252)	207,842
Accounts payable and accrued expenses	79,524	485,863
Deferred revenue	(307,354)	1,543,300
Postretirement benefit obligation	1,224,093	227,309
Net cash and cash equivalents provided by		
operating activities	**2,833,594**	**5,107,562**
Cash flows from investing activities:		
Purchases and sales of short-term investments, net	2,131,922	(2,979,741)
Purchases and redemptions of certificates of deposit, net	26,000	1,228,000
Purchases of property and equipment	(430,220)	(566,452)
Sales of long-term investments	32,826,762	4,427,453
Purchases of long-term investments	(36,836,211)	(6,721,973)
Net cash and cash equivalents used in investing		
activities	**(2,281,747)**	**(4,612,713)**
Cash flows from financing activities:		
Contributions restricted for permanent investment	117,390	114,475
Net cash and cash equivalents provided by		
financing activities	**117,390**	**114,475**
Net increase in cash and cash equivalents	**669,237**	**609,324**
Cash and cash equivalents at beginning of year	1,084,237	474,913
Cash and cash equivalents at end of year	**$ 1,753,474**	**$ 1,084,237**

See accompanying notes to financial statements.

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 1 - Description of Business and Summary of Significant Accounting Policies

Description of Organization

The American Mathematical Society (the "Society") was created in 1888 to further mathematical research and scholarship. It is an international membership organization, currently with over 30,000 members. The Society fulfills its mission with publications and professional programs that promote mathematical research, increase the awareness of the value of mathematical research to society and foster excellence in mathematics education.

The Society is incorporated under the laws of the District of Columbia and follows the provisions of the Uniform Prudent Management of Institutional Funds Act (the "Act") as enacted.

Basis of Financial Statement Presentation

The financial statements of the Society have been prepared on the accrual basis of accounting in accordance with U.S. generally accepted accounting principles ("GAAP").

The Society presents information regarding its financial position and activities according to three classes of net assets described as follows:

Unrestricted - All resources over which the governing board has discretionary control. The governing board of the Society may elect to designate such resources for specific purposes. This designation may be removed at the Board's discretion.

Temporarily restricted - Resources accumulated through donations or grants for specific operating or capital purposes. Such resources will become unrestricted when the requirements of the donor or grantee have been satisfied through expenditure for the specified purpose or program or through the passage of time.

Permanently restricted - Endowment resources accumulated through donations or grants that are subject to the restriction in perpetuity that the principal be invested. These net assets include the original value of the gift, plus any subsequent additions. Unexpended appreciation on permanently restricted net assets is included in temporarily restricted net assets until appropriated by the Board in accordance with the Act for use unless otherwise instructed by the donor.

Estimates

The preparation of the financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, and disclosures of contingent assets and liabilities, as of the dates of the financial statements and the reported amounts of revenues and expenses during the reporting periods. Actual results could differ from those estimates. Significant estimates included in the financial statements include fair value of certain investments, allowances on accounts receivable, recoverability of deferred publication and completed books costs, useful lives of depreciable assets, deferred revenue and postretirement benefit obligations.

AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 1 - Description of Business and Summary of Significant Accounting Policies (Continued)

Operations

The Society defines operating income as the net increase in unrestricted net assets derived from the activities related to the accomplishment of its mission, such as publications, programs, meetings and conferences, and member services. Investments appropriated for spending by the Board of Trustees are also presented as operating revenue. Investment returns less amounts appropriated for spending are presented as a non-operating item. In addition, the Society reports its gains and losses on its postretirement benefit obligation other than net periodic cost as non-operating.

Contributions, Gifts and Pledges Receivable

Contributions received are recorded as unrestricted, temporarily restricted, or permanently restricted support depending on the existence and nature of any donor restrictions. Contributions may include actual gifts or promises to give. Such contributions are considered to be available for unrestricted use unless specifically restricted by the donor or grantor. Contributions are recorded at their fair value on the date of the gift. Restricted gifts or promises to give are required to be reported as restricted support in the period received and are then reclassified to unrestricted net assets upon satisfaction of the donor restriction. Restrictions on contributions related to the acquisition of long-lived assets are considered satisfied at the time the asset is acquired.

The Society receives contributed services from its members, principally as volunteer leaders in the governance structure of the Society and as volunteer members of editorial committees for the Society's various publications. The latter category of contributed services qualifies for recognition as income and expense under GAAP, as the members of the editorial committees must possess specialized skills. However, the Society has no practical way of measuring the fair value of the services received from its volunteer editorial committee members, and accordingly, no such estimate is included as revenue or expense in the accompanying financial statements.

Cash and Cash Equivalents

Cash and cash equivalents are comprised of bank accounts, money market funds, and petty cash. The Society considers as cash equivalents highly liquid investments with maturities at date of purchase of three months or less. The Society maintains its cash in bank deposit accounts which, at times, may exceed federally insured limits. The Society monitors its exposure associated with cash in bank deposits and has not experienced any losses in such accounts.

Certificates of Deposit

Certificates of deposit are carried at cost plus accrued interest and are subject to similar risks as noted in cash and cash equivalents.

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 1 - Description of Business and Summary of Significant Accounting Policies (Continued)

Short-Term and Long-Term Investments

Both short-term and long-term investments are carried at fair value. Fair value is determined as per the fair value policies described later in this section.

Under the Act, the interest, dividends, and net gains or losses on all donor-restricted endowment fund investments is recorded as investment return (loss) in temporarily restricted net assets. As the purpose restriction is met, the income derived from true endowment funds whose use of income is restricted is reclassified from temporarily restricted net assets to unrestricted net assets. As expenditures are incurred that meet the criteria established by the Board of Trustees for use of the income derived from true endowment funds whose use of income is not restricted, the income is reclassified from temporarily restricted net assets to unrestricted net assets.

The Board of Trustees appropriates some investment funds to support the Society's mission-driven activities. Income from the board-designated funds, the Operating Support Fund and the Young Scholars Fund, support the operations of the Society.

The investments of the Society are pooled and unitized for accounting purposes. Each fund subscribes to, or disposes of, units on the basis of the fair value per unit at the end of the calendar quarter within which the transactions take place. Investment income, including interest, dividends and realized and unrealized gains and losses, is allocated quarterly based on the number of units held by each fund at the beginning of the quarter.

Fair Value Measurements

The Society reports investments at fair value on a recurring basis. Fair value standards require an entity to maximize the use of observable inputs (such as quoted prices in active markets) and minimize the use of unobservable inputs (such as appraisals or valuation techniques) to determine fair value. Fair value standards also require the Society to classify these financial instruments into a three-level hierarchy, based on the priority of inputs to the valuation technique.

Instruments measured and reported at fair value are classified and disclosed in one of the following categories:

Level 1 - Quoted prices are available in active markets for identical instruments as of the reporting date. Instruments which are generally included in this category include listed equity and debt securities publicly traded on a stock exchange.

Level 2 - Pricing inputs are not quoted prices in active markets, which are either directly or indirectly observable as of the reporting date, and fair value is determined through the use of models or other valuation methodologies.

Level 3 - Pricing inputs are unobservable for the instrument and include situations where there is little, if any, market activity for the instrument. The inputs into the determination of fair value require significant management judgment or estimation.

Notes to Financial Statements

Note 1 - Description of Business and Summary of Significant Accounting Policies (Continued)

Fair Value Measurements (Continued)

In some instances, the inputs used to measure fair value may fall into different levels of the fair value hierarchy and are based on the lowest level of input that is significant to the fair value measurement.

Market price is affected by a number of factors, including the type of instrument and the characteristics specific to the instrument. Instruments with readily available active quoted prices or for which fair value can be measured from actively quoted prices generally will have a higher degree of market price observability and a lesser degree of judgment used in measuring fair value. It is reasonably possible that changes in values of these instruments will occur in the near term and that such changes could materially affect amounts reported in these financial statements. For more information on the fair value of the Society's financial instruments, see Note 3 - Investments.

Deferred Prepublication Costs

Prepublication costs, consisting of translation, editorial, composition and proofreading costs, are deferred until publication. Upon publication, prepublication costs related to books are transferred into completed books inventory and prepublication costs related to journals are expensed, effectively matching subscription revenue for such journals.

Completed Books

Publication costs of books, consisting of paper, printing, and prepublication costs, are accumulated and recorded as completed books. Costs are amortized and charged to expense generally over five years. The majority of costs are allocated to the first year after completion based on management's assessment of historical sales patterns. This method approximates completed books being recorded at the lower of cost or market.

Land, Buildings, Equipment and Accumulated Depreciation

Land, buildings, and equipment are recorded at cost less accumulated depreciation. Depreciation is provided over the estimated useful lives of the assets using straight-line or accelerated methods.

Asset Classifications	*Estimated Useful Life*
Land and improvements	10 - 20 years
Building and improvements	10 - 35 years
Furniture, equipment, and software	3 - 10 years
Transportation equipment	3 - 15 years

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 1 - Description of Business and Summary of Significant Accounting Policies (Continued)

Land, Buildings, Equipment and Accumulated Depreciation (Continued)

The Society accounts for costs incurred for software developed or obtained for internal use including capitalizing costs incurred during the application development stage with amortization on a straight-line basis beginning when the computer software is ready for its intended use.

Revenue Recognition and Deferred Revenue

Advanced collections for membership dues and subscriptions are deferred and recorded as income over the related membership period or subscription period. Subscriptions include traditional printed and electronic media. Events income is reported as revenue on the date of the event. Advance sales are reported as deferred revenue.

Books and journals revenue is recorded upon shipment, less an estimate for returns.

The Society receives various grants that are subject to audit by the grantors or their representatives. Such audits could result in requests for reimbursement for expenditures disallowed under the terms of the grant; however, management believes that these disallowances, if any, would be immaterial.

Grant income from government funded arrangements is recorded as income as costs are incurred under the related arrangement. Accounting for grant income from other sources is evaluated with certain grants being recorded as revenue as related costs are incurred.

Net assets released from restrictions are classified in the respective revenue accounts on the statement of activities.

Service Fees

The Society provides various supporting services to other unaffiliated organizations for a service fee. Certain transactions flow through the Society's financial accounts; however, revenues and expenses of such organizations are not included in the financial statements of the Society.

Income Tax Status

The Society is recognized by the Internal Revenue Service as an organization described under Section 501(c)(3) of the Internal Revenue Code and is generally exempt from Federal and state income taxes on related income.

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 1 - Description of Business and Summary of Significant Accounting Policies (Continued)

Uncertain Tax Positions

The Society accounts for the effect of any uncertain tax positions based on a "more likely than not" threshold to the recognition of the tax positions being sustained based on the technical merits of the position under scrutiny by the applicable taxing authority. If a tax position or positions are deemed to result in uncertainties of those positions, the unrecognized tax benefit is estimated based on a "cumulative probability assessment" that aggregates the estimated tax liability for all uncertain tax positions. The Society has identified its tax status as a tax-exempt entity as its only significant tax position; however, the Society has determined that such tax position does not result in an uncertainty requiring recognition. The Society is not currently under examination by any taxing jurisdiction. The Society's Federal and state tax returns are generally open for examination for three years following the date filed.

Functional Expense Allocation

Costs have been allocated to functional classifications based on percentage of effort, usage, square footage and other criteria.

Reclassifications

Certain reclassifications have been made to the 2010 financial statements to conform with the 2011 presentation.

Note 2 - Land, Buildings and Equipment, Net

The following comprise the Society's investments in land, buildings, and equipment as of December 31:

	2011	*2010*
Land and improvements	$ 462,978	$ 462,978
Buildings and improvements	7,422,021	7,311,980
Furniture, equipment and software	5,140,199	4,870,656
Transportation equipment	62,384	62,384
Software in progress	745,105	694,469
	13,832,687	13,402,467
Less accumulated depreciation	(9,003,976)	(8,370,580)
	$ **4,828,711**	$ **5,031,887**

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 3 - Investments

The following table summarizes the Society's investments as of December 31, 2011 and 2010, as well as related strategy:

	2011	*2010*
Certificates of Deposit	$ 2,064,000	$ 2,090,000
Fixed income mutual funds	5,301,910	4,938,815
Convertible securities mutual fund	1,428,241	1,531,592
Domestic corporate stock	14,329	15,422
Money market mutual funds	4,930,839	7,321,412
Total short-term investments	11,675,319	13,807,241
Cash and cash equivalents	154,939	153,261
Fixed income mutual funds	16,036,262	13,451,038
Equity mutual funds:		
Broad U.S. market stock mutual fund	49,808,663	49,364,751
Domestic real estate investment trusts	5,076,568	4,730,534
Non U.S. developed and emerging markets stock mutual fund	10,109,640	11,706,762
Total long-term investments	81,186,072	79,406,346
Total investments	$ **94,925,391**	$ **95,303,587**

Short-term and long-term investments are classified as Level 1 in the fair value hierarchy because of the Society's ability to obtain quoted prices at the reporting date and redeem its interest on a daily basis. Certificates of deposit are classified as Level 2 in the fair value hierarchy.

The Society's long-term investments are segregated into five separate portfolios (including mutual funds), each with its own investment manager and investment objective. The overall investment strategy is determined by the Investment Committee of the Board of Trustees and is approved by the Board of Trustees annually. The primary investment objective of the long-term investment portfolio is an average real total return (net of investment fees and the effects of consumer inflation) of at least 5% over the long term. To achieve this result, the investment portfolio is allocated approximately 75% to equity investments and 25% to fixed income investments. The equity investments are further diversified into domestic, international, and real estate holdings. Additionally, the entire portfolio is diversified across economic sectors, geographic locations, industries, and size of investees.

AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 3 - Investments (Continued)

The long-term investment portfolio is allocated among the three categories of net assets as of December 31 as follows:

	2011	*2010*
Unrestricted net assets:		
Board-designated purposes	$ 71,018,071	$ 68,885,038
Total allocated to unrestricted net assets	71,018,071	68,885,038
Total allocated to temporarily restricted net assets	5,183,487	5,654,184
Permanently restricted net assets:		
Unrestricted use of income	1,565,211	1,565,181
Restricted use of income	3,419,303	3,301,943
Total allocated to permanently restricted net assets	4,984,514	4,867,124
Total long-term investments, at fair value	**$ 81,186,072**	**$ 79,406,346**

The following schedule summarizes the investment return and its classification in the accompanying statements of activities for the years ended December 31:

	2011	*2010*
Dividends and interest, net of management fees of $0 and $21,863, respectively	$ 2,009,449	$ 2,278,838
Net realized and unrealized gains (losses)	(2,229,723)	8,017,363
Investment returns	(220,274)	10,296,201
Less investment returns classified as temporarily restricted	19,603	(1,322,495)
Less investment appropriated for spending:		
Spendable income from Operations Support Fund	(1,645,100)	(1,451,100)
Spendable income from Young Scholars Fund	(29,000)	(29,051)
Sub-total	(1,674,100)	(1,480,151)
Investment returns less investments available for spending	**$ (1,874,771)**	**$ 7,493,555**

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 3 - Investments (Continued)

Management fees are incurred directly by mutual funds which the Society has holdings; such returns reported by the funds are net of such costs and, accordingly, such fees are embedded within the investment returns.

Management has assessed that fair value approximates carrying value for cash and cash equivalents, certificates of deposit, accounts receivable and accounts payable and accrued expenses given the short-term nature of these instruments.

Note 4 - Endowments

The Society's endowment consists of approximately 30 individual funds established for a variety of purposes, including both donor-restricted endowment funds (true endowment) and funds designated by the Board of Trustees to function as endowments. Net assets associated with endowment funds, including funds designated by the Board of Trustees to function as endowments, are classified and reported based on the existence or absence of donor-imposed restrictions.

Net assets comprising true endowment funds and funds designated by the Board of Trustees to function as endowments were as follows at December 31:

	Unrestricted	*Temporarily Restricted*	*Permanently Restricted*	*Total*
2011				
Donor-restricted endowment funds	$ (13,113)	$ 5,028,546	$ 4,984,514	$ 9,999,947
Board-designated endowment funds	71,018,071	-	-	71,018,071
Total endowment net assets	$ **71,004,958**	$ **5,028,546**	$ **4,984,514**	$ **81,018,018**
2010				
Donor-restricted endowment funds	$ -	$ 5,500,923	$ 4,867,124	$ 10,368,047
Board-designated endowment funds	68,885,038	-	-	68,885,038
Total endowment net assets	$ **68,885,038**	$ **5,500,923**	$ **4,867,124**	$ **79,253,085**

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 4 - Endowments (Continued)

The following table summarizes the changes in endowment net assets for the year ended December 31, 2011:

	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Endowment net assets, January 1, 2011	$ 68,885,038	$ 5,500,923	$ 4,867,124	$ 79,253,085
Donor-restricted contributions	-	-	117,390	117,390
Investment income	(200,670)	(21,390)	-	(222,060)
Release of endowment net asset restrictions	(1,674,100)	(464,100)	-	(2,138,200)
Additions from operations	3,994,690	13,113	-	4,007,803
Endowment net assets, December 31, 2011	**$ 71,004,958**	**$ 5,028,546**	**$ 4,984,514**	**$ 81,018,018**

The following table summarizes the changes in endowment net assets for the year ended December 31, 2010:

	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Endowment net assets, January 1, 2010	$ 59,473,277	$ 4,647,380	$ 4,752,649	$ 68,873,306
Donor-restricted contributions	-	-	114,475	114,475
Investment income	8,973,706	1,320,254	-	10,293,960
Release of endowment net asset restrictions	(1,480,151)	(466,711)	-	(1,946,862)
Additions from operations	1,918,206	-	-	1,918,206
Endowment net assets, December 31, 2010	**$ 68,885,038**	**$ 5,500,923**	**$ 4,867,124**	**$ 79,253,085**

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 4 - Endowments (Continued)

Interpretation of Relevant Law

The portion of the donor-restricted endowment fund that is not classified in permanently restricted net assets is classified as temporarily restricted net assets until those amounts are appropriated for expenditure by the Society in a manner consistent with the standards of prudence prescribed by the Act. In accordance with the Act, the Society considers the following factors in making a determination to appropriate or accumulate donor-restricted endowment funds:

1. The duration and preservation of the fund
2. The purposes of the Society and the donor-restricted endowment fund
3. General economic conditions
4. The possible effect of inflation and deflation
5. The expected total return from income and the appreciation of investments
6. Other resources of the Society
7. The investment policies of the Society

Funds with Deficiencies

From time to time, the fair value of assets associated with individual donor-restricted endowment funds may fall below the level that the donor or the Act requires the Society to retain as a fund of perpetual duration. Deficiencies of this nature were funded by operations and amounted to $13,113 as of December 31, 2011. In 2010, gains due to the recovery in the financial markets restored $70,137 of the fair value of the assets of affected endowment funds to their required level and have been classified as an increase in unrestricted net assets.

Return Objectives and Risk Parameters

The Society has adopted investment and spending policies for endowment assets that attempt to provide a predictable stream of funding to programs supported by its endowment while seeking to maintain the purchasing power of the endowment assets. Endowment assets include those assets of donor-restricted funds that the Society must hold in perpetuity or for a donor-specified period as well as board-designated funds. Under this policy, as approved by the Board of Trustees, the endowment assets are invested in a manner that is intended to produce an average annual real rate of return of approximately 5% over the long term. Actual returns in any given year may vary from this amount.

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 4 - Endowments (Continued)

Strategies Employed for Achieving Objectives

To satisfy its long-term rate-of-return objectives, the Society relies on a total return strategy in which investment returns are achieved through both capital appreciation (realized and unrealized) and current yield (interest and dividends). The Society targets a diversified asset allocation that places emphasis on investments in equities (allocation in the portfolio between 65% to 85%, with foreign equities comprising no more than 25% of the equity total), fixed income securities (allocation in the portfolio between 15% to 25%) and alternatives (currently real estate investment trusts with an allocation in the portfolio of no more than 10%) to achieve its long-term return objectives within prudent risk constraints.

Spending Policy and How the Investment Objectives Relate to Spending Policy

The Society has a policy of appropriating for distribution each year 5% of its true endowment funds' average fair value using an average determined prior to the beginning of the fiscal year of which the spending policy relates based on the prior four fiscal year end balances. The Board-Designated Operations Support Fund's spending is calculated the same way. In establishing these policies, the Society considered the expected return on its endowment. Accordingly, the Society expects the current spending policy to allow its endowment to maintain its purchasing power by growing at a rate, on average over time, equal to planned payouts. Additional real growth will be provided through new gifts and any excess investment return.

Note 5 - Accrued Study Leave Pay

Certain employees of the Society receive vested rights to study leave pay based upon salary and years of service. The Society provides for this obligation over the related years of the employees' service. The provision for the study leave pay charged to expense totaled $66,606 and $116,081 in 2011 and 2010, respectively.

Note 6 - Pension and Postretirement Benefits

The Society has contributory retirement plans (the "Plans") covering substantially all full-time employees. The Plans are administered by, and related assets are maintained with, Teachers Insurance and Annuity Association and College Retirement Equities Fund. Under the Plans, the Society contributes 9.5% of eligible compensation (with higher amounts for employees earning in excess of the social security second bend point). The Society's retirement expenses for the Plans totaled approximately $1,244,819 and $1,248,256 in 2011 and 2010, respectively. In addition, the Society offers an employee only plan which allows for additional contributions upon election of said employee.

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 6 - Pension and Postretirement Benefits (Continued)

The Society sponsors a defined benefit postretirement medical plan that covers substantially all full-time employees. Under the plan provisions, employees who retire from the Society at age 62 or older with at least 12 years of service are eligible for benefits under the plan upon the attainment of age 65. Plan benefits consist of health insurance coverage under a Medicare Supplement Plan and reimbursement of Medicare Part B premiums. Employees who retire before age 62 may qualify for coverage under the plan according to a longer service requirement schedule established by the Society. Spouses of eligible retirees are not covered. The plan is noncontributory and is unfunded.

The plan limits the annual benefit per retiree to $4,000 for reimbursement of actual premiums paid for Medicare Supplement insurance and any Medicare coverage premiums. The plan was frozen effective June 30, 2006 whereby employees hired after that date are not eligible to participate in the plan. There is no provision for this maximum benefit amount to increase over time.

Net postretirement benefit cost for the years ended December 31, 2011 and 2010 consisted of the following components:

	2011	*2010*
Service cost	$ 118,412	$ 114,963
Interest cost	265,066	252,346
Amortization of prior service cost, pre-2007 amendment	1,722	1,722
Amortization of prior service credit, post-2007 amendment	(247,980)	(247,980)
Amortization of net experience losses	89,100	93,900
Net postretirement benefit cost	**$ 226,320**	**$ 214,951**

The prior service cost (credit) and net loss (gain) expected to be recognized as components of net periodic postretirement benefit cost for the year ending December 31, 2012 are approximately $(246,258) and $163,900, respectively.

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 6 - Pension and Postretirement Benefits (Continued)

The following table reconciles the plan's funded status with the amounts presented in the Society's financial statements at December 31, 2011 and 2010:

		2011		*2010*
Projected postretirement benefit obligation, beginning of the year (and funded status)	$	4,770,464	$	4,543,155
Service and interest cost for the year		383,478		367,309
Benefits paid		(104,412)		(105,033)
Actuarial (gain) loss recognized in the year incurred		945,027		(34,967)
Projected postretirement benefit obligation, end of year	**$**	**5,994,557**	**$**	**4,770,464**
Net liability recognized in the balance sheet	$	5,994,557	$	4,770,464

The following table presents additional information relating to the plan for the years ended December 31, 2011 and 2010:

Discount rate	4.3% (2011)	5.5% (2010)
Healthcare cost trend rate assumed for next year		Not applicable
Rate to which the cost trend rate is assumed to decline (the ultimate trend rate)		Not applicable
Year that the rate reaches the ultimate trend rate		Not applicable

The expected future benefit payments under plan provisions for the next ten years are as follows:

Years ending December 31:

2012	$	157,185
2013		239,809
2014		261,976
2015		286,158
2016		310,340
2017 - 2021		1,751,206

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AMERICAN MATHEMATICAL SOCIETY

Notes to Financial Statements

Note 7 - Designated Unrestricted Net Assets

The Board of Trustees of the Society has designated components of unrestricted net assets to support certain purposes. All such designated funds within unrestricted net assets are supported by the unrestricted portion of the long-term investment portfolio. The Economic Stabilization Fund is designated to provide support for the Society in future years should an unexpected need arise. The Operations Support Fund is designated to provide current operating support to the Society via use of a 5% spending rate applied to the average of the prior four-year ending values of the fund. The Journal Archive Fund is designated to accumulate funds to support changes that may be necessary for electronic files to be available for future use due to as-yet-unforeseen technological changes. The Young Scholars Fund was created by the Board of Trustees in 2000 to augment the funds in Epsilon Fund for Young Scholars, a true endowment fund that supports programs for high school mathematics students.

The following comprise the balances in these designated funds within unrestricted net assets as of December 31:

	2011	2010
Economic Stabilization Fund	$ 24,430,891	$ 23,732,898
Operations Support Fund	45,052,391	43,636,273
Journal Archive Fund	920,784	873,003
Young Scholars Fund	614,005	642,864
Total	**$ 71,018,071**	**$ 68,885,038**

Note 8 - Temporarily Restricted Net Assets

Temporarily restricted net assets consist of amounts restricted by donors for the following purposes as of December 31:

	2011	2010
Restricted purpose:		
Prizes and scholarships	$ 265,089	$ 246,866
Lectures and symposia	55,786	83,056
Fellowships	53,396	80,026
Epsilon awards	109,904	110,607
Book/Journal donation project	10,493	10,493
Graduate student travel program	132,681	101,691
National Mathematics Game	-	2,161
Other miscellaneous	12,481	37,015
Unspent spendable income from unrestricted use		
true endowment funds	97,372	35,082
Accumulated gains on true endowment gifts	5,016,083	5,500,923
Total	**$ 5,753,285**	**$ 6,207,920**

Notes to Financial Statements

Note 9 - Permanently Restricted Net Assets

The Society has two types of donor-restricted endowments: gifts with no donor designations as to the use of income derived there from and gifts whose donors have designated a specific purpose in the gift instrument.

These endowments consisted of the following at December 31:

	2011	*2010*
Endowment without donor designation on use of income	$ 1,565,211	$ 1,565,181
Endowment with donor designation on use of income:		
Prizes	878,157	867,156
Scholarships and fellowships	252,130	252,130
Symposia and lectures	270,000	270,000
China collaboration	366,757	366,757
Epsilon Fund for Young Scholars	1,652,259	1,545,900
	$ **4,984,514**	$ **4,867,124**

Note 10 - Leases

The Society leases certain facilities under short-term arrangements that are renewable annually based on notice.

Note 11 - Customer Concentrations

For the year ended December 31, 2011, three customers comprised approximately 46% of the Society's accounts receivable. For the year ended December 31, 2010, five customers comprised approximately 74% of the Society's accounts receivable.

Note 12 - Subsequent Events

The Society has evaluated events subsequent to occurring through May 18, 2012, the date on which the financial statements were available to be issued. There were no subsequent events to be disclosed based on this evaluation.

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