DESCRIPTION

ISA Transactions is a journal of advances and state-of-the-art in the science and engineering of measurement and automation, of value to leading-edge industrial practitioners and applied researchers.

The topics of measurement include: sensors, perception systems, analyzers, signal processing, filtering, data compression, data rectification, fault detection, inferential measurement, soft sensors, hardware interfacing, etc.; and any of the techniques that support them such as artificial intelligence, fuzzy logic, communication systems, and process analysis. The topics of automation include: statistical and deterministic strategies for discrete event and continuous process control, modelling and simulation, event triggers, scheduling and sequencing, system reliability, quality, maintenance, management, loss prevention, etc.; and any equipment, techniques and best practices that support them such as optimization, learning systems, strategy development, security, and human interfacing and training.

The intended audience is research and development personnel from academe and industry in the fields of control systems, process instrumentation, systems, and automation.

The journal seeks to bridge the theory and practice gap. This balance of interests requires simplicity of technique, credible demonstration, fundamental grounding, and connectivity to the state of the art in both theory and practice.

If you would like more information please visit the ISA Transactions society homepage

Benefits to authors
We also provide many author benefits, such as free PDFs, a liberal copyright policy, special discounts on Elsevier publications and much more. Please click here for more information on our author services.

Please see our Guide for Authors for information on article submission. If you require any further information or help, please visit our Support Center

AUDIENCE

Academy and industry at high-tech level in the field of process instrumentation, measurement, control and automation.
IMPACT FACTOR

2018: 4.343 © Clarivate Analytics Journal Citation Reports 2019

ABSTRACTING AND INDEXING

Cambridge Scientific Abstracts
Current Contents - Engineering, Technology & Applied Sciences
EBSCOhost
Engineering Index Monthly
Ei Compendex
Embase
Gale Academic OneFile
Gale Infotrac Custom
GeoRef
INSPEC
PubMed/Medline
Science Citation Index Expanded
PubMed/Medline
Scopus
TEMA - Technik und Management
Web of Science
Zentralblatt MATH

EDITORIAL BOARD

Editor-in-Chief
A.B. Rad, Simon Fraser University School of Mechatronic Systems Engineering, 250-13450, 102 Avenue, Surrey, V3T 0A3, British Columbia, Canada

Deputy Editor-in-Chief
Q.-G. Wang, University of Johannesburg, School of Electrical Engineering, Johannesburg, South Africa

Subject Area Editors
O. Camacho, University of the Andes School of Engineering, Merida, Venezuela, Bolivarian Republic of
S. Ding, University of Duisburg-Essen, Duisburg, Germany
J. Pieper, University of Calgary, Calgary, Alberta, Canada
D. Theilliol, Automation Research Centre Nancy, Vandoeuvre Les Nancy, France

Associate Editors
E. Cuevas, University of Guadalajara University Center of Exact Sciences and Engineering, Guadalajara, Mexico
L. Dong, Cleveland State University Department of Electrical Engineering and Computer Science, Cleveland, Ohio, United States
D. Gao, Northumbria University Faculty of Engineering and Environment, Newcastle Upon Tyne, United Kingdom
H.R. Karimi, Polytechnic of Milan Department of Mechanical Engineering, Milano, Italy
D. Li, Beijing University of Chemical Technology College of Information Science and Technology, Beijing, China
J. Liu, Harbin Institute of Technology School of Astronautics, Department of Control Science and Engineering, Harbin, China
T. Liu, Dalian University of Technology Institute of Advanced Control Technology, Dalian, China
Y. Liu, South China University of Technology School of Automation Science and Engineering, Guangzhou, China
R.C. Panda, Indian Institute of Technology Madras Department of Chemical Engineering, Chennai, India
I. Petráš, Technical University of Košice Faculty of Mining Ecology Process Control and Geotechnologies, Košice, Slovakia
V. Puig, Polytechnic University of Catalonia, Barcelona, Spain
F. Rivas Echeverría, Federico Santa Maria Technical University, Valparaiso, Chile
H. Schulte, htw Saar University of Applied Sciences School of Engineering, Saarbrücken, Germany
S. Simani, University of Ferrara, Department of Biochemistry, Ferrara, Italy
M. Stefanovic, University of Denver, Denver, Colorado, United States
F. Tadeo, University of Valladolid, Valladolid, Spain
L. Wang, Beihang University, Beijing, China
Y.-W. Wang, Huazhong University of Science and Technology School of Artificial Intelligence and Automation, Wuhan, China
M. Witczak, University of Zielona Gora, Poland
Y. Yang, Peking University, Beijing, China
D. Zhang, Zhejiang University of Technology Department of Automation, Hangzhou, China
P. Zhang, TU Kaiserslautern Faculty of Electrical and Computer engineering, Kaiserslautern, Germany
W. Zhang, Yangzhou University, Yangzhou, China
G. Zhu, Polytechnique Montréal Department of Electrical Engineering, Montréal, Quebec, Canada
K.P. Zhu, Chinese Academy of Sciences, Institute of Advanced Manufacturing Technology, Changzhou, China

Editorial Advisory Board
Y.A. Ermolin, Moscow State University of Railway Engineering, Moskva, Russian Federation
Z. Gao, Cleveland State University, Cleveland, Ohio, United States
I. Maric, Ruder Boskovic Institute, Zagreb, Croatia
R.R. Rhinehart, Oklahoma State University Stillwater, Stillwater, Oklahoma, United States
P. Tatjewski, Warsaw University of Technology, Warszawa, Poland
GUIDE FOR AUTHORS

INTRODUCTION

ISA Transactions is a journal of advances and state-of-the-art in the science and engineering of measurement and automation, of value to leading-edge industrial practitioners and applied researchers.

The topics of measurement include: sensors, perception systems, analyzers, signal processing, filtering, data compression, data rectification, fault detection, inferential measurement, soft sensors, hardware interfacing, etc.; and any of the techniques that support them such as artificial intelligence, fuzzy logic, communication systems, and process analysis. The topics of automation include: statistical and deterministic strategies for discrete event and continuous process control, modelling and simulation, event triggers, scheduling and sequencing, system reliability, quality, maintenance, management, loss prevention, etc.; and any equipment, techniques and best practices that support them such as optimization, learning systems, strategy development, security, and human interfacing and training.

The intended audience is research and development personnel from academe and industry in the field of process instrumentation, systems, and automation.

The journal seeks to bridge the theory and practice gap. This balance of interests requires simplicity of technique, credible demonstration, fundamental grounding, and connectivity to the state of the art in both theory and practice.

Manuscript Types and Categories

We publish articles (primarily relating to research or to practice), letters, or errata.

Errata: These publications represent an authors' or editor's correction to an article.

Letters: Letters to the editor would be short, one-paragraph, or so, affirmations, questions, challenges, or answers to articles or letters.

Research Articles: These can be from either of the categories that follow, and will primarily relate to research, investigation, and to possibilities. Research Articles focus on the fundamental analysis or mathematics of a technique and are illustrated with simulations, and are written by and for those in research.

Practice Articles: These can be from either of the categories that follow, and will primarily relate to the practice or to applications. Practice Articles focus on the pilot-scale or full-scale application and the heuristics and post implementation audit of an application. They are concerned with application results and interpretation, and are written by and for those implementing measurement and control.

Articles (research or practice) may be from one of the following categories:

Analysis: Clearly develop a fundamental, mathematical analysis of a practice-relevant application or methodology. Explicitly state implications and recommendations for its application. Provide credible examples.

Design: Present a complete "how-to" guide. Connect design procedures to first principles. Explicitly state heuristics and limits of applicability. Provide evidence that the procedures are practicable.

Application: Present the results of new (or under-utilized) techniques or novel applications. Provide a complete description of results, including pilot- or plant-scale experimental data, and a revelation of heuristics and shortcomings.

Tutorial/Review: Present what might become a chapter in a text - a comprehensive exposition or survey of the analysis, design and application of a technique that is practice-important but not yet common textbook material. Include a critical review of the state of the art to guide practitioner choices.
Editorial: Present a balanced and learned perspective on the implications of historical trends or developing issues that reveal needs and direction for action or change. The concepts could be aimed at research, standards, products, criteria for evaluation, or organizations.

Technical Notes: Present new concepts or initial proof-of-concept results on innovative approaches. The manuscripts would be short, perhaps two journal pages, and would not require extensive comprehensive defence required of regular papers. However, they would be critically reviewed for compliance to ISA T Aims and Scope. Technical notes are intended to accelerate the dissemination of ideas, and will be given priority in the publication queue. The title must start with the identification "Technical Note:"

Page charges
This journal has no page charges.

Submission checklist
You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:
- E-mail address
- Full postal address

All necessary files have been uploaded:

Manuscript:
- Include keywords
- All figures (include relevant captions)
- All tables (including titles, description, footnotes)
- Ensure all figure and table citations in the text match the files provided
- Indicate clearly if color should be used for any figures in print

Graphical Abstracts / Highlights files (where applicable)

Supplemental files (where applicable)

Further considerations
- Manuscript has been 'spell checked' and 'grammar checked'
- All references mentioned in the Reference List are cited in the text, and vice versa
- Permission has been obtained for use of copyrighted material from other sources (including the Internet)
- A competing interests statement is provided, even if the authors have no competing interests to declare
- Journal policies detailed in this guide have been reviewed
- Referee suggestions and contact details provided, based on journal requirements

For further information, visit our Support Center.

BEFORE YOU BEGIN

Ethics in publishing
Please see our information pages on Ethics in publishing and Ethical guidelines for journal publication.

Declaration of interest
All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential conflicts of interest include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors should complete the declaration of interest statement using this template and upload to the submission system at the Attach/Upload Files step. If there are no interests to declare, please choose: 'Declarations of interest: none' in the template. This statement will be published within the article if accepted. More information.
If excerpts from other copyrighted works are included, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has preprinted forms for use by authors in these cases: contact Elsevier's Rights Department, Oxford, UK: phone (+44) 1865 843830, e-mail permissions@elsevier.com. Requests may also be completed online via the Elsevier homepage (https://www.elsevier.com/locate/permissions).

**Submission declaration and verification**
Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see 'Multiple, redundant or concurrent publication' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify originality, your article may be checked by the originality detection service Crossref Similarity Check.

**Use of inclusive language**
Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Articles should make no assumptions about the beliefs or commitments of any reader, should contain nothing which might imply that one individual is superior to another on the grounds of race, sex, culture or any other characteristic, and should use inclusive language throughout. Authors should ensure that writing is free from bias, for instance by using 'he or she', 'his/her' instead of 'he' or 'his', and by making use of job titles that are free of stereotyping (e.g. 'chairperson' instead of 'chairman' and 'flight attendant' instead of 'stewardess').

**Changes to authorship**
Authors are expected to consider carefully the list and order of authors before submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only before the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the corresponding author: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.

Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors after the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

**Copyright**
Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (see more information on this). An e-mail will be sent to the corresponding author confirming receipt of the manuscript together with a 'Journal Publishing Agreement' form or a link to the online version of this agreement.

Subscribers may reproduce tables of contents or prepare lists of articles including abstracts for internal circulation within their institutions. Permission of the Publisher is required for resale or distribution outside the institution and for all other derivative works, including compilations and translations. If excerpts from other copyrighted works are included, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has preprinted forms for use by authors in these cases.

For gold open access articles: Upon acceptance of an article, authors will be asked to complete an 'Exclusive License Agreement' (more information). Permitted third party reuse of gold open access articles is determined by the author's choice of user license.

**Author rights**
As an author you (or your employer or institution) have certain rights to reuse your work. More information.

Elsevier supports responsible sharing
Find out how you can share your research published in Elsevier journals.
Role of the funding source

You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement then this should be stated.

Funding body agreements and policies

Elsevier has established a number of agreements with funding bodies which allow authors to comply with their funder's open access policies. Some funding bodies will reimburse the author for the gold open access publication fee. Details of existing agreements are available online.

The gold open access publication fee for this journal is **USD 3300**, excluding taxes. Learn more about Elsevier's pricing policy: [https://www.elsevier.com/openaccesspricing](https://www.elsevier.com/openaccesspricing).

Green open access

Authors can share their research in a variety of different ways and Elsevier has a number of green open access options available. We recommend authors see our open access page for further information. Authors can also self-archive their manuscripts immediately and enable public access from their institution's repository after an embargo period. This is the version that has been accepted for publication and which typically includes author-incorporated changes suggested during submission, peer review and in editor-author communications. Embargo period: For subscription articles, an appropriate amount of time is needed for journals to deliver value to subscribing customers before an article becomes freely available to the public. This is the embargo period and it begins from the date the article is formally published online in its final and fully citable form. [Find out more.](https://www.elsevier.com/openaccess)

This journal has an embargo period of 24 months.

Author's Guidelines

Review

Quality is important. We aim to provide useful material to the ISA T readers. Accordingly, about 3 or 4 experts (at least one from academe and one from industry) review each submission to feedback balanced and comprehensive direction for manuscript improvement. The review process normally takes 2 to 4 months. To minimize bias, to achieve a double-blind review process, authors are asked to submit their names and affiliation on the separate cover letter.

Length

Include all necessary material; but only that which is necessary to define the need, develop the contribution, and defend the conclusion. Including figures and tables, manuscripts should be from 10 to 20 double-spaced letter-sized papers.

Format

Manuscripts should be typed in double spacing, single column in 12-point, conventional font. All pages should be numbered consecutively. Place tables and figures at the end. Once accepted, the publisher will format the final layout.

Language

The language of the journal is English. Manuscripts will be reader-friendly. Proficient English usage is essential.

Style

For review the manuscript should be organized in the following order: Title; abstract (less than about 125 words in length); keywords (3 to 5); main body of paper (divided into numbered sections and subsections); acknowledgement (where applicable); references; tables; figures; appendices (where applicable). An abbreviated title of less than 40 characters (including spaces) should also be suggested. (Authors' names and affiliations will be included once the manuscript has been accepted.) Organization is that of a standard scientific paper. See previous articles published in ISA Transactions as examples.
Layout

Title. Authors names, affiliation, and full contact information (on coversheet). Abstract - an explicit description of the contribution/impact of the manuscript of less than about 125-words. Keywords (less than about 5). Sections as appropriate, with a bold title, and numbered consecutively in base-10, real, Arabic numerals (1., 2., 3., etc.). Subsections, as appropriate, numbered sequentially (2.1, 2.2, 2.3, etc.). The Conclusion section will be the last numbered section. Acknowledgment (if appropriate). References. Tables numbered sequentially using Roman numerals (I, II, III, IV, etc.). Figures numbered sequentially using Arabic numerals (1., 2., 3., etc.). Appendices (if appropriate) identified with capital letters (A., B., C., etc.).

Content

Commercialism (any attempt to promote product, enterprise, country, or viewpoint) is strictly forbidden. Claims must be supported by evidence, and be consistent with any limits or idealizations of the development.

Submission

Authors must submit their manuscript via EVISE at https://ees.elsevier.com/isatrans. Authors will be asked to select the Associate Editor or Editor-in-Chief whose technical interests most nearly match the manuscript. When in doubt, use the Editor-in-Chief.

There are three essential elements to be submitted:

1) The manuscript must be a single file (including tables, figures, etc.), of less than 1 Meg, using either an Adobe-compatible portable document format or an MS Word *.doc (preferred). Submit the manuscript without the authors' names and affiliation (Blinded).

2) Submit a cover page/letter that includes the manuscript title, names and affiliation and contact information of all authors (full postal and e-mail addresses, phone and fax numbers). The cover letter could also reveal to the editor any special aspects of the manuscript or review process that should to be considered.

3) Submit Highlights, a bulleted list of 3 to 5 items indicating what was studied and the authors' claims about the work. This is a relatively new trend in scientific journals. Highlights is neither the Abstract, Conclusions, nor Key Words. An Abstract talks all about the paper, but usually does not provide the bottom-line results. The Abstract is a teaser that gets people to look at the article, hoping the article provides the solution they need. The Conclusion provides bottom-line results, but full paragraph text is not a user-convenient way to sort through manuscript applicability or contribution. And, often the Conclusion does not provide scope or grounding. The Keywords help in e-sorting, but do not convey applicability or results. Highlights will be a bulleted list of scope and results. It will be published with the article, and represents a trend in improving the functionality of search engines in the e-database to find articles that are relevant to the searcher's enquiry. To help understand, Elsevier has a link with a few examples of bad and good Highlights: https://www.elsevier.com/highlights. Highlights are not a copy of the conclusions, abstract, or keywords. It is not a forecast of future work. Reviewers for ISA Transactions will be expected to comment on the authors' Highlights as they have commented on all other parts of the paper that are integral to the published article.

Referees

Please submit the names and institutional e-mail addresses of several potential referees. For more details, visit our Support site. Note that the editor retains the sole right to decide whether or not the suggested reviewers are used.

PREPARATION

Peer review

This journal operates a double blind review process. All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. More information on types of peer review.
Double-blind review
This journal uses double-blind review, which means the identities of the authors are concealed from the reviewers, and vice versa. More information is available on our website. To facilitate this, please include the following separately:

Title page (with author details): This should include the title, authors' names, affiliations, acknowledgements and any Declaration of Interest statement, and a complete address for the corresponding author including an e-mail address.

Blinded manuscript (no author details): The main body of the paper (including the references, figures, tables and any acknowledgements) should not include any identifying information, such as the authors' names or affiliations.

Use of word processing software
It is important that the file be saved in the native format of the word processor used. The text should be in single-column format. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. In particular, do not use the word processor's options to justify text or to hyphenate words. However, do use bold face, italics, subscripts, superscripts etc. When preparing tables, if you are using a table grid, use only one grid for each individual table and not a grid for each row. If no grid is used, use tabs, not spaces, to align columns. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the Guide to Publishing with Elsevier). Note that source files of figures, tables and text graphics will be required whether or not you embed your figures in the text. See also the section on Electronic artwork.

To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

LaTeX
You are recommended to use the Elsevier article class elsarticle.cls to prepare your manuscript and BibTeX to generate your bibliography. Our LaTeX site has detailed submission instructions, templates and other information.

Article structure
Subdivision - numbered sections
Divide your article into clearly defined and numbered sections. Subsections should be numbered 1.1 (then 1.1.1, 1.1.2, ...), 1.2, etc. (the abstract is not included in section numbering). Use this numbering also for internal cross-referencing: do not just refer to 'the text'. Any subsection may be given a brief heading. Each heading should appear on its own separate line.

Introduction
State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

Material and methods
Provide sufficient details to allow the work to be reproduced by an independent researcher. Methods that are already published should be summarized, and indicated by a reference. If quoting directly from a previously published method, use quotation marks and also cite the source. Any modifications to existing methods should also be described.

Theory/calculation
A Theory section should extend, not repeat, the background to the article already dealt with in the Introduction and lay the foundation for further work. In contrast, a Calculation section represents a practical development from a theoretical basis.

Results
Results should be clear and concise.

Discussion
This should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

Conclusions
The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.
Appendices
If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

Essential title page information
- **Title.** Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.
- **Author names and affiliations.** Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. You can add your name between parentheses in your own script behind the English transliteration. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lowercase superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name and, if available, the e-mail address of each author.
- **Corresponding author.** Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. This responsibility includes answering any future queries about Methodology and Materials. **Ensure that the e-mail address is given and that contact details are kept up to date by the corresponding author.**
- **Present/permanent address.** If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

Highlights
Highlights are mandatory for this journal as they help increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the examples here: example Highlights.

Highlights should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point).

Abstract
Abstract - an explicit description of the contribution/impact of the manuscript of less than about 125-words. Sections as appropriate, with a bold title, and numbered consecutively in base-10, real, Arabic numerals (1., 2., 3., etc.). Subsections, as appropriate, numbered sequentially (2.1, 2.2, 2.3, etc.). The Conclusion section will be the last numbered section. Acknowledgment (if appropriate). References. Tables numbered sequentially using Roman numerals (I, II, III, IV, etc.). Figures numbered sequentially using Arabic numerals (1., 2., 3., etc.). Appendices (if appropriate) identified with capital letters (A., B., C., etc.).

Graphical abstract
Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view Example Graphical Abstracts on our information site. Authors can make use of Elsevier’s Illustration Services to ensure the best presentation of their images and in accordance with all technical requirements.

Keywords
Immediately after the abstract, provide a maximum of 6 keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, ‘and’, ‘of’). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.
Abbreviations
Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

Acknowledgements
Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

Formatting of funding sources
List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, please include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Units
All measurements and data should be given in SI units, or where other units are used, provide the SI value in parenthesis. Each paper should be self-consistent as to symbols and units, and all are to be properly defined.

Math formulae
Mathematical expressions - Mathematical symbols and formulae should be typed. Particular care should be exercised in identifying all symbols and in avoiding ambiguities. Distinction should be made between the number one (1) and the letter "ell" (l), and between the number zero (0) and the letter "oh" (O). Symbols for vectors and matrices should be marked clearly on the manuscript. Equation numbers should appear in parentheses, and numbered consecutively. All equation numbers must appear on the right-hand side of the equation and should be referred to within the text. Use the following sequence for nested parentheses: ) ] }.

Footnotes
Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors can build footnotes into the text, and this feature may be used. Otherwise, please indicate the position of footnotes in the text and list the footnotes themselves separately at the end of the article. Do not include footnotes in the Reference list.

Artwork
Illustrations
Photographs, charts and diagrams are to be referred to as Figures and should be numbered consecutively in Arabic numerals in the order in which they are first mentioned. They should follow the manuscript on separate pages (not imbedded within the manuscript). All illustrations should be clear and suitable for reduction (to 50% original size). Lettering must be clear and open and must also be large enough to be reduced by the same proportion. Figure legends should be typed on a separate sheet and placed in a list at the end of the manuscript. The amount of lettering on a drawing should be reduced as far as possible by transferring it to the legend. Format figures to emphasize the region of interest.

Electronic artwork
General points
- Make sure you use uniform lettering and sizing of your original artwork.
- Embed the used fonts if the application provides that option.
- Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
• Number the illustrations according to their sequence in the text.
• Use a logical naming convention for your artwork files.
• Provide captions to illustrations separately.
• Size the illustrations close to the desired dimensions of the published version.
• Submit each illustration as a separate file.
• Ensure that color images are accessible to all, including those with impaired color vision.

A detailed guide on electronic artwork is available.

You are urged to visit this site; some excerpts from the detailed information are given here.

Formats
If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply 'as is' in the native document format.

Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please 'Save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):

EPS (or PDF): Vector drawings, embed all used fonts.
TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 300 dpi.
TIFF (or JPEG): Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.
TIFF (or JPEG): Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.

Please do not:
• Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;
• Supply files that are too low in resolution;
• Submit graphics that are disproportionately large for the content.

Color artwork
Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF), or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in color in the printed version. For color reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article. Please indicate your preference for color: in print or online only. Further information on the preparation of electronic artwork.

Figure captions
Ensure that each illustration has a caption. Supply captions separately, not attached to the figure. A caption should comprise a brief title (not on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

Tables
Particular care is needed to ensure that tables are clearly and legibly set out. Tables should be numbered consecutively in Roman numerals in the order in which they are first mentioned. They should follow the manuscript on separate pages (not imbedded within the manuscript). If accepted, original electronic files or line drawings (not photocopies or scanned versions) should be submitted. Table titles should be typed on a separate sheet and placed in a list at the end of the manuscript. Only reveal significant figures.

References
Citation in text
Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

Web references
As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.
Data references
This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

References in a special issue
Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

Reference management software
Most Elsevier journals have their reference template available in many of the most popular reference management software products. These include all products that support Citation Style Language styles, such as Mendeley. Using citation plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal's style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide. If you use reference management software, please ensure that you remove all field codes before submitting the electronic manuscript. More information on how to remove field codes from different reference management software.

Users of Mendeley Desktop can easily install the reference style for this journal by clicking the following link: http://open.mendeley.com/use-citation-style/isa-transactions

When preparing your manuscript, you will then be able to select this style using the Mendeley plug-ins for Microsoft Word or LibreOffice.

Reference style
Text: Indicate references by number(s) in square brackets in line with the text. The actual authors can be referred to, but the reference number(s) must always be given.

List: Number the references (numbers in square brackets) in the list in the order in which they appear in the text.

Examples:
Reference to a journal publication:
Reference to a journal publication with an article number:
Reference to a book:
Reference to a chapter in an edited book:
Reference to a website:
Reference to a dataset:
Note shortened form for last page number. e.g., 51–9, and that for more than 6 authors the first 6 should be listed followed by 'et al.' For further details you are referred to 'Uniform Requirements for Manuscripts submitted to Biomedical Journals' (J Am Med Assoc 1997;277:927–34) (see also Samples of Formatted References).

Journal abbreviations source
Journal names should be abbreviated according to the List of Title Word Abbreviations.
**Video**

Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our [video instruction pages](https://www.elsevier.com/locate/isatrans). Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

**Supplementary material**

Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

**Research data**

This journal encourages and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings. To facilitate reproducibility and data reuse, this journal also encourages you to share your software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. If you are sharing data in one of these ways, you are encouraged to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the [research data page](https://www.elsevier.com/locate/isatrans).

**Data linking**

If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the [database linking page](https://www.elsevier.com/locate/isatrans).

For supported data repositories a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

**Mendeley Data**

This journal supports Mendeley Data, enabling you to deposit any research data (including raw and processed data, video, code, software, algorithms, protocols, and methods) associated with your manuscript in a free-to-use, open access repository. During the submission process, after uploading your manuscript, you will have the opportunity to upload your relevant datasets directly to Mendeley Data. The datasets will be listed and directly accessible to readers next to your published article online.
For more information, visit the Mendeley Data for journals page.

**Data statement**
To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the Data Statement page.

**AFTER ACCEPTANCE**

**Online proof correction**
Corresponding authors will receive an e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors.
If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors, including alternative methods to the online version and PDF.
We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

**Dissemination**
Quarterly paper publications of ISA Transactions have been sent to individual, corporate, and library subscribers worldwide. In 2012 we start bimonthly, 6 issues per year, publication. In addition, to maximize impact of the author’s contributions, content of each issue is searchable on the Internet and accessible to the general public from ScienceDirect. [http://www.sciencedirect.com/](http://www.sciencedirect.com/)

**Offprints**
The corresponding author will, at no cost, receive a customized Share Link providing 50 days free access to the final published version of the article on ScienceDirect. The Share Link can be used for sharing the article via any communication channel, including email and social media. For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication. Both corresponding and co-authors may order offprints at any time via Elsevier’s Author Services. Corresponding authors who have published their article gold open access do not receive a Share Link as their final published version of the article is available open access on ScienceDirect and can be shared through the article DOI link.

**AUTHOR INQUIRIES**
Visit the Elsevier Support Center to find the answers you need. Here you will find everything from Frequently Asked Questions to ways to get in touch.
You can also check the status of your submitted article or find out when your accepted article will be published.

© Copyright 2018 Elsevier | [https://www.elsevier.com](https://www.elsevier.com)