

## Contest Rules, Registration and Instructions

*(All rules and instructions apply to both ICM and MCM contests, except where otherwise noted.)*

To participate in a contest, each team may consist of a maximum of three students and must be sponsored by a faculty advisor from its institution.

**Team Members:** A team may consist of up to three students from the same school and is open to all undergraduate and high school students.

**Team Advisors:** Please read these instructions carefully. It is your responsibility to make sure that teams are correctly registered and that all of the following steps required for participation in the contest are completed:

Please print a copy of these contest instructions for reference before, during, and after the contest.

### I. BEFORE THE CONTEST BEGINS:

- A. Registration
- B. Choose your team members

### II. AFTER THE CONTEST BEGINS:

- A. View the contest problems via the contest web site
- B. Choose a problem
- C. Teams prepare solutions
- D. Print Summary Sheet and Control Sheet

### III. BEFORE THE CONTEST ENDS:

- A. Send electronic copy of Solution Paper by email

### IV. WHEN THE CONTEST ENDS:

- A. Prepare Control Sheet
- B. Mail signed Control Sheet

### V. AFTER THE CONTEST IS OVER:

- A. Confirm that your team's solution was received
- B. Check contest results
- C. Prizes/Certificates

### **IMPORTANT NOTES:**

- COMAP is the final arbiter of all rules and policies, and may disqualify or refuse to register any team that, in its sole discretion, does not follow these contest regulations and procedures.
- Decisions of the judges, the contest directors, and the editor of The UMAP Journal are final.

- If a team is caught violating the rules, the faculty advisor will not be permitted to advise another team for one year, and the advisor's institution will be put on probation for one year.
- If a team from the same institution is caught violating the rules a second time, then that school will not be allowed to compete for a period of at least one year.
- All times given in these instructions are in terms of Eastern Standard Time (EST). (COMAP is located in the U.S. Eastern Time zone.)

**By submitting an entry, team members agree that:**

- Their submission and all rights to its publication become the property of COMAP, Inc.
- COMAP may use, edit, excerpt, and publish this submission for promotional use or any other purpose, including placing it online, distributing it electronically, or publishing it in The UMAP Journal or otherwise, without compensation of any kind.
- COMAP reserves the right to use in materials relating to this contest, the names of the team members, their advisor(s), and their affiliations, without further notification, permission, or compensation.
  - and team members assert that
- All images, figures, photographs, tables, and drawings in their submission were either created by the team or else, if reproduced from another source, the submission cites a specific reference for each at its location in the submission.
- All direct quotations in the submission are enclosed in quotation marks or otherwise identified as such, with a specific reference cited for each at its location in the submission.

**I. BEFORE THE CONTEST BEGINS:**

**A. Registration**

**All teams must be registered before 3PM EST on Thursday, January 28, 2016.** We recommend that all teams complete the registration process well in advance, since the registration system will not accept any new team registrations after the deadline. COMAP will not accept late registrations for MCM/ICM 2016 **under any circumstances. NO EXCEPTIONS WILL BE MADE.**

1. **Register your team online via the contest web site:** Go to

<http://www.comap.com/undergraduate/contests/mcm>.

- a. If you are registering your first team for this year's contest, click on **Register for Contest** on the left-hand side of the screen.

Enter all the required information, including your email address and contact information.

**IMPORTANT:** Be sure to use a valid and current email address so that we can use it to contact you at any point before, during, and after the contest, if necessary.

- b. If you have already registered a team for this year's contest and want to register a second team, click on **Advisor Login**, then log in with the same email address and password that you used when you registered your first team. Once you're logged in, click on **Register Another Team** near the upper right corner of the page, then follow the instructions there. **There is no longer a restriction on the number of teams an advisor can register.**

2. **Registration Fee**

A \$100 registration fee per team is required.

**OPTIONAL: For an additional \$100 fee per team, you can receive a Judges Commentary written specifically about your team's paper.**

We accept payment with Mastercard or Visa only via our secure web site. We cannot accept other forms of payment. Our secure site will process your credit card payment, so your credit card number is protected. Our system will not store your credit card number after it processes your payment.

3. After we receive approval from your financial institution (this takes only a few seconds), the system will issue a control number for your team. Your team is not officially registered until you have received a team **control number**. **Print the page that displays your team control number: It is your only confirmation that your team has been registered.** This page also lists the email address and password that you entered when registering; you will need this information to complete the contest procedures.

You will **NOT** receive an email confirmation of your registration.

4. If you need to change any of the information (name, address, contact information, etc.) that you specified when you registered, you can do so at any point before or during the contest by logging in to the contest web site with the same email address and password that you used when registering (click on the **Advisor Login** link on the left side of the screen). Once logged in, click on the **Edit Advisor or Institution Data** link near the upper right corner of the page.
5. Check the contest web site regularly for any updated instructions or announcements about the contest. Except in extreme circumstances, COMAP will not send any confirmation, reminders, or announcements by email. All communication regarding the contest will be via the contest web site.
6. You will return to the contest web site during the contest to enter and confirm information about your team, and to print out your team's Control Sheet and Summary Sheets, which you will use when preparing your team's solution packet. Details on these steps follow in the instructions below.

**B. Choose your team members:**

1. You must choose your team members **before the contest begins at 8PM EST on Thursday January 28, 2016**. Once the contest begins you may not add or change any team members (you may, however, remove a team member, if he or she decides not to participate).
2. Each team may consist of a maximum of three students. (Teams may consist of 1, 2, or 3 students).
3. Each student may participate on only one team.
4. Team members must be enrolled in school at the time of the contest, but they need not be full-time students.
5. Team members must be enrolled at the same school as the advisor and other team members.
6. Team members must be enrolled at the same school. (No exceptions will be made).
7. Team members must be undergraduate students postgraduate students are not allowed.

## II. AFTER THE CONTEST BEGINS:

### A. View the contest problems via the contest web site:

Teams can view the contest problems via the contest web site **when the contest begins at 8PM EST on Thursday January 28, 2016:**

1. The contest problems will become available precisely at 8PM EST on Thursday January 28, 2016; team members can view them by visiting <http://www.comap.com/undergraduate/contests/mcm>. No password will be needed to view the problems; simply go to the contest web site at or after 8PM EST on Thursday, January 28, 2016 and you will see a link to view the problems.
2. The contest problems will become available precisely at 7:50PM EST on Thursday January 28, 2016 on the following mirror sites:  
<http://www.comap-math.com/mcm/index.html>  
<http://www.mathismore.net/mcm/index.html>  
<http://www.mathportals.com/mcm/index.html>  
If you cannot access any of the sites, there may be a problem with your local Internet connection. Contact your local Internet service provider to resolve the issue.

### B. Choose a problem:

Each team may choose any one of the six problem choices and should submit a solution to only one problem.

- **MCM problems are Problem A, Problem B or Problem C.**
- **ICM problems are Problem D, Problem E or Problem F.**

### C. Teams prepare solutions:

1. Teams may use any inanimate source of data or materials: computers, software, references, web sites, books, etc. **ALL SOURCES USED MUST BE CREDITED.** Failure to credit a source will result in a team being disqualified from the competition.
2. Team members may not seek help from or discuss the problem with their advisor or anyone else, except other members of the same team. Input in any form from anyone other than student team members is strictly forbidden. This includes email, telephone contact, and personal conversation, communication via web chat or other question-answer systems, or any other form of communication.
3. Partial solutions are acceptable. There is no passing or failing cut-off score, and numerical scores will not be assigned. The MCM/ICM contest judges are primarily interested in the team's approach and methods.
4. **Summary Sheet:** The summary is an essential part of your MCM/ICM paper. The judges place considerable weight on the summary, and winning papers are often distinguished from other papers based on the quality of the summary.

To write a good summary, imagine that a reader will choose whether to read the body of the paper based on your summary: Your concise presentation in the summary should inspire a reader to learn about the details of your work. Thus, a summary should clearly describe your approach to the problem and, most prominently, your most important conclusions. Summaries that are mere restatements of the contest problem, or are a cut-and-paste boilerplate from the Introduction are generally considered to be weak.



2. Enter the team member names and confirm that each name is spelled correctly. **This determines how the names will appear on the contest certificates. COMAP will not make any changes or reprint certificates for any reason.**
3. Specify the problem that your team has chosen to solve.
4. Print one copy of the Control Sheet.
5. Print or copy the team Summary Sheet.

### III. BEFORE THE CONTEST ENDS:

#### A. Send electronic copy of Solution Paper by email:

1. Each team is required to submit an electronic copy of its solution paper by email to [solutions@comap.com](mailto:solutions@comap.com). Any team member or the advisor may submit this email.
  - a. **Your email MUST be received at COMAP by the email submission deadline of 9PM EST on February 1, 2016.**
  - b. Failure by a team to submit a solution via email by **9PM EST on February 1, 2016** constitutes a violation of the contest rules and will result in that team's disqualification.
  - c. No further modifications, enhancements, additions, or improvements may be made to the team's solution paper after 8PM EST on February 1, 2016. Any changes to the solution will constitute a violation of the contest rules and may result in disqualification.
2. In the subject line of your email write: COMAP and your team's control number. For example:  
Subject: **COMAP 2222**
3. Use your team's control number as the name of your file attachments.
4. COMAP will accept only an **Adobe PDF** or **Microsoft Word** file of your solution. DO NOT include your **Control Sheet**, programs or software with your email as they will not be used in the judging process. Limit one solution per email. **The names of the students, advisor, or institution should NOT appear on any page of the electronic solution. Your team's summary should be included as the first page of your file. \*Note: The attachment must be less than 17MB. !! Do not use a cloud service such as Google Docs your email must contain a Adobe PDF or Microsoft Word attachment.**
5. See the rules for submitting the signed Control Sheet via mail below.

### IV. WHEN THE CONTEST ENDS:

#### A. Prepare Control Sheet:

##### When the contest ends at 8PM EST on February 1, 2016:

1. Each team member must sign the Control Sheet to pledge that he or she abided by the contest rules and instructions.
2. Make **one** copy of your team's signed Control Sheet.

**\*Note you are no longer required to mail a print copy of your Solution Paper.**

### **B. Mail The Signed Control Sheet:**

1. Mail your team's signed Control Sheet to:  
MCM/ICM Coordinator  
COMAP, Inc.  
175 Middlesex Turnpike., Suite 3B  
Bedford, MA 01730  
USA
2. COMAP must receive your signed Control Sheet via mail on or before **Friday February 26, 2016**. It is your responsibility to make sure that your team's signed Control Sheet arrives at COMAP by this deadline. Use registered or express mail, if necessary, to insure that it arrives at COMAP by **Friday February 26 2016**.
3. COMAP will not accept late signed Control Sheet under any circumstances.
4. If you require confirmation that your signed Control Sheet was received by COMAP, send the packet via a carrier that provides package tracking. Due to the number of papers received, COMAP can not answer receipt inquiries or emails.

### **V. AFTER THE CONTEST IS OVER:**

#### **A. Confirm that your team's solution was received:**

1. You may login to the contest web site using the **Advisor Login** link to verify that your team's Electronic Solution was received at COMAP. If you require confirmation that your signed Control Sheet was received by COMAP, send the packet via a carrier that provides package tracking. Due to the number of papers received, COMAP can not answer receipt inquiries or emails.

#### **B. Check contest results:**

1. **Judging:** Judging will be completed in March and the results will be posted on April 29, 2016. The Solution Papers will be recognized as Unsuccessful, Successful Participant, Honorable Mention, Meritorious, Finalist, or Outstanding Winner.
2. We will post the contest results on the web site as soon as they are available, so visit the contest web site regularly to check for updates. It will take several weeks for the judges to evaluate the solutions and for COMAP to process the results. Please do NOT call or email COMAP regarding contest results.

#### **C. Prizes/Certificates:**



The **Two Sigma Scholarship Award** will be awarded to two top MCM/ICM US teams; \$10,000 per team with \$9000 going to the team members and \$1000 to the school represented. Awards will be announced in April 2016.





After the results are issued, each successfully participating team advisor and student will receive a certificate of participation. You may login to the contest web site using the **Advisor Login** link to view and print your team's certificates. All international teams will receive ONLY an electronic (PDF) certificate. US teams should allow several weeks after the results are posted to the contest web site to receive your print certificate. [Click here to download MCM/ICM certificates.](#)

- **MCM Awards (Problem A, B and C)**
- The Ben Fusaro Award will be accorded to an especially creative paper and will be chosen from the contest finalists.
- The Frank R. Giordano Award began in 2012. It honors Brig. Gen. (ret) Frank Giordano who directed the MCM for 20 years. This award goes to a paper that demonstrates true excellence in the execution of the modeling process.
- **ICM Awards (Problem D, E and F)**
- The Leonhard Euler Award is presented to a team selected by the head judge of the ICM's Problem D. The criteria are: 1) a paper in the Meritorious/Finalist/Outstanding rating; 2) contains especially creative and innovative modeling; and 3) shows good understanding of interdisciplinary science. The award honors the name of a 18th-century Swiss applied mathematician, who was known for the breadth of his research applications, volume of written work, excellent teaching, and interdisciplinarity.
- The Rachel Carson Award honors an American conservationist whose book "Silent Spring" initiated the global environmental movement and whose work spanned many disciplines concerned with the local and global environments. This award is presented to a team selected by the Head Judge of ICM Problem E for excellence in using scientific theory and data in its modeling.
- Vilfredo Pareto was an Italian scholar, modeler and problem solver, who at various times was an engineer, sociologist, economist, political scientist, mathematician, and philosopher. He lived and worked in the late 19th and early 20th centuries. The ICM Pareto Award for outstanding modeling in the Policy Modeling problem (ICM Problem F) honors the work and legacy of this famous social science problem solver. In particular for this award, the head judge seeks to highlight a paper that best models the more dynamic and challenging contextual human elements that make simplification or refinement of policy models so difficult.



The Institute for Operations Research and the Management Sciences (INFORMS) is the largest society in the world for professionals in the field of operations research (OR), management science (MS), and analytics. INFORMS has long recognized the importance of involving undergraduate students and faculty in an unscripted process of mathematical modeling whose problems contain many of the modern elements seen by its membership.



The MCM/ICM exemplifies these characteristics. Consequently, INFORMS has been an active supporter of the MCM/ICM since its inception.

INFORMS carefully selects and designates a single Outstanding team from each of the six problems - A, B, C, D, E, F - as an INFORMS Outstanding winning team whose modeling and analyses best exemplify the style and content reflected in its membership's professional practice. Each of the INFORMS Outstanding teams receives an engraved plaque for their department's use as a public recognition of the team's achievement. Each student also receives a letter of congratulations from the current INFORMS President, a complimentary one-year INFORMS student membership, a print copy of the award plaque suitable for framing, and an individual cash award. Each associated faculty advisor receives a letter of congratulations and appreciation from the current INFORMS President, along with complimentary one-year access to the full suite of award-winning INFORMS journals.



The Society for Industrial and Applied Mathematics (SIAM) will designate one Outstanding team from each MCM problem as a SIAM winner.

#### Description of the Award

##### Student Team Members

Each student member of the winning team will receive a cash award of \$500 and three one-year student memberships in SIAM. Team members' travel expenses will be reimbursed by SIAM up to \$650 for domestic travel or \$800 for international travel. A one-year student membership in SIAM will be given to each member of non-winning teams judged as "Outstanding" by the official contest judges.

##### Faculty Adviser

A suitable certificate for the home institutions will be given to the faculty advisers of the winning teams



The Mathematical Association of America (MAA) will designate one Outstanding team from each problem for the MCM as a MAA winner. Each student member of the winning team will receive a certificate. MAA will partial reimburse teams travel expenses to Math Fest so that they may present their paper.