# Official Rules and Guidelines
## MathWorks Math Modeling Challenge (M3 Challenge) 2025

This competition is void where prohibited by law. All decisions by M3 Challenge judges are final.

Visit M3Challenge.siam.org for resources and information about M3 Challenge or go directly to MyM3Challenge.siam.org (referred to as the *MyM3 site*) to register a team.

## 2025 Deadlines and Important Dates

Note that times are provided in Eastern Standard Time (ET). Adjust as necessary for your time zone.

| DATE | EVENT |
|---|---|
| November 2024 | Registration opens |
| February 14, 2025 | Deadline for teams to request free software licenses |
| **February 21, 2025, at 5:00 p.m. ET** | **Registration closes** |
| **Friday, February 28, 2025, 12:01 a.m. ET through Monday, March 3, 2025, 11:00 p.m. ET** | **Challenge Weekend:** <br> **Teams may choose any continuous 14-hour work time to participate** |
| March 4, 2025, at 3:00 p.m. ET | Deadline for (1) coaches and students to log in and make changes to the team record, and (2) parents/participants to complete the consent form. |
| March 7, 2025 | Deadline for coach to log in to confirm that the paper their team submitted is authentic and was completed according to the Official Rules and Guidelines. |
| March 6—19, 2025 | Triage judging (including Technical Computing) |
| March 19, 2025 | Teams making it through triage judging and into Round 2 are notified. |
| March 20—23, 2025 | Contention judging |
| March 26, 2025 | Finalist, Semi-finalist, Honorable Mention, SPARK, and Technical Computing Awardee teams and coaches are notified. |
| Monday, April 28, 2025 | Final Event in New York City: <br> Validation judging with presentations by Finalist and Technical Computing Awardees, followed by an awards ceremony |

## Eligibility

Teams consisting of three (3) to five (5) students with one (1) coach, may register for M3 Challenge, so long as the students, coach, and school all meet the following eligibility criteria.

### Individual eligibility

- Participants must be students enrolled in a secondary school who are on track to receive a diploma.
- Participants must be:
  - **High school juniors or seniors attending school in the U.S. (including U.S. territories and DoDEA schools), or sixth form students (age 16–19) attending school in England or Wales.**
  - No exceptions will be made to allow underclassmen.
  - In the case of students for whom these classifications do not apply (e.g., homeschool or cyber school students), participants must be 16–18 years old.
- No one under the age of 13 may participate**.**
- Participants under the age of 18 must have parent/guardian consent to participate. Participants aged 18 or over must provide their own consent. The consent form is available upon login with your team credentials [jump link to section on Consents and Certification at end].
- Individuals are eligible to participate in two consecutive M3 Challenges only.
- International and exchange students may participate in M3 Challenge provided they are officially enrolled at an eligible school at the time of registration and through completion of all aspects of the Challenge.
- Children, grandchildren, and siblings of employees, officers, directors, or trustees of SIAM, and of employees of MathWorks who are on the Challenge staff team, are not eligible to participate in MathWorks Math Modeling Challenge.

### Coach eligibility

- Coaches are typically part-time or full-time teachers or administrators employed by a school or by the district in which the school is located. However, any professional (e.g., a retired teacher or a volunteer who leads a math club) may serve as coach. By registering a team, a coach certifies that any associated school approves of their role as team coach.
- If a school has more than one team participating in M3 Challenge, the teams may have different coaches or may have the same coach.
- **Coaches are not required by M3 Challenge to be present during the Challenge.** If your school policy requires it, coaches may act as proctors only, giving absolutely no help. More details on the role of the coach are provided below.

### School eligibility

- High schools in the U.S. (including U.S. territories and DoDEA schools) are eligible. Schools with sixth form students (age 16–19) in England and Wales (including British Schools Overseas) are eligible.
- Homeschool and cyber school students may either form their own team(s) or request to participate on a team at a school in the district or community in which they reside. All efforts to

contact the local school are up to the homeschool or cyber school student. Homeschool and cyber school students must adhere to the following guidelines:

- o Students taking classes below a full-time course load are not eligible.
- o A signed Homeschool Affidavit Form is required for each homeschooled student participating in the Challenge.
- o A signed Cyber School Affidavit Form is required for each cyber school student participating in the Challenge.
- Teams from the following may be eligible to compete, at the discretion of SIAM:
  - o dual/joint enrollment programs
  - o magnet programs
  - o other academic or training programs that draw students from more than one high school for a subset of classes or academic enrichment
  - o online high schools
  - o other self-formed groups of students

For such teams, a coach must petition for eligibility by sending an email to m3challenge@siam.org at least one week prior to the registration deadline indicating the origin of the team and confirming that the team members and coach all meet the eligibility requirements.

Once such a team is deemed eligible, they will receive instructions on how to register. M3 Challenge does not guarantee eligibility to an organization other than a recognized school, and eligibility decisions are final.

## How M3 Challenge Works

Participants in M3 Challenge use math and data to solve open-ended and timely real-world problems. Participants should provide insight and suggest solutions via the use of the modeling process. The Challenge problem is unknown to students until teams download it over Challenge weekend to begin their work time.

### Registration/Team Changes/Role of Coach

- Coaches must register teams at the MyM3 site [link] by the registration deadline above.
- The coach is responsible for ensuring team members have the SHARED login credentials (team ID and password) for the MyM3 site.
  - o The MyM3 site serves as the registration site for the team, and also as the Challenge platform. During Challenge weekend, teams use the platform to access the problem and upload their solution.
  - o Note that care should be taken to safeguard login credentials, as they allow full access for the team's contest participation.
- The coach may choose to help prepare the teams for the Challenge or point teams to the free resources on the M3 Challenge website.
- Coaches are not required to be physically with or near the team during Challenge weekend.
- Teams may log in to the MyM3 site to make changes to their registration information through 3:00 p.m. ET on the Tuesday immediately following Challenge weekend (per the deadlines

above). This allows teams to (1) verify that the team record accurately reflects who participated and (2) adjust for no-shows or last-minute substitutions. All team data must be finalized by the Tuesday following Challenge weekend.

- During the week following the Challenge, the coach will be notified via email that the authenticity certification form is available on the "Authenticate" page of the MyM3 site.
  - This certification requires that the coach have a conversation with the team (or the team captain who speaks for the team) following their final submission and based on that conversation, to ascertain, to the best of their knowledge, that the team did not violate any of the rules of the Challenge.
  - Authenticity certification is required for a team to be eligible for scholarship awards.

## Logistics

- Teams choose their continuous 14-hour work time during Challenge weekend (Friday at 12:01 a.m. ET through Monday at 11:00 p.m. ET). Note that times are provided in Eastern Standard Time.
- During Challenge weekend, the problem becomes available for download on the MyM3 site. Once any member of a team (coach or student) downloads the problem, the team has exactly 14 continuous hours to submit a solution.
- The clock cannot be paused. Teams should start at least 14 hours before the end of Challenge weekend to make use of the full 14 hours allowed.
- Teams are encouraged to take breaks as needed throughout the 14-hour work period.
- Teams must upload a solution paper via the registration platform before their time expires. More details about the solution paper are provided below.
- Teams can work from any location they choose.
- It is the sole responsibility of the individual schools to (a) provide any specialized staff or assistance for team members with special needs to participate as required by law and (b) provide and be responsible for any transportation of the team members to M3 Challenge events. Neither SIAM nor MathWorks is responsible for any risk, injury, or damage related in any way to any student's or team's participation in the Challenge.

## Disclaimer regarding the inability of a team to register and/or compete

MathWorks Math Modeling Challenge, SIAM, and MathWorks are not responsible for local weather conditions, power or internet outages, pandemic or disease spread, and related common-sense actions, or any other situation or circumstance that would prevent a potential team from registering or fully participating in the Challenge, (including, for example, by preventing the submission of a paper during their selected M3 Challenge work time) or that prevents normal M3 Challenge processes or procedures from occurring (including for example, cancelation or replacement of the Final Event). No accommodation can be made for teams if such unfortunate circumstances were to occur during registration or at any time during the Challenge, up to and including the Final Event.

## During Challenge Weekend

- Teams may use computers, software packages, books, reference works, internet resources, or any other inanimate sources, all of which must be properly referenced within the solution paper.
- Use of AI tools: Teams are advised not to rely exclusively on AI technology to answer Challenge questions; it is not likely to produce results that would earn any level of distinction. That said, it is not excluded as a tool teams can use if they want to. Teams that use AI tools must cite and acknowledge their use.
- **Team members may not discuss any aspect of the problem, nor seek help from via any means or method, with or from a coach or anyone other than their teammates over Challenge weekend.** Attempts to get help from human sources–in person or via any medium–will result in disqualification. This includes assistance through interactive "help" websites or social media.
- Teams will be disqualified for posting or sharing part or all of the problem statement anywhere during Challenge Weekend.
- Use of MATLAB software, or any technical computing software, is not required and will not influence selection of comprehensive awards. Use of technical computing software will, however, put teams in contention for a Technical Computing Award. See details below.
- **In their solution paper, teams may identify themselves by their team number ONLY**. Other identifying information will exclude the team from possible M3 Finalist status. This ensures the integrity of our blind judging process.
- Unethical or disrespectful submissions will be flagged for follow-up.
- By uploading a solution paper during Challenge weekend, the team is certifying that the work is completely their own, with attribution provided for any ideas found during research. All suspected instances of rules violations and/or plagiarism will be taken seriously and investigated. Rules violations and/or plagiarism will result in disqualification.

## Preparation of the Solution Paper Submission

- Format
    - Solution papers must be typed and in English.
    - Teams may use a solution paper template if they like, and teams do not need to cite the use of a template. We offer two templates you may wish to use:
        - This template is a Word document and contains helpful hints about modeling and what to include in your paper.
        - This template is a MATLAB Live Script File for teams wishing to use MATLAB for technical computing. (Note: you'll need to have access to MATLAB to use this template. Learn how to get MATLAB here.)
    - Papers must be submitted as a PDF file, with max file size 10MB.
        - Charts, tables, code, and other graphics must be embedded into the PDF document.
        - No supplemental files should be uploaded with your solution paper.
        - Multiple files contained in a ZIP file or other format (including a PDF portfolio) will not be accepted.
        - Teams are advised to allocate time for creating and reviewing their PDF before submitting (to make sure nothing is lost in the conversion process).

- M3 Challenge organizers will attempt to convert any non-PDF submission to PDF, but we cannot guarantee the file integrity after this process.
  - Links to cloud-based documents (including Google docs) cannot be accepted. If a team uses a cloud-based document to create their solution, they must export it as a PDF and upload it for submission.
  - Each page of the solution paper should contain the team's ID number and page number in the header at the top of the page. For example: *Team # 12345, page 1 of 15.*
  - M3 Challenge recommends using 1" margins all around, a minimum of 11pt font size, and a simple, readable font.
  - **The main body of the paper is recommended to be 20 pages or fewer** in length, using standard letter size (8.5" by 11") or A4 formatting. Judges are not required to read beyond the first 20 pages. However, 20 pages is not a hard limit as we understand that images, graphs, and code snippets may increase the page count, as could the use of code notebooks like MATLAB Live Editor or Jupyter Notebooks in preparing the paper.
  - Appendices may be included if there is content (such as code) that the team wishes to submit. If a team includes an appendix, they should refer to it in the main body of the paper, alerting judges to what they will find should they choose to read it. Appendices do not count toward the recommended 20-page limit.
  - If teams need more guidance on what should be included, there are lots of free resources available on the M3 Challenge website.

- Content
  - Organization, conciseness, and clarity of the solution paper are critical.
  - Do NOT include any identifying information in your solution paper (e.g., team member names, school name, hometown); only team number should be included.
  - A solution paper should answer all questions posed and have the following elements:
    - SUMMARY (sometimes called executive summary) of results should be on the first page of your solution paper, clearly identified, and not more than one page in length. It should be a concise, straightforward explanation of the main results and answer the questions posed, written with minimal use of technical language.
    - The body of your paper should include:
      - RESTATEMENT of your interpretation of the questions, and JUSTIFICATION of all assumptions.
      - ANALYSIS of the problem, DESIGN of the model, and JUSTIFICATION of the modeling used.
      - DISCUSSION of the results, potentially including strengths, weaknesses, accuracy, and sensitivity to assumptions.
      - APPENDIX (OPTIONAL)

- Citations
  - Teams are required to provide attribution when using ideas that are not original.
  - When a quote, figure, equation, statistic, paraphrased idea, insight, or any other information from a source is used in the solution paper, it should be marked with an in-

text citation (e.g., a reference number [17] or author + year [Simmon 2011]) referring to the list of all references used, which should be placed at the end of the paper).
- o Any consistent citation style is allowed.
- o Citations do not count toward the recommended 20-page limit.

- **Code**
  - o If a team chooses to use technical computing as part of its solution:
    - ▪ Code may be in the main body of the paper or included as an appendix, or a combination of the two. Teams are advised that long blocks of code are better suited for an appendix, so as not to interrupt the flow of the solution paper. Appendices do not count toward the recommended 20-page limit.
    - ▪ When uploading your submission, check the "yes" box indicating the solution should be considered for Technical Computing Awards.
  - o See the scoring guide for more information on what judges value for this award.

- **Submission of Record**
  - o A solution paper must be contained in a **single PDF file** upload.
  - o You may upload versions of your solution paper at any time from the start of your Challenge time until your deadline. **If you upload more than once, your most recent upload will entirely replace any previous versions and will become your submission of record.** The last upload before your time expires is the submission on which you will be judged.
  - o If your upload attempts are problematic, as a last resort you may email your submission - within or immediately following your 14-hour work time - as an attached PDF file to m3challenge@siam.org with your team # in the subject line.
  - o A team's complete submission will become the sole and confidential property of MathWorks and SIAM. The coach and team members agree to permit MathWorks and SIAM to use any information contained in their entry for any purpose deemed relevant. Teams may also share their submissions with their local school and community.

- **Partial solutions are acceptable**
  Creativity, good work, and acknowledging where you fall short and what you would have done with more time is valued. The judges are particularly interested in each team's approach and methods. Judges will read, score, and provide feedback and comments on partial solutions. Teams are strongly encouraged to submit, even if they feel they did not complete enough.

## Judging, Scholarship Awards, and Recognition

Submissions are judged by professionals with a background in applied mathematics, and most have PhDs. Judging happens in several stages over four weeks in a blind judging process that involves calibration of judge scores for consistency and rigor.

- All decisions made by the judges are final and are not subject to challenge or appeal.
- All participants who submit a viable solution paper, along with their coaches, will be able to download and print certificates of participation. Links to certificate files will be provided to coaches within eight weeks of Challenge weekend.
- Teams distinguished with Honorable Mention, Semi-Finalist, Finalist, Technical Computing, SPARK, or Outstanding Communication of Results awardee status receive scholarship awards for college education. Each scholarship award is shared equally among the members of a team.
- Scholarship awards are paid directly to the college or university at which winning students enroll, in one payment, and preferably in the first year of post-secondary education.
- Scholarship awards may be used for tuition, fees, or placed in school-sanctioned (flexible) spending accounts that are administered by the institution and used for educational materials.
- Student winners may have their scholarship award payment held in escrow by SIAM until they are ready to use it. **Any scholarship or portion of a scholarship awarded but remaining unused or unclaimed on the sixth (6th) anniversary of the date of email award notification will be deemed abandoned, the right of the associated scholarship award winner will expire, and the funds will revert to SIAM.**
- M3 Challenge reserves the right to limit the number of Finalist and Technical Computing Awards to two per school.
- To be eligible for Finalist and Technical Computing Awards, the entire team must present their solution at the Final Event for the final validation phase of judging. Exceptions may be made for medically documented reasons at the discretion of the organizers.
- Comprehensive awards:
    - **Honorable Mention:** 19 team scholarship awards of $1,000 each are awarded to teams whose papers are judged to be worthy of recognition for their superior efforts.
    - **M3 Challenge Semi-finalist:** six team scholarship awards of $1,500 each are awarded to teams whose papers were highly ranked and underwent in-depth, specific discussion by judges.
    - **Finalist Awards** honor the top six teams overall for outstanding mathematical approaches to the main prompts in the Challenge problem. Team scholarship amounts: Champion - $20,000; Runner Up - $15,000; Third Place - $10,000; Finalist (3) - $5,000 each.
- **Technical Computing Awards** honor teams for outstanding use of computer programming (using a programming platform other than spreadsheets) in their solution for the Challenge problem. These awards may be overlaid and added onto other awards; they are not mutually exclusive. Team scholarship amounts: Winner - $3,000; Runner Up - $2,000; Third Place - $1,000.

- **SPARK Awards** honor teams that develop *Solutions with Passion, Resourcefulness, and Knowledge* in solving one or more parts of the Challenge problem. Team scholarship amounts: SPARK Winner: - $3,000; SPARK Runner Up - $2,000; SPARK Third Place - $1,000.

  Eligibility for SPARK Awards:

  - Teams from Title 1 eligible schools in the U.S. (including U.S. territories) are eligible for SPARK Awards.
  - Teams from magnet programs, private schools, online schools, other academic or training programs that draw students from more than one high school for a subset of classes or academic enrichment, and other self-formed groups of students are not eligible.
  - If a team wins any of the other scholarship-bearing awards, they are not eligible for a SPARK Award.
- Teams presenting their solutions at the Final Event are also eligible to win the **Outstanding Communication of Results Award**. More details are provided below.
- Winners in the UK receive currency conversion amount in pounds.


### To claim scholarship awards:
- M3 Challenge sends email reminders to all student winners asking them to complete the Scholarship Payment Form twice a year, typically in April and October, using the email address on record. It is the responsibility of the student and/or parent/guardian (if the student is under the age of 18) to update the email address on record if it changes by sending an email to m3challenge@siam.org.
- Each winning team member must fill out the online Scholarship Payment Form to indicate to which college/university the scholarship award is to be disbursed. The date we receive the form will influence when your scholarship check will be processed and mailed.
- Once a scholarship award payment has been processed, any further movement of funds is the responsibility of the scholarship recipient.


### Final Event/Validation Judging
M3 Finalist and the Technical Computing Awardees will be invited to present their papers for the final validation phase of judging.
- Presentations by the **entire** team are a requirement for winning one of the awards. Exceptions may be made for medically documented reasons at the discretion of the organizers.
- Barring unforeseen events, the location of the Final Event is New York, NY, and travel and expense funds will be available for teams.
- Securing travel documents (e.g., passports, visas, any necessary documentation to get to the Final Event) on time is the responsibility of individual team members, coaches, and chaperones.
- M3 Finalist and the Technical Computing Awardees will receive notification via email with instructions for arranging travel. Travel rules and guidelines are available here [link].
- Outstanding Communication of Results Award is determined on-site at the Final Event and given to the team delivering the "best" presentation of the Final Event. Judges will look for clarity, presence, and polish. This award adds $500 to the team scholarship award amount.

# Consents and Certifications

### Understanding Rules and Guidelines

As part of the team registration, coaches must acknowledge that they and their student team members have read and understand the rules and privacy and data policy (below). This certification is built into the registration process.

### M3 Challenge Consent Form

Participants under the age of 18 must have parent/guardian consent to participate. Participants aged 18 or older must provide their own consent. The consent form is available upon login with your team credentials. All team members' consents must be completed by Challenge weekend. By entering the optional racial/ethnic information on the consent form, students/parents/guardians are consenting to the processing of sensitive/ special personal data.

### Authenticity Certification

The coach for each team will be prompted via email immediately after Challenge weekend to electronically certify authenticity after the team submits its final solution paper.

### Privacy and Data Policy

Please review the M3 Challenge privacy policy prior to registration. Coaches should not enter data for any participant under the age of 16. If you have a participant between the ages of 13-15, the parent must log in and add the participant directly. Individuals under the age of 13 are not eligible to participate.

By submitting a registration form, the coach acknowledges that they received consent from all students registered for their personal data to be processed for the purposes of M3 Challenge participation, including receipt of email communications.

Only teams that earn Finalist or Technical Computing Awards and are invited to present their work in New York City will be required to provide additional personal information for the purpose of arranging travel. Teams that provide such additional information consent to M3 Challenge sharing such personal data (such as name, address, date of birth, etc.) with a travel professional who will book travel to the Final Event.

For teams distinguished with Honorable Mention, Semi-Finalist, Finalist, SPARK, or Technical Computing Awardee status, each winning team member will be invited to provide special personal information via an online Scholarship Payment Form so that M3 Challenge may provide scholarship checks directly to the participant's college or university.

### Consent for communication

By registering, you agree to receive the important emails from the Challenge via email and/or the email communication service used by the Challenge (RealMagnet), sent directly by SIAM. Please whitelist *m3challenge@siam.org* and *m3mailer@siam.org* in order to receive these emails.