MOODY'S MEGA MATH CHALLENGE:
"Making Sense of the 2010 Census
to count or not to count, that is the question..."

As the 2010 census was getting underway, teams of 11th and 12th grade students competing in Moody's Mega Math (M[3]) Challenge 2010 were given a problem statement concerning the census. The problem required students to evaluate U.S. Census Bureau figures and methods and submit a paper proposing mathematically-based recommendations for undercount adjustment, the best method for apportioning the U.S. House of Representatives, and the fairest way to draw Congressional districts. The teams analyzed several techniques for correcting errors in the census, sampling, imputation, and extrapolation from demographic data; a variety of methods for allocation of seats, including some novel methods; and several approaches to redistricting based on geometry and demographics. Given the often conflicting constraints and objectives embedded in these problems, there were no common recommendations; rather, each team provided a feasible approach backed by mathematical models.

Sponsored by The Moody's Foundation and organized by the Society for Industrial and Applied Mathematics (SIAM), the M[3] Challenge is an annual competition that spotlights 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. Entirely Internet-based and free of entrance and participation fees, the M[3] Challenge requires teams of high school students to solve a real-world problem in 14 hours or less using mathematical modeling and analysis and then submit a solution that meets the stated criteria. The top six teams are awarded scholarships ranging from $2,500 to $20,000, with a total of $100,000 in prizes. Complete information about the M3 Challenge is available at http://m3challenge.siam.org.

For the 2010 Challenge, 57 professional applied mathematicians read and ranked the 531 submissions in the first round of judging. The best 104 papers moved into a second judging round, where 16 math professionals gathered at SIAM headquarters in Philadelphia to read, score, discuss, and debate the submissions. This resulted in a tentative rank of the top six winning teams, identification of the six finalist teams (ranked 7 -12 overall), and selection of an additional 31 honorable mention" teams. The top six teams were required to present their papers at the Moody's Corporation in Manhattan, and answer questions about their work from a panel of five judges.

Further information about the Moody's Foundation is available at http://philanthropy.moodys.com. Further information about the Society for Industrial and Applied Mathematics is available at http://www.siam.org.

The following is the Champion paper in the 2010 Moody's Mega Math Challenge in essentially the same form as was originally submitted.