

COMAP



**2017
MCM/ICM[®]
Call for Entries**

The MCM and ICM Contests are Sponsored by:

- The Institute for Operations Research and the Management Sciences
- The Society for Industrial and Applied Mathematics
- The Mathematical Association of America
- The Department of Defense Analysis, Naval Postgraduate School
- Chinese Society for Industrial and Applied Mathematics
- Two Sigma Investments:

A group of experienced, analytical, and technical financial professionals based in SoHo, New York, building and operating sophisticated quantitative trading strategies for domestic and international markets. The firm is successfully managing several billion dollars using highly automated trading technologies. For more information about Two Sigma, please visit our Website at www.twosigma.com.

MCM[®]

Dear Colleagues:

The Mathematical Contest in Modeling (MCM), a unique international contest for high school students and college undergraduates, will hold its 33rd annual competition in January 2017. Last year, 7421 teams from 919 institutions in thirteen countries participated in the contest. The MCM is designed to encourage effective discussion supporting informed modeling decisions, improve student problem-solving, and promote technical writing. Students participate as team members rather than as individuals, creating an environment for peer learning and skill development. Each team must have a faculty advisor, who could be advising more than one team. Your institution can be a part of the MCM effort by promoting faculty and student participation from within and across departments. Faculty advisors help organize the teams, distributing contest materials, and insure solution papers get to COMAP on time.

Please take a moment to read this Contest Overview and then go to www.mcmcontest.com for more information about registration, deadlines, and contest rules. All registration will take place online. If you have any questions please contact mcm@comap.com.

We hope that you and your team take pleasure in this intellectual challenge and enjoy the spirit of this competition.

Best Wishes,



Patrick Driscoll, Contest Director

ICM[®]

Dear Colleagues:

The Interdisciplinary Contest in Modeling (ICM), an international contest for high school students and college undergraduates, will hold its 19th annual competition in January 2017. Last year, 5025 teams from 595 institutions in eight countries participated in the contest. ICM is designed to develop and advance interdisciplinary problem-solving skills as well as competence in written communication. This year there will be three ICM problems to select from: one will focus on network science, the second on environmental science, and the third on policy. You can specifically build and prepare your team to tackle one of these topics, if you so chose.

Your institution may take part in the ICM effort by encouraging a member of your department to serve as a faculty advisor and by promoting the participation of faculty and students from associated departments. Advisors help organize the teams, distribute contest materials, and return solution papers to COMAP.

Please take a moment to read this Contest Overview, then go to www.mcmcontest.com for more information about ICM history, registration, deadlines, and contest rules. All registration will take place online. If you have any questions please contact icm@comap.com.

We hope that you and your team(s) will enjoy this modeling challenge.

Best Wishes,



Chris Arney, Contest Director

Contest Director

Patrick Driscoll
U.S. Military Academy, NY

Executive Director

Solomon A. Garfunkel
COMAP, Inc., MA

Associate Director

William C. Bauldry
Appalachian State University,
NC

Founding Director

Ben Fusaro
Florida State University, FL

Advisory Board

Ben Fusaro
Florida State University, FL

Marvin S. Keener
Oklahoma State University, OK
Peter Anspach
National Security Agency, MD

Maynard Thompson
Indiana University, IN

Marie Vanisko
California State University, CA

Karen D. Bolinger
Clarion University of
Pennsylvania, PA

Kathleen M. Shannon
Salisbury University, MD

Frank R. Giordano
Naval Postgraduate School, CA

Contest Directors

Chris Arney
U. S. Military Academy, NY

Executive Director

Solomon A. Garfunkel
COMAP, Inc., MA

Associate Director

Tina Hartley
U. S. Military Academy, NY

Head Judges

Amanda Beecher
Romapo College, NJ

Ralucca Gera
Naval Postgraduate School, CA

Yulia Tyshchuk
U.S. Military Academy, NY

Jessica Libertini
Virginia Military Institute, VA

Amy Richmond
U.S. Military Academy, NY

Kathryn Coronges
Northeastern University, MA

Cover Picture: Debris-LEO1280.jpg. Public domain via Wikimedia Commons.

Mathematical Contest in Modeling (MCM)[®], High School Mathematical Contest in Modeling (HiMCM)[®], and Interdisciplinary Contest in Modeling (ICM)[®] are registered trade marks of COMAP, Inc.

Contest Overview

MCM and ICM are parallel contests and follow the same rules.

All the information listed below, except where noted, pertains to both contests.

The Ground Rules

Contest Date and Time: The 2017 contests must be accomplished at a local facility starting at 5:01 PM EST on Thursday, January 19, 2017 and ending at 8:00 PM EST on Monday, January 23, 2017.

Faculty advisors must ensure that no further modifications, enhancements, additions, or improvements may be made to the team's solution paper after the contest deadline. (8:00 PM EST on Monday, January 23, 2017.)

Each team is required to submit an electronic copy of its solution paper by email to solutions@comap.com. The advisor or any team member may submit this email. **Team papers MUST be received at COMAP by the submission deadline of 9:00 PM EST (U.S.) on January 23, 2017.**

COMAP must then receive your Signed Control Sheet via email on or before **Friday, February 3, 2017. No school or team member identifying information may appear anywhere except on the control sheet.**

The Contest Materials: The contest Website contains all the guidelines, requirements, judging criteria, and suggested procedures for the submission of solution papers, including step-by-step instructions.

No materials will be available in any other form.

On Thursday, January 19, 2017 at 5:00 PM EST, the contest problems will be posted on the contest Website.

The Advisors: Advisors inform students about this competition and encourage the formulation of teams.

Advisors may guide and rehearse the team prior to the beginning of the competition but may not assist the team in any way once the contest begins.

During the competition, the students are required to develop all of their modeling, analysis, and writeup without the help of others.

Registration of Teams: All teams must register online on or before January 19, 2017, at 3:00 PM EST.

A \$100 registration fee must be paid at registration online in order to participate.

The MCM and ICM contests allow **unlimited** teams per institution, with **unlimited** teams per department.

Each team may consist of up to three high school or undergraduate students who are enrolled in the same school at the time of the contest.

Team members do not need to be named at the time of registration, but they must be determined before the contest problems are read.

The Contest Problems: Teams will choose any of six modeling problems:

- MCM Problem A (continuous)
- MCM Problem B (discrete)
- MCM Problem C (data insights)
- ICM Problem D (operations research/network science)
- ICM Problem E (environmental science)
- ICM Problem F (policy)

Data, if needed, will be attached to the problem or available on the contest Website.

Sample problems from other years are online at www.mathmodels.org

The Report: Participants may use all the resources available such as computers, libraries, software packages, Internet, or any other inanimate sources.

Problems are designed to be open-ended and are unlikely to have a unique solution.

Attention must be focused on clarity, analysis, and design of the solution.

The narrative section of the solution papers must be typed and in English. Partial solutions are acceptable.

You are no longer required to mail a print copy of your Solution Paper.

Results: Judging will be completed by April 2017.

Team solutions will be designated as Successful Participant, Honorable Mention, Meritorious, Finalist, or Outstanding.

The results will be posted on COMAP's Website.

Certificates and press releases will be mailed or emailed by May 2017.

Select outstanding teams will have their solution papers published in *The UMAP Journal*.

Prizes:  **TWO SIGMA** will sponsor a \$10,000 Scholarship Award to the two best USA teams in the competition.

The Institute for Operations Research and the Management Sciences (INFORMS) will designate an Outstanding Team from each of the problems as an INFORMS winner.

The Society for Industrial and Applied Mathematics (SIAM) will designate one Outstanding Team from MCM Problem A and B as a SIAM winner.

The Mathematical Association of America (MAA) will designate one Outstanding Team from each problem for the MCM as a MAA winner.

For detailed information on all of the above, please go to the contest Website at: www.mcmcontest.com

Recent MCM Contest Outstanding Teams

Adlai E. Stevenson High School, IL, USA
Chongqing University, China
Northwestern Polytechnical University, China
Shanghai Jiao Tong University, China (2)
University of Colorado Boulder, CO, USA
Southwestern University of Finance and Economics, China
Wuhan University, China
Zhejiang University, China
Shanghai University of Finance and Economics, China
Tsinghua University, China (2)
Virginia Tech, VA, USA

Recent ICM Contest Outstanding Teams

Chongqing University, China
Communication University of China, China
Huazhong University of Science and Technology, China
Northwestern Polytechnical University, China
Rensselaer Polytechnic Institute, NY, USA
Brown University, RI, USA
NC School of Science and Mathematics, NC, USA (2)
United States Military Academy, NY, USA
University of Colorado Denver, CO, USA
Xiamen University, China
Renmin University of China, China
Shandong University, China
Sun Yat-Sen University, China