

**American Mathematical Society  
Committee on Education Meeting  
October 25-27,2007  
Washington DC**

**Summary Report**

The Committee discussed a number of issues related to mathematics education. Guests of the Committee included representatives from the National Science Foundation, Achieve, Teach For America, The College Board, Business-Higher Education Forum, The Brookings Institution, Mathematical Association of America, Mathematicians and Education Reform Forum (MER), and the National Association of State Universities and Land Grant Colleges (NASULGC). The meeting was very well attended, with 84 participants, including 48 chairs and representatives of mathematical sciences department.

***Discussion on Teacher Training***

Bill McCallum (University of Arizona/Chair of COE) opened the meeting with a discussion on teacher training. He began by quoting some statistics that describe the level of training that high school math teachers currently receive. He discussed the number of secondary math and science teachers that will be needed within the next decade. He suggests that the situation dictates that mathematics departments be involved in preparing these teachers and that teacher training become a core department activity. McCallum highlighted a few institutions that have model programs in this area and there was discussion of other program examples.

***Report from the National Science Foundation – Division of Undergraduate Education***

Dan Maki (Program Director, NSF-DUE) began his presentation by giving some description and background information on the Division of Undergraduate Education (DUE). He then presented several DUE programs of particular significance to the mathematics community, including the: Course Curriculum and Laboratory Improvement (CCLI) Phases I, II and III; Science, Technology, Engineering and Mathematics Talent Expansion Program (STEP); NSF Scholarships in Science, Technology, Engineering and Mathematics (S-STEM); Robert Noyce Scholarship Program, National Science Digital Library (NSDL) and Advanced Technological Education (ATE) program. Two programs are managed in cooperation with the Division of Mathematical Sciences: the Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences (UBM) program and the Computational Sciences Training for Undergraduates in the Mathematical Sciences (CSUMS). He also mentioned Math and Science Partnership (MSP) program and the Cyber-Enabled Discovery and Innovation (CDI) program.

***“An American Imperative: Transforming the Recruitment, Retention, and Renewal of Our Nation’s Mathematics and Science Teaching Workforce.”***

***A Report from the Business-Higher Education Forum***

Brian Fitzgerald (Executive Director, Business-Higher Education Forum) presented this newly released report from the Business-Higher Education Forum (BHEF). He began by explaining that the BHEF is a coalition of corporate, academic and foundation members whose objective is to further U.S. competitiveness through innovative solutions to our nation’s educational challenges. Fitzgerald then discussed two issues that the report addresses: the quality of the teaching workforce in mathematics and science, and the shortage of teachers in these areas.

The report provides an action plan, including three key components that are intended to strengthen our nation’s math and science teaching workforce: Recruitment, Retention and Renewal. As part of the recruitment strategy, the report calls for teacher incentives such as scholarships, signing bonuses and differential pay. The report suggests that the content and pedagogy of teacher preparation be strengthened. In addition, the report calls for improvements in the retention of both new and experienced

teachers, as well as addressing teacher dissatisfaction. Further, the report suggests that renewal activities are important to the support of teachers in the classroom – professional development programs focused on both content and pedagogy, license renewal programs to incorporate measures of teacher effectiveness, and systems to track student progress and teacher employment trends.

Five key stakeholders in strengthening the number and quality of mathematics and science teachers include the federal government, state governments, school districts, higher education, and business and foundations. The report suggests specific roles that each of these groups can play in this effort.

### ***National Professional Science Master's Association (NPSMA)***

Bogdan Vernescu (President, NPSMA) began his presentation on the NPSMA by giving a history of efforts to introduce terminal Masters' degrees in order to satisfy global workforce needs in science, mathematics and technology.

Vernescu discussed NPSMA goals and objectives and several mathematics programs. PSM degrees in mathematics are offered in: Applied Financial Mathematics, Applied Statistics (& Bioinformatics), Biostatistics, Computational Science, Financial Mathematics, Industrial Mathematics, Mathematical Science, Quantitative Computational Finance, Quantitative Financial Mathematics and Statistics for Entrepreneurs. Mathematics programs offered at several institutions were highlighted.

### ***Teach For America: Closing the Academic Achievement Gap***

Jennie Tsang (Specialist, Math and Science Recruitment, Teach For America) presented information on Teach For America, a national corps of teachers recruited from recent college graduates in all academic majors who agree to work for two years in underserved urban and rural public schools. Teach For America attempts to address the disparities in educational outcomes for children growing up in low-income communities nationwide.

Central to Teach For America's recruitment program is the concept of 'teaching as leadership.' The organization aggressively targets proven achievers and leaders on college campuses. Tsang asked meeting attendees for help in identifying potential corps members. She discussed Teach For America's teacher selection process, placement, training and ongoing support, and alumni network.

Teach For America launched a Math and Science Initiative in 2005 that seeks to double the number of corps members teaching math and science to 2,000 by the year 2010.

### ***Report on the National Mathematics Advisory Panel***

Tom Loveless (Director, Brown Center on Education Policy, The Brookings Institution) began his presentation on the National Mathematics Advisory Panel by giving an overview of the panel including background, panel members, meeting schedule, task groups and subcommittees, and its mission to advise the President and Secretary of Education on advancing the teaching and learning of mathematics, particularly in algebra.

Task Group subject areas included Conceptual Knowledge and Skills, Learning Processes, Instructional Practices, Teachers, and Assessment. At this stage, the majority of these task groups have reported to the Panel in public sessions and their work is mostly completed. The subcommittee on the Survey of Algebra Teachers has also reported findings. Loveless discussed some of these early findings.

The next steps for the Panel will be the drafting of the final report which will include recommendations. The adoption of the final report and its official release is scheduled for Spring 2008.

### ***Achieve's Fourteen State Algebra II Assessment***

Laura McGiffert Slover (Vice President, Content and Policy Research, Achieve Inc.) gave meeting attendees background information on Achieve, its mission, and the American Diploma Project (ADP). The ADP has grown to a network of 30 states, and has developed a common core of knowledge and skills in math and English necessary for high school graduates to be successful in college and in the workplace.

Benchmarks have been established to assure that students have acquired necessary skills and knowledge by the time they graduate high school.

The ADP policy agenda includes aligning high school standards with college and career expectations, requiring a curriculum aligned with these standards, holding high schools accountable for student preparation, and including a test in the high school assessment system to determine if students are college and career ready. For assessment, fourteen states have worked together to develop the Algebra II End-of-Course Exam. This exam, field tested in October 2007, will be given for the first time in Spring 2008. States will apply this exam in different ways: some will require all Algebra II students to take the exam; some states will make it optional for students; some states will allow districts to decide; and at least one state will require the exam for graduation.

### ***MAA's Project on Articulation between High School and College***

Michael Pearson (Director of Programs and Services, Mathematical Association of America) discussed a project being undertaken by the MAA that addresses the gap between expectations of high school mathematics versus those of college mathematics. The MAA project seeks to increase the number of students majoring in mathematics. The project will study current enrollment trends in college mathematics courses.

### ***CBMS 2005 Survey***

Jim Maxwell (Associate Executive Director, American Mathematical Society) presented the newest edition of the Conference Board of the Mathematical Sciences (CBMS) Survey -- a national survey of undergraduate mathematical and statistical sciences in four-year and two-year universities and colleges. He presented background information on the survey and discussed the sampling and response rates for the 2005 survey.

The contents of the 2005 report include: four-year enrollments and bachelors degrees; four-year faculty demographics; first year courses in four-year institutions; two-year enrollments, course offerings and instructional practices; and two-year faculty, administration, and special topics. A copy of the report is available in hard copy from the AMS and is also posted on the AMS website.

### ***National Association of State Universities and Land Grant Colleges (NASULGC) Science and Mathematics Teacher Imperative***

Howard Gobstein (Vice President, Research and Science Policy, NASULGC) discussed the *Science and Mathematics Teacher Imperative (SMTI)*, a project of the NASULGC that seeks to increase the number and quality of secondary school math and science teachers.

The SMTI project was initiated in response to several recent prominent studies, most notably the National Academy of Sciences' report "Rising above the Gathering Storm," which questions U.S. capability to keep pace with the global economy's intense competitive pressures. The report makes several recommendations on how to improve our nation's competitiveness, including increasing the talent pool in the U.S. by significantly improving K-12 math and science education. This recommendation is at the core of the SMTI project.

A national commission consisting of leaders from higher education, K-12 learning, business, and state government is guiding the project. Several working groups are reaching out to individuals and institutions to secure their participation in the effort. All universities involved in teacher preparation at the secondary school level are invited to participate.

### ***West Virginia University's Institute for Math Learning***

Michael Mays (Director, Dept of Mathematics, West Virginia University) presented information on the Institute for Math Learning (IML) at West Virginia University. Established in 2001, the goal of the IML is to improve the teaching and learning of mathematics for students at WVU and throughout the state in K-12 classrooms.

Mays explained that one of the core missions of IML is its initiative on curriculum and instruction. WVU has made across-the-board course changes so there is a common look and feel to all freshman level courses -- this includes having a computer lab component to supplement lectures. Mays described curricular and technological changes that have been put in place at WVU. He noted that the technological teaching tools utilized by the Institute have been adopted by the university as a whole.

#### ***AMS Task Force on the First Year College Mathematics Experience***

Jim Lewis (University of Nebraska) discussed the newly formed AMS Task Force on the First Year College Mathematics Experience. This task force is charged with identifying the challenges in pursuing excellence in freshman instruction; collecting and analyzing information about the diverse strategies that departments, organizations and groups are currently using to address these challenges, and formulating recommendations for the AMS.

The task force has had one meeting to date. It has also created an online blog to which Lewis encouraged meeting attendees to visit and offer information on their own experiences. The task force will also hold a focus group at the Joint Mathematics Meeting in San Diego in January 2008. The task force needs input from the mathematics community in order for their work to be productive.

#### ***AMS Working Group on Preparation for Technical Careers***

Frank Quinn (Virginia Tech) presented information on the AMS technical careers project, which is planned to launch at the end of 2007. The project is a long term, web-based community project to develop materials concerned with the preparation of high-achieving K-12 students for vigorous mathematical training for technical careers.

The working group is looking for participation from the mathematics community, particularly from teachers of university math courses for mathematics, science and engineering majors.

#### ***Math Is More Project***

John Ewing (Executive Director, American Mathematical Society) discussed the *Math Is More* project, a group of mathematics educators, mathematicians and concerned individuals committed to improving mathematics education. Ewing directed meeting attendees to the project website at <http://www.mathismore.net> to learn more. The Sloan Foundation will fund a workshop, planned for the near future, to evaluate first year, last course problems.

#### ***Other Discussion***

Bill McCallum opened the floor to the committee to see if there were any issues or policy recommendations the Committee on Education should consider. Discussion on potential distribution methods that could be utilized to make articles on mathematics education available to committee members and interested parties ensued. It was decided that the AMS Washington Office would establish a webpage repository for posting such articles. Any articles to be posted to this repository should be forwarded to Anita Benjamin of the AMS Washington Office.

#### ***COE Activities at San Diego, CA Joint Mathematics Meetings, January 2008***

Bill McCallum reported that the AMS Committee on Education will host a panel discussion at the Joint Meetings in San Diego, CA in January 2008 entitled "Making Teacher Preparation Our Business." The panel discussion will be held on Tuesday, January 8<sup>th</sup> from 1:00 to 2:30 pm.

#### ***Date of Next Meeting***

The committee chose October 30 – November 1, 2008 as the dates for the next meeting of the AMS Committee on Education. The meeting will be held in Washington, DC.