

MOODY'S MEGA MATH CHALLENGE:

All Aboard: Can High Speed Rail Get Back on Track?

In March 2012, teams of 11th and 12th grade students competing in Moody's Mega Math (M³) Challenge were given a problem statement that asked them to use mathematical modeling to determine the best regions in the country to revive the Department of Transportation's planned High-Speed Intercity Passenger Rail (HSIPR) program – a hot topic in Congress due to the success of North America's only high speed rail line, Amtrak's Acela Express. From recommending the best regions for the rail lines to predicting ridership numbers, cost of implementation, and effects of such a program on foreign-energy dependence, teams of three to five students put the problem-solving skills they learned in the classroom to the test.

The contest – designed to spotlight the relevancy and power of mathematics in solving real-world issues as well as motivate students to consider further education and careers in math – gave the nearly 1,000 participating teams (comprised of almost 5,000 students) 14 hours to study the issue in question, collect data, and devise models before uploading their solutions online in the form of a report with recommendations. The problem was completely unknown to teams until they downloaded it on the morning of their Challenge day.

The M³ Challenge is entirely Internet-based and free of entrance and participation fees. The top six teams are awarded scholarships ranging from \$2,500 to \$20,000, with a total of \$115,000 in prizes available in 2012.

More than 100 professional mathematicians read and ranked the 961 submissions in the first round of judging, selecting the 134 best papers to move into the second judging round in which 16 computational professionals gathered at SIAM headquarters in Philadelphia to read, score, discuss, and debate the relative merits. This resulted in a tentative rank of the top six teams, identification of the six semi-finalist teams (ranked 7 -12 overall), and selection of an additional 43 honorable mention teams. The top six teams presented their papers and answered questions about their work from a panel of five judges at the final round held at Moody's Corporation in Manhattan.

Sponsored by The Moody's Foundation and organized by the Society for Industrial and Applied Mathematics (SIAM), the M³ Challenge is conducted annually to spotlight applied mathematics as a powerful problem-solving tool, as a vibrant and challenging profession, and as a vital contributor to advances in an increasingly technology-oriented society.

The 2013 Challenge will take place on March 2-3; registration deadline is February 22.

Complete information about the M³ Challenge is available at <http://m3challenge.siam.org>.

The following is the first place paper from the 2012 Moody's Mega Math Challenge with some minor reviewer suggestions incorporated. The winning team was awarded a \$20,000 team scholarship prize.