

**American Mathematical Society
Committee on Education Meeting
October 31 – November 1, 2008
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, NRC Board on Higher Education and Workforce, Mathematicians and Education Reform Forum (MER), National Council on Teacher Quality (NCTQ), Council of Graduate Schools, and the National Council of Teachers of Mathematics (NCTM). The meeting was very well attended, with over 75 participants, including 40 chairs and representatives of mathematical sciences department.

Presentation on National Science Foundation - Division of Mathematical Sciences Programs

Hank Warchall (Program Director, NSF-DMS) began his presentation on the NSF's Proactive Recruitment in Introductory Science and Mathematics (PRISM) program by pointing out that it was developed in response to the National Academies report entitled "Rising Above the Gathering Storm," which discussed the need for a comprehensive and coordinated federal effort to bolster U.S. competitiveness in an increasingly globalized economy. The PRISM program is designed to strengthen the nation's scientific competitiveness by increasing the number of well-prepared, successful U.S. undergraduate majors and minors in science and mathematics. The program intends to improve the experience of college freshmen and sophomores in mathematics and statistics to better prepare them for and increase their interest in scientific majors. The program is expected to fund three to eight awards in FY2009 with an award size of \$100,000 to \$600,000 per year.

Dean Evasius (Program Director, NSF-DMS) discussed the NSF's Workforce Program in the Mathematical Sciences, which seeks to increase the number of students that pursue careers in the mathematical sciences and other NSF-supported disciplines. Its primary interest is in activities centered on education through research participation for trainees. The program is particularly interested in improving recruitment and retention, educational breadth and professional development. Some examples of Workforce funded activities over the years include the EDGE Program, Summer Undergraduate Mathematical Sciences Research Institute (SUMSRI) at Miami University and the Park City Mathematics Institute. The Workforce program also administers activities like the Enhancing the Mathematical Sciences Workforce in the 21st Century (EMSW21) program, which includes Vertical Integration of Research and Education in the Mathematical Sciences (VIGRE), Research Training Groups (RTG) and Mentoring Through Critical Transition Points (MCTP); Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences (UBM); and other training activities.

Council of Graduate Schools Initiative on Professional Master's Degrees

Carol Lynch (Senior Scholar, Council of Graduate Schools) began her presentation by giving attendees some background information on the mission of CGS, its priorities and initiatives. She then discussed the Professional Science Master's (PSM) program, which prepares graduates for science careers by combining study in science and mathematics with workforce skills-based coursework in business, government and non-profit sectors. PSM programs emphasize communication skills, leadership and team building, while providing connections to potential employers through internships. The program also often includes cross disciplinary courses. These Professional Master's degrees are much like a standard master's degree with equivalent credit requirements. However, the majority of program coursework is in graduate-level science and math courses and the workforce skills component is developed in consultation with prospective employers.

Lynch highlighted some examples of PSM programs at institutions across the country – there are currently 120+ PSM programs at 60+ institutions. This effort is a major initiative of the Council of Graduate Schools, which hopes to continue and improve existing PSM programs and encourage the development of new PSM programs.

National Research Council Report: Enhancing the Master’s Degree in the Natural Sciences

Peter Henderson (Director, NRC Board on Higher Education and Workforce) presented a new report from the National Research Council entitled “Science Professionals: Master’s Education for a Competitive World.” The report presents findings and conclusions about the strength of master’s education programs in the natural sciences and provides recommendations for enhancing their effectiveness.

Key findings of the report discuss increased demand for master’s level science professionals and the appeal of these programs to students who would rather seek career advancement, gain competitive edge or refine skills than pursue a doctoral degree. Recommendations of the report include: federal expansion of the PSM program to other major federal science agencies outside of the NSF; funding by state governments for the creation and expansion of PSM programs in their state and region; and continued support and innovation by higher education institutions for these programs.

National Council of Teachers of Mathematics Focus in High School Mathematics Project

Hank Kepner (President, NCTM/University of Wisconsin-Milwaukee) spoke briefly about NCTM’s previous report on PK – Grade 8 Mathematics to illustrate the need for a similar report on high school mathematics. NCTM began this high school mathematics project in early 2007 and expects the final report to be released to the public in September 2009. Kepner gave a general overview of the draft document.

The report will be centered on high school students and what they require for future success -- whether they decide to go on to college or directly into the workforce. Kepner discussed the fact that the report will make recommendations for key elements of a high school mathematics curriculum and will suggest major areas for revision. There will also be a series of follow-up documents to expand on the vision set forth in the report to provide more detailed advice for teachers.

Math for America Outreach Effort in Conjunction with the Park City Mathematics Institute

Jon Schweig (Program Director, Math for America) began his presentation by giving some background information on the mission of Math for America and its two programs in New York City (MfA Fellowship Program and MfA Master Teacher Program). He highlighted some MfA program statistics and discussed some of the opportunities and support provided to program teachers, including National Board Certification, workshops and seminars, and funding to attend mathematical conferences.

MfA is now also focusing on community outreach opportunities. Along with the Park City Mathematics Institute, MfA is sponsoring the New York City-based Professional Development and Outreach (PDO) Group which supports secondary school mathematics teachers through workshops and other activities. The goals of the PDO Group are to expose participants to new mathematics, to give participants substantial time to do rich problems, to give participants time to experience a problem-based pedagogy, and to give participants time and a supportive community in which to reflect on their experiences in relation to their classroom practice.

No Common Denominator: A Report of the National Council on Teacher Quality

Julie Greenberg (Senior Policy Analyst, National Council on Teacher Quality) discussed NCTQ’s new report “No Common Denominator: The Preparation of Elementary Teachers in Mathematics by

America's Education Schools." The study for the report evaluated mathematics programs at a sampling of 77 education schools and considered three factors related to coursework: relevance, breadth and depth. Study findings included that few schools cover the math content that teachers need; that state guidance is inadequate; that textbooks are deficient and vary greatly between schools; that there are inadequate entry requirements for aspiring teachers; and that there are inadequate exit tests of teacher knowledge.

The report made recommendations for states, the Association for Mathematics Teacher Educators (AMTE), education schools, higher education institutions and textbook publishers. Some of these recommendations included that states should set higher thresholds for acceptable scores on entrance and exit exams; that states develop stronger course standards and new assessments to test for those standards; and that schools give algebra a higher priority.

K-12 and Higher Education: Working Together to Improve College Readiness

Tracy Halka (Project Manager-Assessment Partnership, Achieve Inc.) gave meeting attendees some background information on Achieve and its mission, as well as some history on their American Diploma Project (ADP). Through the development of benchmarks, the ADP strives to assure that students have acquired the necessary knowledge and skills in English and Mathematics to be successful in college and in the workplace. The ADP Network has grown to include 34 states committed to taking necessary steps to improve student preparation.

In May 2005, leaders of the ADP Network began to explore collaboration on common assessment goals and decided to develop a common end-of-course exam in Algebra II. The exam consists of a common core, which is to be taken by students across all participating states. In addition to the core exam, there are seven optional modules available to states to add content to the core that is important to colleges. There are also ADP Network states developing an Algebra I end-of-course exam.

In an effort to provide states with the tools, training and technical assistance necessary to align high school standards in English and Mathematics to the demands of college and career, Achieve has organized a series of Alignment Institutes. States participating in these institutes send representatives from K-12 state education, higher education and the business community to cross-state work sessions with peers.

Report on the National Mathematics Panel and Forum

Bill McCallum (University of Arizona) reported on the National Math Panel Forum which took place October 6-7, 2008 in Washington, DC. Participants were asked to form teams – 80 were formed, each developed an action plan to address one or more of the recommendations/findings of the National Math Panel Report. This Forum is to be the first in a series, the next scheduled for Spring 2009. McCallum directed attendees to the CBMS website (www.cbmsweb.org) for further information on the Forum and to review the Team Action Plans that were developed.

Panel Discussion: Recruiting Students into Graduate Mathematics

This panel discussion centered on recruiting students into graduate mathematics. Three presenters described their respective institutions' efforts in this endeavor. **George Andrews** (Pennsylvania State University) discussed the Mathematics Advanced Study Semesters (MASS) at Penn State University. The program was started in 1996 and provides a comprehensive, semester-long immersion into the mathematical environment at Penn State for talented, mostly senior, undergraduate students. **Harvey Diamond** (West Virginia University) presented meeting attendees with statistical information to illustrate the need to recruit more students into graduate mathematics. The charts presented revealed the stark number of mathematical sciences majors that are employed in science and engineering fields after graduation. **Phil Kutzko** (University of Iowa) discussed the strategies and resources utilized for the

successful graduate education program at the University of Iowa. He also discussed the National Alliance for Doctorial Studies in the Mathematical Sciences, a partnership of the math sciences departments at the University of Iowa, Iowa State University and the University of Northern Iowa, intended to introduce potential graduate students to all three schools.

Other Discussion

Bill McCallum opened the floor to the committee to discuss issues or propose policy recommendations the Committee on Education should consider. General discussion touched on a number of topics including placement and preparedness tests, how best to communicate and gain common ground on issues affecting the mathematical sciences and attendees' own experiences and collaborative work in mathematics education.

COE Activities at Washington, DC Joint Mathematics Meetings, January 2009

Bill McCallum reported that the AMS Committee on Education will host a panel discussion at the Joint Meetings in Washington, DC in January 2009 entitled "The Future of School Mathematics Education." Panelists include Scott Baldrige (Louisiana State University), Daniel Chazan (University of Maryland), Sol Garfunkel (COMAP) and Kristin Umland (University of New Mexico). The panel discussion will be held on Thursday, January 8th from 8:30 am to 10:00 am.

Date of Next Meeting

The committee chose October 23 – 24, 2009 as the date for the next meeting of the AMS Committee on Education. The meeting will be held in Washington, DC.