

FOCUS ON MATHEMATICS

Summer 2008 Newsletter

A PARTNERSHIP OF TEACHERS AND MATHEMATICIANS COMMITTED TO INCREASING STUDENT ACHIEVEMENT.

This newsletter is available online at www.focusonmath.org

5th Annual Math Expo Shines on Students' Mathematical Accomplishments

One of the greatest rewards of the *Focus on Mathematics* (FoM) Math Science Partnership comes from the students themselves. For the fifth year in a row, students in grades 5 to 12 from the five FoM school districts developed mathematical research projects as part of the FoM Math Fair program. This year about 2,600 students participated in local Math Fairs held at 17 middle and high schools in the spring. Of the 1,426 projects that were presented, 134 of them were selected for special exhibit at the Math Expo held June 14 at the Museum of Science. This fifth-annual, sunny Saturday event brought together the FoM community to celebrate students' mathematical accomplishments.

During the months and weeks leading up to math fairs, students researched mathematical questions they had or explored the underlying mathematics in topics that interested them. Sample student projects included "the number of pencils to Mount Everest" by fifth graders in Chelsea; a probability experiment flipping coins by fourth graders and figuring height by measuring one's tibia bone by eighth graders in Lawrence; a Waltham ninth grader's deciphering of algorithms in "the secret world of encryption"; Waltham tenth graders' modeling of Celtics' jump shots using quadratic equations; and a Watertown tenth grader's look at the mathematics of winning presidential caucuses and primaries. *Continued on page 2*



Fifth grade student Xin Wen (left) of South Lawrence East in Lawrence shares her project "MMM: Magnificent Math Magic" with Expo attendees.

Mathematician and innovator in education reform Uri Treisman visits FoM



National leader in education policy and research Uri Treisman speaks at the 2008 FoM Spring Colloquium. For his efforts to foster minority student high achievement in mathematics, he was named a MacArthur Fellow in 1992.

Philip Uri Treisman highlighted challenges and promising solutions for improving mathematics achievement during FoM's Spring Colloquium on June 9 at Boston University. Dr. Treisman is a mathematics professor and founder and executive director of the Charles A. Dana Center at the University of Texas at Austin. His notable visit to the FoM community shared strategies for making mathematics more accessible and challenging for all students.

In his talk Treisman stressed the importance of continuously "honoring good work" of teachers and students, pointing to a 2007 study indicating that in mathematics, eighth grade students in Massachusetts perform at the same level as students in Japan.¹ In another study, the 2007 National Assessment of Educational Progress (NAEP), Massachusetts' eighth graders ranked first in the nation on math scores, though not one state's math average reached the Proficient level and on an international scale, the U.S. is significantly below the highest achieving countries.² *Continued on page 2*

5th Annual Math Expo, continued



Fifth graders Joshua Bush (center) with Jonathan Gutierrez (left) of Parthum School in Lawrence explain how they found the perimeter of a

"Each year the number of projects has increased and, more importantly, the quality of the projects has improved," Dick Hall, Boston University mathematics professor and FoM Math Fair advisor said. "Students are realizing that the eight to ten years' worth of mathematics they have learned in school has given them a tool of tremendous power and that thinking mathematically can help them solve fascinating questions." Jordan Sutherland, a sixth-grade student from McDevitt Middle School in Waltham noted, "The Math Fair showed me how important math is and how it can be used in real life."

Students' creativity, curiosity, and understanding of mathematics was evident in their math fair presentations to FoM mathematicians, teachers, administrators, and mentors. At the Math Expo, students proudly displayed their math projects to attending grandparents, parents, classmates, and teachers. Thank you to the 2008 Math Expo

sponsors ExxonMobil, Novell, Foster-Miller, and The Learning Tree Store for their generous contributions, and to Math Fair sponsors Google, Eureka! Puzzles, Alkermes, UMass Lowell, and Raytheon for their time and support.

Across the five FoM districts Math Fair participation has grown exponentially, from 584 students in Year 1 to nearly 2,600 students in Year 5. This genuine research-like experience in mathematics is a core approach in the *Focus on Mathematics* mission to improve student achievement in mathematics. We look forward to future math fairs in the coming school year.

2008 Spring Colloquium, continued

Treisman's point was clear—progress is being made but there's work to be done, especially in narrowing achievement gaps. He referred to several studies and innovative programs that are helping educators raise the mathematics performance for all students. Among those discussed were:

- *Word Generation*, a program to build ELL students' academic language proficiency across content areas being piloted in Boston Public Schools. www.serpininstitute.org, under Tools & Programs
- *Academic Youth Development (AYD) Initiative*, an Algebra-readiness program designed to change the culture of the mathematics classroom by creating student allies who model respectful engagement and academic success. www.utdanacenter.org, under "Practices Worthy of Attention"
- *Student motivation research* by renowned psychologist Carol Dweck shows students who view intelligence as something that can be improved with learning and habits of mind are more likely to persist through initial failure. www.sciam.com/article.cfm?id=the-secret-to-raising-smart-kids&page=2
- *Addressing Accessibility in Mathematics*, a professional development program for middle school mathematics and special education teachers using study groups and collaborative problem solving as a vehicle to increase the accessibility of mathematics for students with disabilities. www.edc.org/accessmath
- *Recommended viewing*: Video cases from a yearlong study of a middle school mathematics classroom with analysis of teacher practice and students' mathematical ideas and representations, from *Connecting Mathematical Ideas: Middle School Video Cases to Support Teaching & Learning* by Jo Boaler and Cathy Humphreys.

Treisman's talk and the proceeding discussion shared effective strategies and an optimistic perspective on ways teachers, educators, and mathematicians can continue their important work together to improve student performance in mathematics. The presentation is available at www.focusonmath.org.

^{1,2} Phillips, G. W. 2007. *Chance Favors the Prepared Mind: Mathematics and science indicators for comparing states and nations*. American Institutes for Research (AIR). www.air.org/publications/documents/phillips.chance.favors.the.prepared.mind.pdf

FoM Expands Summer Professional Development Programs

Teachers looking to focus on math this summer benefited from a range of professional development activities available through FoM. In Year 5 of the Partnership, FoM continued to offer immersion experiences in mathematics through weeklong content institutes and the six-week PROMYS For Teachers program at Boston University. In addition, a new two-week graduate course designed for upper elementary and middle school teachers titled "Uncovering the Fundamentals of Arithmetic" explored extensions from whole number arithmetic to algebra and from decimals and fractions. Several teachers enrolled in the online summer course "Mathematical Problem Solving" offered by UMass Lowell. FoM teachers also participated in weeklong workshops focused on developing mathematical habits of mind using approaches and materials from new NSF-funded curriculum programs *Think Math!* for K-5 and *CME Project* for high school mathematics. In total, 79 teachers across the five FoM districts participated in at least one FoM summer course and 22 teachers enrolled in two or more courses.

*"Working with colleagues was very enriching because it made me approach the problems in different ways."
—High school teacher institute participant*

"This institute has been a revelation—so many new ideas, problems, and solving strategies were uncovered and shared. Tremendous insights and great ammunition for the classroom and future practice."

—7th grade teacher institute participant

FoM summer programs give teachers, specialists, and coaches at all grade levels opportunity to participate in a community of practice and engage in mathematical problem solving. Participants see various ways to solve a problem, explore extensions, and make direct connections to teaching practice and students' development of mathematical ideas. In feedback surveys teachers appreciated the collegiality of the institutes—the shared insights and approaches and comfortable atmosphere—and the connections made between concepts across mathematical ideas. Many of the participants plan to use new strategies they learned in their classrooms.

This summer, for the first time, content institutes were facilitated entirely by teacher leaders from FoM districts. It was also the largest PROMYS for Teachers program yet, with 45 teacher participants, 11 from FoM districts. A special note of appreciation goes to district administrators and school staff from Watertown High School and Waltham's Kennedy Middle School for hosting summer institutes and to EDC's Karina Dymina for her hard work and support throughout the summer.



(top row) Amy Brondolini and Kara Spang, K-5 teachers from Lawrence, present the ice cream cone combination problem in Session 2; high school teachers Jessica Humphries, Kevin Wynn, and Chuck Garabedian work on finance problems during Session 3; (second row) facilitator Eileen Herlihy and teachers Kristine Severino of Waltham's McDevitt middle school and Terri Le of Lawrence High School discuss an algebra problem; middle school teacher Eileen Doherty and high school teacher Kent Werst share a problem in Session 1.

Resources to Share

- **Free software! GeoGebra** www.geogebra.org
Check out an open-source dynamic mathematics software that uses Dynamic Geometry Software and provides basic features of Computer Algebra Systems to connect geometry, algebra, and calculus.
- **New MCAS resources for data analysis** www.focusonmath.org
Mathematicians David Stanley and Marvin Stick from FoM partner UMass Lowell have developed extensive instructor's resources to prepare students for MCAS exams. A new document is now available for data analysis topics, the third in a series of reference guides created by UMass Lowell (geometry, measurement and fractions guides available as well). These resources, which are an outgrowth of work done in Lawrence study groups, can be used as professional development material. To download the guides, visit the FoM website, under Resources and MCAS.
- **Math Fair project ideas** www.focusonmath.org
As the school year is underway, find ideas for mathematics research projects and interactive mathematical problems on the FoM website, in the Resources, Math Problems section. A link to "Making Mathematics" website offers terrific problems and projects for study groups and student projects.

Congratulations to New 2008 MMT Grads

Congratulations to our fourth cohort of graduates from FoM's Masters of Mathematics for Teaching (MMT) program at Boston University. Octavia Bruner of Arlington High School and Andy Katz of Lawrence High School completed their degrees in August. These teachers join the cadre of Mathematics Teaching Fellows (MTFs) emerging from the FoM Partnership who'll share their mathematical expertise and leadership with students and teachers in their schools and districts.

Grant Opportunities

Best Buy Te@ch grants

http://www.bestbuyinc.com/community_relations/teach_awards.htm

\$1,000+ grants available for technology; deadline is 10/18/08

HP Technology for Teaching grants

http://www.hp.com/hpinfo/grants/us/programs/tech_teaching/

Information for next year's round of grants will be posted in October.

DonorsChoose.org

<http://www.donorschoose.org>

Matches companies and donors to teachers, especially in high need schools, for funding of classroom supplies and student projects.

National Teachers Hall of Fame

<http://www.nthf.org>

Secondary school mathematics teachers are eligible; deadline is 1/1/09

Suggestion Box

*We welcome your contributions,
news, and questions to share
with the FoM community.*

Please send suggestions to:

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*Lookout for FoM
professional development opportunities
to be announced this fall.*

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