

# Integrating Materials and Manufacturing Innovation

## Instructions for Authors

All submissions should use American English. As appropriate, authors are strongly encouraged to separately publish the data and code supporting their articles whenever possible.

### Article Types

The journal publishes four classes of articles: Technical Articles, Brief Communications, Review Articles, and Thematic Articles.

### Technical Articles

Manuscripts should represent completed, original work embodying the tools, application, and impact of integrated computational materials engineering (ICME). Materials must be considered to have significant permanent value. In addition to technical acceptability, material should be presented clearly and concisely, and the article should not exceed 8,000 words. There are three sub-classes of Technical Articles: Case studies, Data descriptor articles, and Tools and methods articles.

*Case studies* should describe and explore the novel application of ICME tools and methodologies to a specific scientific or engineering problem. An analysis of the impact of the case study in terms of time, cost, or technological advance is highly desirable.

*Data descriptor* articles are standalone records of scientific work that present a detailed account of the methodology used to collect experimental or simulation data, a thorough description of the resulting data, and a brief discussion of the anticipated value of the data if accurately modeled, analyzed, or used in some other fashion. However, these articles are not intended to assess new hypotheses, provide extensive analyses of physical phenomena, or descriptions of new experimental or computational methods.

As appropriate, the authors should endeavor to address the following attributes of data quality:

- Verification – Accuracy of the computation in solving the underlying equations of the model for the quantities of interest (Applies to computational data only)
- Validation – Agreement between realizations of a model in experimental and computational or analytic results
- Uncertainty – Quantitative level of confidence in the experimental results or computational predictions
- Sensitivity – Effect of changes in inputs or assumed boundary conditions on data (Applies primarily to computational data)

Example activities that may be employed to address data quality include:

- Presentation of protocols and standards employed to ensure reliable and unbiased data production
- Experiments that support or validate the data-collection procedure
- Statistical analyses of experimental error and variation
- Characterization of the system that can link the measured data to prior studies
- Any other information needed for the peer reviewers to assess technical rigor

The journal requires authors to deposit the data set(s) supporting *Data descriptor* articles in a publicly accessible data repository that is committed to archiving data sets indefinitely, assigns a

unique and persistent digital identifier, and allows bi-directional linking between the article and dataset. The dataset(s) are to be cited, where appropriate in the manuscript, and included in the reference list following the guidelines below.

**Tools and methods** articles provide a detailed record of a novel tool or method developed to enable the application of ICME to a scientific and/or engineering problem. Examples include simulation software, novel experimental techniques, software platforms for collaboration, and tools for materials data management. For simulation software, essential information to be provided includes required computational environment, steps taken for verification and validation, and protocols for interfacing with the code. Software should have a mature interface and be useable by more than experts in a specific programming language.

As appropriate, the tools and methods presented must be publicly accessible. Additionally, the data used to validate software or experimental tools should be published in a publicly accessible data repository that is committed to archiving data sets indefinitely, assigns a unique and persistent digital identifier, and allows bi-directional linking between the article and dataset. The dataset(s) are to be cited, where appropriate in the manuscript, and included in the reference list following the guidelines below.

### **Brief Communications**

Brief communications generally take one of the following forms:

- A brief report of findings or tools that is in line with the journal's scope and of particular interest to the community.
- A substantial re-analysis of a previously published article in *Integrating Materials and Manufacturing Innovation* or in another journal.
- An article that may not cover “standard research” but that is of general interest to the broad readership of the journal.

A brief communication should not exceed 3,000 words.

### **Review Articles**

Review articles are summaries of recent insights in specific research areas within the scope of the journal. Key aims of Review articles are to provide systematic and substantial coverage of mature subjects, evaluations of progress in specified areas, and/or critical assessments of emerging technologies. Review articles should not exceed 12,000 words.

### **Thematic Articles**

Thematic articles generally fall into the Technical Articles category but are specifically part of a named topical collection.

### **Manuscript Submission**

Submission of a manuscript implies that the work described has not been published before; that it is not under consideration for publication anywhere else; and that its publication has been approved by all co-authors, if any, as well as by the responsible authorities – tacitly or explicitly – at the institution where

the work has been carried out. The publisher will not be held legally responsible should there be any claims for compensation.

### **English Language Support**

For editors and reviewers to accurately assess the work presented in your manuscript, authors should ensure that the English language is of sufficient quality to be understood. If help is needed with writing in English, authors should consider obtaining assistance from a professional language editing service such as the following:

- <http://www.aje.com>
- <https://authorservices.springernature.com>

TMS members are entitled to a 15% discount with Springer Author Services. Members should first log in on [this page](#), at which point a link will be visible.

Use of a language editing service is not a requirement for publication in this journal and does not imply or guarantee that the article will be selected for peer review or will be accepted. If your manuscript is accepted it will be checked by copyeditors before publication.

### **Permissions**

Authors wishing to include figures, tables, or text passages that have already been published elsewhere are required to obtain permission from the copyright owner(s) and to include evidence that such permission has been granted when submitting their manuscripts. Any material received without such evidence will be assumed to originate from the authors.

### **Online Submission**

Access <https://www.editorialmanager.com/immj>. After registering or logging in, select “Submit New Manuscript.”

### **Title Page**

The title page should include:

- The name(s) of the author(s)
- A concise and informative title
- The affiliation(s) and address(es) of the author(s)
- The e-mail address of the corresponding author

### **Abstract**

Include an abstract of 150 to 250 words. The abstract should not contain any undefined abbreviations or reference citations. The abstract also should not contain figures.

### **Keywords**

Provide 4 to 6 keywords that can be used for indexing purposes.

### **Text**

#### **Text Formatting**

Manuscripts should be submitted in Word.

- Use a normal, plain font (e.g., 10-point Times Roman) for text.

- Use italics for emphasis.
- Use the automatic page numbering function to number the pages.
- Do not use field functions.
- Use tab stops or other commands for indents, not the space bar.
- Use the table function, not spreadsheets, to make tables.
- Use the equation editor or MathType for equations.
- Save your file in docx format (Word 2007 or higher) or doc format (older Word versions).

Manuscripts with mathematical content can also be submitted in LaTeX format. See [here](#) for information on creating and uploading LaTeX documents. Templates are available at [LaTeX2e macro package](#). Although the full LaTeX package with source files is encouraged at the time of initial submission, the PDF file of the LaTeX submission is acceptable for peer review purposes only. LaTeX source files are required before a manuscript can be accepted.

### **Headings**

Please use no more than three levels of displayed headings.

### **Abbreviations**

Abbreviations should be defined at first mention in both the abstract and the text and be used consistently thereafter.

### **Footnotes**

Footnotes can be used to give additional information; however, they should not consist solely of a reference citation and they should never include the bibliographic details of a reference. Always use footnotes instead of endnotes.

Footnotes to the text should be numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

### **Acknowledgments**

Acknowledgments of people, grants, funds, etc. should be placed in a separate section before the reference list. The names of funding organizations should be written in full.

### **Scientific style**

- Please always use internationally accepted signs and symbols for units (SI units).
- Nomenclature: Insofar as possible, authors should use systematic names similar to those used by Chemical Abstract Service or IUPAC.
- Please use the standard mathematical notation for formulae, symbols etc.:
  - Italic for single letters that denote mathematical constants, variables, and unknown quantities
  - Roman/upright for numerals, operators, and punctuation, and commonly defined functions or abbreviations, e.g., cos, det, e or exp, lim, log, max, min, sin, tan, d (for derivative)
  - Bold for vectors, tensors, and matrices.

## References

### Citations

Reference citations in the text should be identified by numbers in square brackets and should be in ascending numerical order.

### Reference list

The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text. Do not use footnotes or endnotes as a substitute for a reference list. The entries in the list should be numbered consecutively. For authors using EndNote, Springer provides an output style that supports the formatting of in-text citations and reference list. See [here](#).

- Journal article

Boyce DE, Dawson PR, Miller MP (2009) The design of a software environment for organizing, sharing, and archiving materials data. *Metall Mater Trans A* 40:2301-2318.  
<https://doi.org/10.1007/s11661-009-9889-y>

Ideally, the names of all authors should be provided but the usage of “et al” in lists with more than five authors also will be accepted:

Klimeck G, McLennan M, Brophy SP et al (2008) nanoHUB.org: advancing education and research in nanotechnology. *Comput Sci Eng.* 10:17-23. <https://doi.org/10.1109/MCSE.2008.120>

- Article by DOI

Cowles B, Backman D, Dutton R (2012) Verification and validation of ICME methods and models for aerospace applications. *Integ Mater Manuf Innov.* <https://doi.org/10.1186/2193-9772-1-2>

- Book

Horstemeyer MF (2012) Integrated computational materials engineering (ICME) for metals: using multiscale modeling to invigorate engineering design with science. John Wiley & Sons, Hoboken.

- Book Chapter

Uchic M (2011) Serial sectioning methods for generating 3D characterization data of grain- and precipitate-scale microstructures. In: Ghosh S, Dimiduk D (eds) *Computational methods for microstructure-property relationships*. Springer, New York, pp 31-52

- Online document

Warren JA, Boisvert RF (2012) Building the materials innovation infrastructure: data and standards. National Institute of Standards and Technology, Gaithersburg, MD.  
<http://nvlpubs.nist.gov/nistpubs/ir/2012/NIST.IR.7898.pdf>. Accessed 11 February 2015

Use standard journal abbreviations as given in the current listing of Chemical Abstracts Service at this [link](#).

### Data and code

Data citation should be consistent with the Joint Declaration of Data Citation Principles (Data Citation Synthesis Group: Joint Declaration of Data Citation Principles. Martone M. (ed.) San Diego CA: FORCE11; 2014 <https://doi.org/10.25490/a97f-egyk>).

- Online dataset

Shade PA, Groeber MA, Schuren JC, Uchic MD (2013) 3D microstructure reconstruction of polycrystalline nickel micro-tension test. <http://hdl.handle.net/11115/152>. Accessed 14 May 2014

- Online database where individual datasets are not citable

American mineralogist crystal structure database (2014) Mineralogical Society of America, Chantilly, VA and the Mineralogical Association of Canada, Québec.

<http://rruff.geo.arizona.edu/AMS/amcsd.php>. Accessed 14 May 2014

## Tables

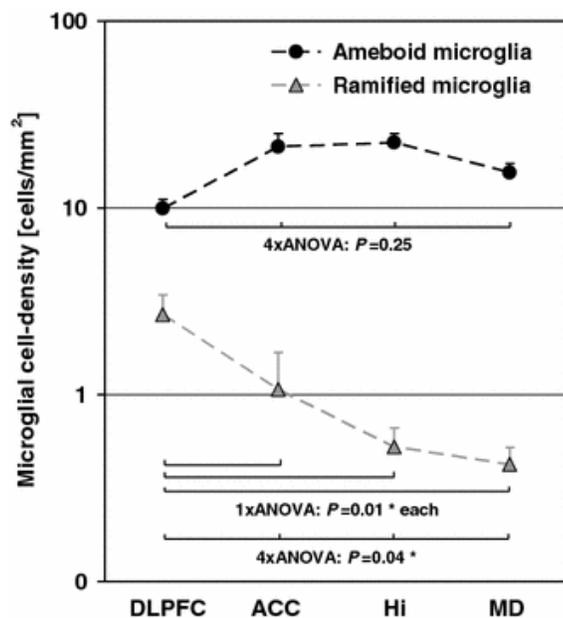
- Tables should be numbered using Arabic numerals.
- Tables should always be cited in text in consecutive numerical order.
- For each table, supply a caption (title) explaining the table.
- Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.
- Footnotes to tables should be indicated by superscript lowercase letters (or asterisks for significance values and other statistical data) and included beneath the table body.

## Artwork and Illustration Guidelines

### Electronic Figure Submission

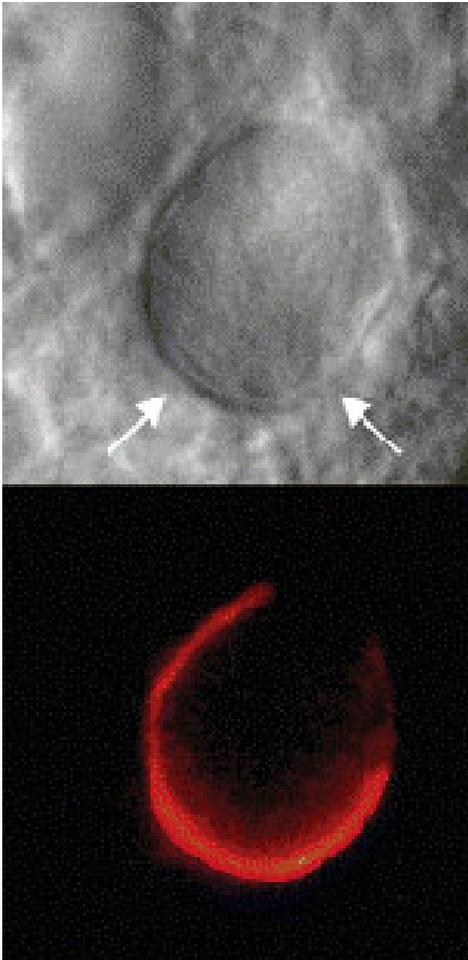
- Supply all figures within the manuscript file and as separate high-resolution files.
- Indicate what graphics program was used to create the artwork.
- For vector graphics, the preferred format is EPS; for halftones, use TIFF format. MSOffice files are also acceptable if the image quality is high.
- Vector graphics containing fonts must have the fonts embedded in the files.
- Name your figure files with "Fig" and the figure number, e.g., Fig1.eps.

### Line Art



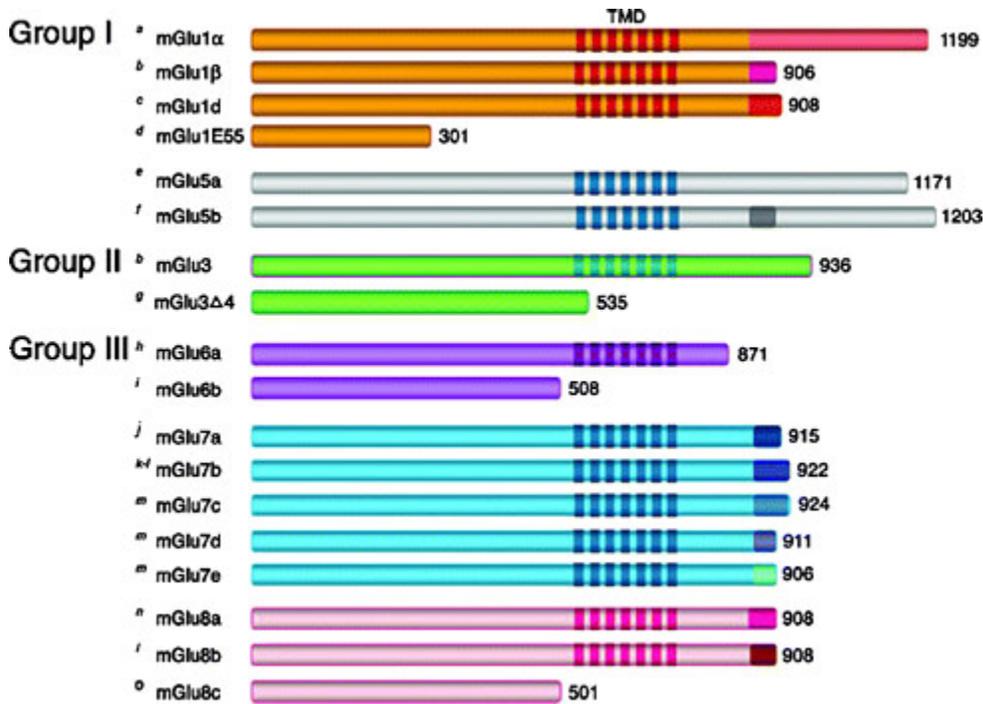
- Definition: Black and white graphic with no shading.
- Do not use faint lines and/or lettering and check that all lines and lettering within the figures are legible at final size.
- All lines should be at least 0.1 mm (0.3 pt) wide.
- Scanned line drawings and line drawings in bitmap format should have a minimum resolution of 1200 dpi.

### Halftone Art



- Definition: Photographs or drawings with fine shading.
- If any magnification is used in the photographs, indicate this by using scale bars within the figures themselves.
- Halftones should have a minimum resolution of 300 dpi.

## Combination Art



- Definition: a combination of halftone and line art, e.g., halftones containing line drawing, extensive lettering, color diagrams, etc.
- Combination artwork should have a minimum resolution of 600 dpi.

## Figure Lettering

- To add lettering, it is best to use Helvetica or Arial (sans serif fonts).
- Keep lettering consistently sized throughout your final-sized artwork, usually about 2–3 mm (8–12 pt).
- Variance of type size within an illustration should be minimal, e.g., do not use 8-pt type on an axis and 20-pt type for the axis label.
- Avoid effects such as shading, outline letters, etc.
- Do not include titles or captions within your illustrations.

## Figure Numbering

- All figures are to be numbered using Arabic numerals.
- Figures should be cited in text in consecutive numerical order.
- Figure parts should be denoted by lowercase letters (a, b, c, etc.).
- If an appendix appears in your article and it contains one or more figures, continue the consecutive numbering of the main text. Do not number the appendix figures, "A1, A2, A3, etc." Figures in Electronic Supplementary Material should, however, be numbered separately.

## Figure Captions

- Each figure should have a concise caption describing what the figure depicts. Include the captions under the embedded figures in the manuscript file or in a separate list at the end of the manuscript if the figures are not embedded.

- Figure captions should begin with the term Fig. in bold type, followed by the figure number, also in bold type.
- Identify all elements found in the figure in the figure caption and use boxes, circles, etc., as coordinate points in graphs.
- Identify previously published material by giving the original source in the form of a reference citation at the end of the figure caption. For figures being reprinted, indicate “Reprinted with permission from [reference number]” at the end of the figure caption. For figures being adapted from another source, state “Adapted from [reference number].”
- 

### **Figure Placement and Size**

- Figures should be included within the manuscript file and also supplied as separate high-resolution files.
- When preparing your figures, size figures to fit in the column width.
- For most journals the figures should be 39 mm, 84 mm, 129 mm, or 174 mm wide and not higher than 234 mm.

### **Permissions**

If you include figures that have already been published elsewhere, you must obtain permission from the copyright owner(s). Please be aware that some publishers do not grant electronic rights for free and that Springer will not be able to refund any costs that may have occurred to receive these permissions.

### **Accessibility**

In order to give people of all abilities and disabilities access to the content of your figures, please make sure that

- All figures have descriptive captions (blind users could then use a text-to-speech software or a text-to-Braille hardware)
- Patterns are used instead of or in addition to colors for conveying information (colorblind users would then be able to distinguish the visual elements)
- Any figure lettering has a contrast ratio of at least 4.5:1

### **Electronic Supplementary Material**

Additional materials that are not appropriate for placement in the main article, including figures, tables, datasets, and videos, can be included as electronic supplementary material. This material is accessible online but not in print.

Submitting research datasets as electronic supplementary material is highly discouraged. Authors should read the journal’s research data policy. The journal encourages research data to be archived with a persistent digital identifier in accessible data repositories wherever possible.

### **Submission**

- Upload one PDF file that contains all supplementary text, figures, and tables, including figure captions and table titles
- The first page should include "Supplementary Material for:" at the top of the page followed by the manuscript title, journal name, author names, and affiliations, and e-mail address of the corresponding author
- To accommodate user downloads, please keep in mind that larger-sized files may require long download times and that some users may experience other problems during downloading.

### **Audio, Video, and Animations**

- Aspect ratio: 16:9 or 4:3
- Maximum file size: 25 GB
- Minimum video duration: 1 sec
- Supported file formats: avi, wmv, mp4, mov, m2p, mp2, mpg, mpeg, flv, mxf, mts, m4v, 3gp

### **Spreadsheets**

- Spreadsheets should be converted to PDF if no interaction with the data is intended.
- If the readers should be encouraged to make their own calculations, spreadsheets should be submitted as .xls files (MS Excel).

### **Specialized Formats**

- Specialized format such as .pdb (chemical), .wrl (VRML), .nb (Mathematica notebook), and .tex can also be supplied.

### **Collecting Multiple Files**

- It is possible to collect multiple files in a .zip or .gz file.

### **Numbering**

- If supplying any supplementary material, the text must make specific mention of the material as a citation, similar to that of figures and tables.
- Figures with captions, tables, and text intended to publish as ESM should be identified as “Fig. S-1,” “Table S-I,” etc. and cited in the manuscript as “supplementary Fig. S-1,” “supplementary Table S-I,” etc. At first mention of the ESM within the text, include the phrase “(refer to electronic supplementary material)”.
- Name the files consecutively, e.g., “ESM\_3.mpg”, “ESM\_4.pdf”.

### **Captions**

- For each supplementary material, please supply a concise caption describing the content of the file.

### **Processing of supplementary files**

- Electronic supplementary material will be published as received from the author without any conversion, editing, or reformatting.

### **After acceptance**

Upon acceptance, your article will be exported to Production to undergo typesetting. Once typesetting is complete, you will receive a link asking you to confirm your affiliation, choose the publishing model for your article, as well as arrange rights and payment of any associated publication costs. Once you have completed this, your article will be processed and you will receive the proofs.

### **Copyright transfer**

Authors will be asked to transfer copyright of the article to the Society (or grant the Society exclusive publication and dissemination rights). This will ensure the widest possible protection and dissemination of information under copyright laws.

Open Choice articles do not require transfer of copyright as the copyright remains with the author(s). In opting for open access, the author(s) agree to publish the article under the Creative Commons Attribution License.

### **Color illustrations**

Online publication of color illustrations is free of charge. For color in the print version, authors will be expected to pay toward the additional printing expense.

### **Proofreading**

The purpose of the author proof stage is to check for typesetting or conversion errors and the completeness and accuracy of the text, tables, and figures. Substantial changes in content, such as new results, corrected values, and modifications to the title or the author listing are not permitted without the approval of the Editor in Chief.

After online publication, further changes can only be made in the form of an Erratum, which will be hyperlinked to the article.

### **Online First**

The article will be published online after receipt of the corrected proofs. This is the official first publication citable with the DOI. After publication in a particular issue, the article can also be cited by issue and page numbers.

### **Open Choice**

In addition to the normal publication process (whereby an article is submitted to the journal and access to that article is granted to customers who have purchased a subscription), Springer provides an alternative publishing option: Springer Open Choice. A Springer Open Choice article receives all the benefits of a regular subscription-based article, but in addition is made available publicly through Springer's online platform SpringerLink.

### **Conflict of Interest**

Authors must indicate whether or not they have a financial relationship with the organization that sponsored the research. This note should be added in a separate section before the reference list. If no conflict exists, authors should state: "The authors declare that they have no conflict of interest."

### **Ethical Responsibilities of Authors**

This journal is committed to upholding the integrity of the scientific record. As a member of the Committee on Publication Ethics (COPE) the journal will follow the COPE guidelines on how to deal with potential acts of misconduct.

Authors should refrain from misrepresenting research results which could damage the trust in the journal and ultimately the entire scientific endeavor. Maintaining integrity of the research and its presentation can be achieved by following the rules of good scientific practice, which includes:

- The manuscript has not been submitted to more than one journal for simultaneous consideration.
- The manuscript has not been published previously (partly or in full), unless the new work concerns an expansion of previous work (provide transparency on the re-use of material to avoid the hint of text-recycling ("self-plagiarism")).
- A single study is not split into several parts to increase the quantity of submissions and submitted to various journals or to one journal over time.

- No data have been fabricated or manipulated (including images) to support your conclusions.
- No data, text, or theories by others are presented as if they were the authors own (“plagiarism”). Proper acknowledgements to other works must be given (this includes material that is closely copied (near verbatim), summarized and/or paraphrased), quotation marks are used for verbatim copying of material, and permissions are secured for material that is copyrighted.

**Important note: This journal uses software to screen for plagiarism.**

- Consent to submit has been received from all co-authors and responsible authorities at the institute/organization where the work has been carried out **before** the work is submitted.
- Authors whose names appear on the submission have contributed sufficiently to the scientific work and therefore share collective responsibility and accountability for the results.

In addition:

- Changes of authorship or in the order of authors are not accepted **after** acceptance of a manuscript.
- Requests to add or delete authors at revision stage may be considered only after approval from all authors
- Upon request authors should be prepared to send relevant documentation or data in order to verify the validity of the results. This could be in the form of raw data, samples, records, etc.

If there is a suspicion of misconduct, the journal will carry out an investigation following the COPE guidelines. If, after investigation, the allegation seems to raise valid concerns, the accused author will be contacted and given an opportunity to address the issue. If misconduct has been proven, this may result in the journal’s implementation of the following measures, including, but not limited to:

- If the article is still under consideration, it may be rejected and returned to the author.
- If the article has already been published online, depending on the nature and severity of the infraction:
  - an erratum/correction may be placed with the article
  - an expression of concern may be placed with the article
  - in severe cases, retraction of the article may occur.

The reason will be given in the published erratum/correction, expression of concern or retraction note. Please note that retraction means that the article is maintained on the online platform and watermarked “retracted”; the explanation for the retraction is provided in a note linked to the watermarked article.

- The author’s institution may be informed.