

## 2023 International Metallographic Contest (IMC) and Exhibit

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### Deadline for Entry Receipt: September 29, 2023

The International Metallographic Contest and Exhibit is being held in conjunction with the 2023 International Materials, Applications, and Technologies (IMAT) Conference & Exhibition in Detroit, Michigan, October 16–19, 2023. The contest features the best work of metallographers and microstructural analysts from around the world. Entrants need not be members of the International Metallographic Society (IMS) or ASM International. Conference attendance is not required.

### Purpose

The primary goal of the contest is to advance the science of microstructural analysis by providing an opportunity for those interested in material properties and characterization to display their work in print and electronic formats and communicate significant scientific information. There are six different classes of competition covering all fields of optical and electron microscopy. In Classes 1 through 3, multiple images and captions in a poster format are expected to be used to describe how metallography was used to help characterize a material or process, solve a problem, or to describe a unique or unusual technique. Classes 4 and 5 are for individual artistic images. Class 6 is a video class, aimed at engaging undergraduate students who may be unable or have limited access to the laboratory due to COVID-19 restrictions. This class is a video format on a topic of choice related to a specific material, family of material, a specific component, or a process for materials. Additional requirements are listed in the Requirements section. Topic must specify a problem that presented work goes towards solving.

The IMC is open to all, including non-members of IMS and ASM International with IMAT conference attendance not required.

IMS or ASM officers, IMC award sponsors, and commercial exhibitors may enter in any class to compete for

cash awards including Best in Show. If an entry submitted by IMS or ASM officers, IMC award sponsors, or a commercial exhibitor receives a first place award in any class, then the submitter is prohibited from entering the same class the following year.

### Awards

All monetary awards will be issued in U.S. dollars.

For each class (if awarded), first place winners will receive \$500. Second place winners will receive \$200. Third place winners will receive \$100. A certificate of appreciation will be awarded for Honorable Mention(s).

**Best in Show:** This award is endowed by Buehler and is open to Classes 1 and 2 only. The winner will receive the **Jacquet-Lucas Award** consisting of a plaque, the Jacquet-Lucas Medal in Shadow Box, a hand lettered Calligraphy Certificate, and \$3,000.

First place winners will receive \$500 or the Jacquet-Lucas Award, but not both. Entries for Classes 1 and 2 are expected to be experienced metallographers and metallurgists, although a group submitting an entry may include student or novice technician participation.

**The DuBose-Crouse Award** is based on unique, unusual, and new techniques in microscopy, which is open to Classes 1, 2, and 3. The winner receives prize money associated with first, second, or third place, and the DuBose-Crouse plaque.

**The George L. Kehl Award** is a prestigious award, recognizing outstanding achievement by an undergraduate student. This award is open to Classes 3 and 6 for consideration. The first-place student winners will receive \$1,000 (shared if two or more contributors on the winning entry) and the George L. Kehl Plaque, if awarded, as compared to the first-place award of \$500. For Class 3 consideration, the poster should exhibit skill and knowledge of metallographic techniques and application of microscopy. For Class 6 consideration, the presented content should exhibit exceptional knowledge of the topic chosen. The work need not be complete but should define ultimate goals and demonstrate progress

towards these goals. It is expected that entries submitted for Class 3 and 6 will be guided by a department professor or advisor. Undergraduate students should acquire a letter of confirmation from their advisors, stating that the entry was completed by the student(s) with minimal assistance after the entry outline was established.

A first prize will be awarded in each class, unless minimum standards are not met. If a first prize is not awarded, then second and third prizes will not be awarded. However, in the event a first prize is not awarded, then Honorable Mention certificate(s) may be awarded. Honorable Mention certificate(s) may be awarded in lieu of, or in addition to second and third place prizes.

Prize money, plaques, and certificates will be sent to the primary investigator (i.e., first author identified in submission information), except in the case of the Jacquet-Lucas Award, which will be divided equally among the authors.

Entries are prominently displayed at the annual IMAT Conference following judging. Winning entries will be displayed at ASM Headquarters.

## Classes

1. **Light Microscopy**—All Materials.
2. **Electron Microscopy**—All Materials.
3. **Student Entries**—All Materials. (Undergraduate Students Only<sup>1</sup>)
4. **Artistic Microscopy (Color)**—This class is based on the use of color microscopy.
5. **Artistic Microscopy (Black & White)**—This class is based on the use of black & white microscopy.
6. **Video**—Topic of choice involving defined problem. (Undergraduate Students Only<sup>1</sup>)

## Additional Notes

- Entries should not be purely of biological subjects.
- Digitally captured images are permitted in all categories, but the images must depict true structures, which have not been significantly altered from their original appearance.
- Class 1, 2, and 3 entries are expected to use multiple images/techniques and narrative to convey how metallography and/or electron microscopy techniques were used to characterize a material or process, help solve a problem, or describe a unique or unusual technique.

<sup>1</sup> A student is defined as an individual who is working toward a first degree (e.g., Associates Degree, Bachelor's Degree), or equivalent in another country. All undergraduate students, whether as an individual or as a student team, must enter into Class 3. An undergraduate student may be part of a team with an entry in Classes 1 or 2, provided the team lead is a graduate student, professor, or other professional.

- Class 4 and 5 entries are for artistic or aesthetic value and are not eligible for Best in Show Jacquet-Lucas Award.

## Requirements

### General—All Entries Must Meet These Requirements

1. All entries become the joint property of the IMS and ASM International, and cannot be returned.
  - (a) Images must not have been previously published. This includes both print and electronic forms, which include prior or current official company products (e.g., literature, websites, displays, etc.), individual products (e.g., publications, displays, social media posts), and/or submissions to other metallographic and artistic competitions.
2. The IMC Chair and/or the judges' panel reserves the right to exclude entries from the IMC competition, if considered to be of poor quality or unsuitable subject matter.
3. No more than four entries per individual (or team) will be accepted.
4. Images used in entries for Classes 1, 2, or 3 may not be resubmitted in Classes 4 or 5 or utilized in Class 6.
5. All printed or electronic entries that contain digitally captured images must be submitted with a signed copy of the following statement:

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These images have not been previously published or significantly altered from their original appearance by application of image-enhancement algorithms and convolution kernels, unless the purpose of the entry is to show how those are used to illustrate specific effects.

Submitting this image/poster to the International Metallographic Competition, allows the ASM International to display this entry at sponsored events, the ASM Headquarters, and other venues as long as the submitters accreditation is displayed on the image/poster face.

Entry Title: \_\_\_\_\_ Date: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_

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- (a) Printed entries must have this statement affixed to the back of the entry. Electronic entries must submit an electronic scan of this signed statement for attachment to the back of the printed entry.
  - (b) Class 6 entries require the video disclaimer (available at <https://www.asminternational.org/web/ims/membership/imc/requirements>) signed by the submitter and for each individual interviewed or shown in the video.
6. The submitter's name, company/university affiliation, postal address, phone number, and email address must be placed on the printed entry back prior to judging.

- (a) This information must not appear on the front of the submission, or within micrographs, and/or images (e.g., company logo from scanning electron images) prior to judging.
  - (b) Identifying information found on the front of the submission will be covered during judging and uncovered after judging.
  - (c) The IMC Chair will affix a name and address label on the face of the entry after judging to allow viewers to identify the submitter.
7. Entries must provide the following information in electronic and/or printed form:
- (a) Entry Class (Class 1–6);
  - (b) Material(s) or alloy;
  - (c) Etchant (if any);
  - (d) Magnification; and
  - (e) Explanation and any unusual technical or structural features.

This caption information may be included on the face of the printed entry, or be added following judging by the IMC Chair. This information can be submitted in any language, but an English translation must be included.

8. **Entry Submission**—Entries can be submitted in electronic and/or printed format. If submitting in a printed format, an electronic format is requested to allow for combination virtual/in-person judging.
- (a) **Electronic Entries**— Must be submitted to [Ellen.M.Rabenberg@nasa.gov](mailto:Ellen.M.Rabenberg@nasa.gov) by September 29, 2023. The maximum file size accepted for Classes 1 to 5 is 10 MB using the highest quality images regarding bit depth, file size, and resolution. Unless otherwise indicated, the submitted file will be printed in the maximum size permitted by the respective class. The file format must be in a JPEG (jpeg, jpg, jpe, jfif), GIF (gif), TIFF (tif, tiff), BMP (bmp, dib), or PNG (png) format. Upload, or include with your email, a txt file with your name, address, email address, company affiliation, phone number, and the file name of the images you are submitting.
  - (b) **Printed Entries**— Must be received by September 29, 2023 at the following location: TBD, contact Ellen Rabenberg at [Ellen.M.Rabenberg@nasa.gov](mailto:Ellen.M.Rabenberg@nasa.gov) for information.
  - (c) **Video entries** (and signed disclaimers) for Class 6 should be uploaded to <https://transfer.asminternational.org/app?operation=pubopp&id=1637692873134X10A10A1A8PBoYo>. The maximum

file size for videos is 10 GB. Video files must be in a MOV, AVI, WMA, or MP4 format. Signed disclaimer forms for the submitter and each person with their likeness included in the video should also be uploaded.

### Class 1, 2, and 3 Specific Requirements

- 9. **Entries**—No more than two entries per team are allowed in Classes 1–3. Multiple posters for one entry are not acceptable.
- 10. **Technical Content**—Detailed preparation/examination information of the metallographic/microscopy techniques used must be included.
- 11. **Poster Size**—The maximum/minimum acceptable printable dimensions are 36 inch × 24 inch (90 cm × 60 cm) ± 10%, and 10 inch × 8 inch (25 cm × 20 cm) ± 10%, respectively
- 12. **Labeling Space**—A blank space 2 inch × 4 inch (5.1 cm × 10.2 cm) must be placed on the poster front, lower left corner to accommodate submitter information affixed after judging is completed.
  - (a) Identifying information should not be placed on the front of the submission. If any identifying information is put on the front of the submission, this information will be covered during judging. Submitter information will be affixed after judging is completed.
- 13. **Mounting**—Printed entries should be mounted on a lightweight backing no thicker than 0.25 inch (0.6 cm) or laminated, and should not be framed.

### Class 4 and 5 Specific Requirements

- 14. **Entries**—One metallography/microscopy image is permitted per entry.
  - (a) Supplemental information (e.g., magnification, micron markers, title) not directly on the submitted image will not be considered as part of the judging. Conversely, any information added to the image (e.g., markings, text, etc.) will be considered part of the image aesthetic and open for judging. However, the micrograph size requirements apply to the submitted entry and not just the image.
- 15. **Identifying information** (such as company logo from scanning electron images) should not be on the face of the submission. If identifying information is put on the front of the submission, this information will be covered during judging.
- 16. **Micrograph Size**—The maximum/minimum acceptable dimensions are 18 inch × 18 inch (46 cm × 46 cm) ± 10% and 11 inch × 8.5 inch (22 cm × 28 cm) ± 10%, respectively.

17. **Mounting**—Printed entries should be mounted on a lightweight backing no thicker than 0.25 inch (0.6 cm) or laminated, and should not be framed.

### Class 6 Specific Requirements

18. Focus to be a specific material, family of material, a specific component, or a process for materials.
19. Must include a well-defined problem that the topic focus works to solve. The problem does not need to show a complete solution, but needs to show how the topic works towards solving the defined problem.
20. Video Length—4-5 min long
21. Entries should include at least 3 of the 5 following components:
- Interview(s) with industry professional(s) regarding topic of choice.
  - Interview(s) with current graduate student(s) or professor(s) working with the chosen material(s) or process regarding current innovations and/or research.
  - Unique uses for material(s) or process chosen.
  - Challenges in the industry regarding the chosen material(s) or process.
  - How the material(s) or process chosen is a good choice for our environment or sustainability.
22. Signed release forms are required for each individual interviewed or shown in the video.
23. Maximum file size—10 GB max.
24. Video format—MOV, AVI, WMA, or MP4.
25. Upload video and signed disclaimer forms to <https://transfer.asminternational.org/app?operation=pubopp&id=1637692873134X10A10A1A8PBoYo>

### Judging

Judging for 2023 will be a combination of a virtual/in-person judging such that judges will be able to review an electronic version of entries prior to the onsite judging on October 15th, 2023 at IMAT in Detroit, Michigan.

### Judging for Classes 1, 2, and 3 will be on a point system using the following criteria

1. Technical content—originality of the project in relation to characterizing a material or process, solving a problem—45 points maximum.

2. Quality and uniqueness of specimen preparation—25 points maximum.
3. Photographic quality—20 points maximum.
4. Uniqueness of the presentation in an aesthetic and technical sense, manner of titles, and other printed descriptions—10 points maximum.

### Judging for Classes 4 and 5 will be based on artistic value of the micrographs only

### Judging for Class 6 will be based on a point system using the following criteria:

1. Technical content (defined problem, originality of the project, is content accurate, etc.)—45 points maximum.
2. Video requirements have been met (3–5 of listed components included, and minimum/maximum time limit)—25 points maximum.
3. Presentation (how well was the content presented)—20 points maximum.
4. Aesthetics of the video—10 points maximum.

### Requirements for the Panel of Judges

1. An even number of judges, with the IMC Chair casting the deciding vote if necessary.
2. At least one judge with an advanced degree and experience in physical metallurgy.
3. At least two judges shall be practicing metallographers.
4. At least one judge shall be a representative from the commercial “metallography” trade.
5. Judges shall serve for no more than three consecutive years.
6. At least two new judges shall be appointed each year.

These criteria can be met with one judge satisfying more than one requirement. A group of six or eight judges is considered ideal.

**For further information, e-mail:** Ellen Rabenberg (IMC Chair) at: [Ellen.M.Rabenberg@nasa.gov](mailto:Ellen.M.Rabenberg@nasa.gov).

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