**DESCRIPTION**

*Energy* is an international, multi-disciplinary journal in **energy engineering** and research. The journal aims to be a leading peer-reviewed platform and an authoritative source of information for analyses, reviews and evaluations related to energy. The journal covers research in mechanical engineering and thermal sciences, with a strong focus on energy **analysis**, energy **modelling** and **prediction**, integrated energy systems, energy **planning** and energy **management**. The journal also welcomes papers on related topics such as energy conservation, energy efficiency, biomass and bioenergy, renewable energy, electricity supply and demand, energy storage, energy in buildings, and on economic and policy issues, provided such topics are within the context of the broader multi-disciplinary scope of *Energy*.

**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**

Energy researchers, planners, industrial energy users and producers.

**IMPACT FACTOR**

2018: 5.537 © Clarivate Analytics Journal Citation Reports 2019
ABSTRACTING AND INDEXING

Elsevier BIOBASE
Environmental Periodicals Bibliography
Science Citation Index
Current Contents
Research Alert
BIOSIS Citation Index
Cambridge Scientific Abstracts
Chemical Abstracts
Current Contents - Engineering, Technology & Applied Sciences
Engineering Index
INSPEC
Current Contents - Social & Behavioral Sciences
Scopus
Middle Eastern & Central Asian Studies
Engineered Materials Abstracts
Environmental Engineering Abstracts
Environmental Sciences & Pollution Management
Materials Business File
METADEX
Pollution Abstracts
Current Contents
Science Citation Index Expanded
Web of Science
Composites Industry Abstracts
Corrosion Abstracts
Earthquake Engineering Abstracts
GeoRef
British & Irish Archaeological Bibliography
Bibliography of Asian Studies
CAB International
Academic Search (EBSCO)
Computers & Applied Sciences Complete
Current Abstracts (EBSCO)
Energy & Power Source
Environment Complete
Environment Index
TOC Premier
Public Affairs Information Service Bulletin
Compendex
Engineering Information Database EnCompass LIT (Elsevier)
FLUIDEX
Engineering Village - GEOBASE
Wilson Applied Science and Technology Abstracts
OCLC Contents Alert
Advanced Polymers Abstracts
Aerospace & High Technology Database, Selective
ASFA2 – Ocean Technology, Policy and Non-Living Resources
Ceramic Abstracts
CSA Sustainability Science Abstracts (Cambridge Scientific Abstracts)
CSA Technology Research Database
CSA Mechanical & Transportation Engineering Abstracts (Cambridge Scientific Abstracts)
CSA Civil Engineering Abstracts
CSA Engineering Research Database (Cambridge Scientific Abstracts)
CSA High Technology Research Database with Aerospace (Cambridge Scientific Abstracts)
EDITORIAL BOARD

Editor-in-Chief
Henrik Lund, Department of Development and Planning, Aalborg University, Fibigerstræde 13, DK-9220 Aalborg, Denmark

Deputy Editors-in-Chief
Soteris Kalogirou, Cyprus University of Technology, Lemesos, Cyprus
Ruzhu Wang, Shanghai Jiao Tong University - Fahua Campus, Shanghai, China

Subject Editors
Gianfranco Chicco, Polytechnic of Turin, Torino, Italy
Neven Duić, University Hospital Centre Zagreb, Zagreb, Croatia
Paula Ferreira, University of Minho Department of Production and Systems, Guimarães, Portugal
Yunho Hwang, University of Maryland at College Park, Baltimore, Maryland, United States
Gregorio Iglesias, University of Plymouth, Plymouth, United Kingdom
Jiří Jaromír Klemeš, Brno University of Technology, Brno, Czech Republic
Lingai Luo, National Centre for Scientific Research, Paris, France
Giampaoalo Manfrida, University of Florence, Firenze, Italy
Silvia Azucena Nebra, Federal University of the ABC, SANTO ANDRE, Brazil
Abdul Ghani Olabi, University of Sharjah, Sharjah, United Arab Emirates
Xunmin Ou, Tsinghua University, Beijing, China
Krzysztof Ptasinski, University of Technology Eindhoven, Eindhoven, Netherlands
Isabel Soares, University of Porto, Porto, Portugal
Wojciech Stanek, Silesian University of Technology, Gliwice, Poland
Jesse Thé, University of Waterloo, Waterloo, Ontario, Canada
Petar S. Varbanov, Brno University of Technology, Brno, Czech Republic
Xiliang Zhang, Tsinghua University, Beijing, China

Term Ending 2019
Naim Hamdia Afgan, University of Lisbon, Lisboa, Portugal
Mohammad Ahmad Al-Nimr, Qatar University College of Engineering Department of Mechanical and Industrial Engineering, Doha, Qatar
Beng Wah Ang, National University of Singapore, Singapore, Singapore
Giorgio Besagni, Energy System Research, Milano, Italy
Shih-Hung Chan, Yuan Ze University, Zhongli, Taiwan
Silvio De Oliveira, Jr, University of Sao Paulo, São Paulo, Brazil
Daniel Favrat, Federal Polytechnic School of Lausanne, Lausanne, Switzerland
Simon Harvey, Chalmers University of Technology, Goteborg, Sweden
Sotirios Karellas, National Technical University Of Athens Laboratory of Steam Boilers and Thermal Plants, Zografou, Greece
Signe Kjelstrup, Norwegian University of Science and Technology, Trondheim, Norway
Zygmun Kolenda, AGH University of Science and Technology, Krakow, Poland
Reiner Kümmel, University of Würzburg, Würzburg, Germany
Qiang Liao, Chongqing University, College of Power Engineering, Chongqing, China
Tyrone Lin, National Dong Hwa University, Shoufeng, Taiwan
Noam Lior, University of Pennsylvania, Philadelphia, Pennsylvania, United States
Adel Mellit, Jijel University, Jijel, Algeria
Michael Moran, OHIO STATE UNIVERSITY, Columbus, Ohio, United States
Luis Serra, University of Zaragoza, Zaragoza, Spain
Vladimir Stevanovic, University of Belgrade, Belgrade, Serbia
Arnaldo Walter, State University of Campinas Mechanical Engineering Faculty, Sao Paulo, Brazil
Chi-Keung Woo, Hong Kong Institute of Education, New Territories, Hong Kong
Jinyue Yan, Royal Institute of Technology, Stockholm, Sweden

Term Ending 2020
Mariusz Adamski, Bialystok University of Technology, Bialystok, Poland
Linda Barelli, University of Perugia, Perugia, Italy
Robert Boehm, University of Nevada Las Vegas, Las Vegas, Nevada, United States
Maria de Graca Carvalho, University of Lisbon, Lisboa, Portugal
Christos Frangopoulos, National Technical University of Athens, Athens, Greece
Mejdji Jeguirim, University of Upper Alsace, Mulhouse, France
Mark Kaiser, Louisiana State University, Baton Rouge, Louisiana, United States
Natasa Markovska, Macedonian Academy of Sciences and Arts, Skopje, Macedonia, the former Yugoslav Republic of
Philippe Mathieu, Retired from the University of Liège, Belgium
Alberto Mirandola, University of Padua, Vicenza, Italy
Jyoti Parikh, Integrated Research and Action for Development, New Delhi, India
Roberto Schaeffer, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil
Enrico Sciubba, University of Rome La Sapienza, Roma, Italy
Ram Shrestha, Asian Institute of Technology Department of Energy Environment and Climate Change, Khlong Nueng, Thailand
Pascal Stouffs, University of Pau and Pays de l’Adour, Pau, France
George Tsatsaronis, Technical University of Berlin, Berlin, Germany
John Twidell, AMSET Centre, Market Harborough, United Kingdom
Peng Zhang, Shanghai Jiao Tong University - Fahua Campus, Shanghai, China
Xudong Zhao, University of Hull, Hull, United Kingdom

Term ending 2021
Mustafa Acaroğlu, Selçuk University, Konya, Turkey
Yuri Aristov, Boreskov Institute of Catalysis SB RAS, Novosibirsk, Russian Federation
Bin Chen, Beijing Normal University, Beijing, China
Brian Elmegaard, Technical University of Denmark, Kogens Lyngby, Denmark
José Goldemberg, University of Sao Paulo, São Paulo, Brazil
Jürgen-Friedrich Hake, Research Centre Jülich, Jülich, Germany
Xiaosong Hu, Chongqing University, Chongqing, China
Masaru Ishida, Tokyo Institute of Technology - Suzukakedai Campus, Yokohama, Japan
Hussam Jouhara, Brunel University London, Uxbridge, United Kingdom
Tahir Hikmet Karakoç, Eskisehir Technical University, Eskisehir, Turkey
Willett Kempton, University of Delaware, Newark, Delaware, United States
Venkat Krishnan, National Renewable Energy Laboratory, Golden, Colorado, United States
Omid Mahian, Xian Jiaotong University, Xian, China
Christos Markides, Imperial College London, London, United Kingdom
Alan Meier, E O Lawrence Berkeley National Laboratory, Berkeley, California, United States
Tatiana Morozyn, Technical University of Berlin, Berlin, Germany
Constantine D. Rakopoulos, National Technical University of Athens, Athens, Greece
Dimitrios Rakopoulos, Centre for Research and Technology-Hellas, Thermi, Greece
Julieza Schallenberg-Rodriguez, University of Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain
Claudia Sheinbaum-Pardo, Autonomous National University of Mexico Faculty of Engineering, Mexico City, Mexico
Gordana Stefanovic, University of Nis, Nis, Serbia
Sergio Ulgiati, University of Naples - Parthenope, Napoli, Italy
Vittorio Verda, Polytechnic of Turin, Torino, Italy
William Worek, Texas A&M University Kingsville Eagle Ford Center for Research and Outreach, Kingsville, Texas, United States
Ernst Worrell, Utrecht University, Utrecht, Netherlands
J. Xaman, National Center for Research and Technological Development Department of Mechanical Engineering, Cuernavaca, Morelos, Mexico
Na Zhang, Chinese Academy of Sciences, Beijing, China
Fengqi Zhou, Shanghai Academy of Social Sciences, Shanghai, China

Assistant Editors
Rafaela Agathokleous, Cyprus University of Technology, Lemesos, Cyprus
Pernille S. Andersen, Aalborg University, Aalborg, Denmark
Wei Li, Shanghai Jiao Tong University - Fahua Campus, Shanghai, China
Kenneth Hansen, Aalborg University, Aalborg, Denmark
Mette Reiche Sørensen, Aalborg University, Aalborg, Denmark

Book Review Panel
Mohammad Ahmad Al-Nimr
Soteris Kalogirou
Henrik Lund
Krzysztof Ptasinski
John Twidell
Ernst Worrell
GUIDE FOR AUTHORS

Your Paper Your Way
We now differentiate between the requirements for new and revised submissions. You may choose to submit your manuscript as a single Word or PDF file to be used in the refereeing process. Only when your paper is at the revision stage, will you be requested to put your paper in to a 'correct format' for acceptance and provide the items required for the publication of your article.
To find out more, please visit the Preparation section below.

INTRODUCTION

ENERGY - The International Journal is a broad multi-disciplinary journal in the field of energy engineering. The purpose of the journal is to be the premium publication in the area of energy and an important source of information aiming to raise the standards of discussions, analyses and evaluations related to energy science. The journal covers research within mechanical engineering such as Heat Transfer, Thermal science, Thermodynamics, and other related sciences with a strong focus on energy analysis as well as other broader issues such as Energy Modeling and Prediction, Integrated Energy Systems, Energy Planning and Energy Management. Moreover the journal welcomes papers on related issues such as Energy Conservation, Energy Efficiency, Biomass, Renewable Energy, Electricity supply/demand and storage, Energy in Buildings, Economy and Policy as long as such subjects are put into the context of the broader multi-disciplinary scope of ENERGY.

For more details, authors should consult the Subject Classifications here.

Types of paper
Energy considers the following types of articles for publication. Please select the appropriate 'Article Type' from the drop down menu in the online submission system.

Note: All text, tables, figures, and appendixes are counted for the word limits per guideline of each article type in below, but references, acknowledgements, or supplementary materials are not counted. Manuscripts exceeding word limits may be rejected before peer review.

Full Length Article: Full length articles (5000-7000 words) are original, high-quality, research papers presenting novel scientific findings.

Review: Reviews (7000-9000 words) are invited by the Editors. A Review is a state-of-the-art overview of a specific area or topic presenting a comprehensive review of the relevant research. Authors who wish to submit (or suggest) a Review should contact Prof. Soteris Kalogirou at soteris.kalogirou@cut.ac.cy and send an outline, a CV, a list of publications, plus names of potential reviewers.

Perspective Paper: Perspective paper (2000-4000 words) is shorter and more focused than a Review. Perspectives provide a critical status of past research, and highlight current research activities and challenges. In general, perspective papers are on invitation but we welcome the submission of short synopses for consideration. Should you wish to send a synopses for consideration, please reach out to Prof. Ruzhu Wang at rzwang@sjtu.edu.cn

Discussion: A short commentary (1000-3000 words) discussing an article previously published in Energy.

Book Review: Book reviews (800-1200 words) are normally produced by the journal's Book Review Panel. The Panel may consider submitted book reviews, and authors should first contact the Editor-in-Chief.

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.

Studies in humans and animals
If the work involves the use of human subjects, the author should ensure that the work described has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans. The manuscript should be in line with the Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals and aim for the inclusion of representative human populations (sex, age and ethnicity) as per those recommendations. The terms sex and gender should be used correctly.

Authors should include a statement in the manuscript that informed consent was obtained for experimentation with human subjects. The privacy rights of human subjects must always be observed.

All animal experiments should comply with the ARRIVE guidelines and should be carried out in accordance with the U.K. Animals (Scientific Procedures) Act, 1986 and associated guidelines, EU Directive 2010/63/EU for animal experiments, or the National Institutes of Health guide for the care and use of Laboratory animals (NIH Publications No. 8023, revised 1978) and the authors should clearly indicate in the manuscript that such guidelines have been followed. The sex of animals must be indicated, and where appropriate, the influence (or association) of sex on the results of the study.

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.

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.

Preprints
Please note that preprints can be shared anywhere at any time, in line with Elsevier's sharing policy.
Sharing your preprints e.g. on a preprint server will not count as prior publication (see 'Multiple,
redundant or concurrent publication' for more information).

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').

Author contributions
For transparency, we encourage authors to submit an author statement file outlining their individual
contributions to the paper using the relevant CRediT roles: Conceptualization; Data curation;
Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources;
Software; Supervision; Validation; Visualization; Roles/Writing - original draft; Writing - review &
editing. Authorship statements should be formatted with the names of authors first and CRediT role(s)
following. More details and an example

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.

Article transfer service
This journal is part of our Article Transfer Service. This means that if the Editor feels your article is
more suitable in one of our other participating journals, then you may be asked to consider transferring
the article to one of those. If you agree, your article will be transferred automatically on your behalf
with no need to reformat. Please note that your article will be reviewed again by the new journal.
More information.

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.

**Open access**
This journal offers authors a choice in publishing their research:

**Subscription**
- Articles are made available to subscribers as well as developing countries and patient groups through our universal access programs.
- No open access publication fee payable by authors.
- The Author is entitled to post the accepted manuscript in their institution's repository and make this public after an embargo period (known as green Open Access). The published journal article cannot be shared publicly, for example on ResearchGate or Academia.edu, to ensure the sustainability of peer-reviewed research in journal publications. The embargo period for this journal can be found below.

**Gold open access**
- Articles are freely available to both subscribers and the wider public with permitted reuse.
- A gold open access publication fee is payable by authors or on their behalf, e.g. by their research funder or institution.

Regardless of how you choose to publish your article, the journal will apply the same peer review criteria and acceptance standards.

For gold open access articles, permitted third party (re)use is defined by the following Creative Commons user licenses:

**Creative Commons Attribution (CC BY)**
Lets others distribute and copy the article, create extracts, abstracts, and other revised versions, adaptations or derivative works of or from an article (such as a translation), include in a collective work (such as an anthology), text or data mine the article, even for commercial purposes, as long as they credit the author(s), do not represent the author as endorsing their adaptation of the article, and do not modify the article in such a way as to damage the author's honor or reputation.

**Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)**
For non-commercial purposes, lets others distribute and copy the article, and to include in a collective work (such as an anthology), as long as they credit the author(s) and provided they do not alter or modify the article.

The gold open access publication fee for this journal is **USD 3200**, excluding taxes. Learn more about Elsevier's pricing policy: 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.

This journal has an embargo period of 24 months.

Elsevier Researcher Academy
Researcher Academy is a free e-learning platform designed to support early and mid-career researchers throughout their research journey. The "Learn" environment at Researcher Academy offers several interactive modules, webinars, downloadable guides and resources to guide you through the process of writing for research and going through peer review. Feel free to use these free resources to improve your submission and navigate the publication process with ease.

Language (usage and editing services)
Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the English Language Editing service available from Elsevier's Author Services.

Submission
Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by e-mail.

Submit your article
Please submit your article via http://ees.elsevier.com/egy/

Referees
Please submit, with the manuscript, the names, addresses and e-mail addresses of three potential referees. Note that the editor retains the sole right to decide whether or not the suggested reviewers are used.

The Editors first evaluate all manuscripts. Those rejected at this stage are insufficiently original, have serious scientific flaws, have poor grammar or English language, or are outside the Aims and Scope of the journal. Those that meet the minimum criteria are passed on to two subject matter experts for review. Referees advise the Editors, who are responsible for the final decision to accept or reject the article. Note: The Editor decision is final.

PREPARATION
All papers showing experiments must include a thorough formal experimental error analysis, including the errors in all measured variables and presented parameters, description of the instruments used, the way they are employed, calibration, etc. All papers using computational models must include a thorough formal error analysis, such as validation with respect to reality and overall calculation of the errors in all conservation and other principles used. In the case of numerical modeling, the error analysis may include discussion of such items as solution convergence, grid dependence, error of satisfaction of conservation laws, or others as appropriate for the problem and solution method.

The Editors strongly advise that all first time authors, BEFORE submitting their manuscript, ensure that they have consulted their professor and/or an experienced colleague about the text and structure of the manuscript. This can help speed up the review and publication, and reduce the chance that a manuscript is rejected or returned due to being incomplete or not prepared according to the standards of the Journal.

NEW SUBMISSIONS
Submission to this journal proceeds totally online and you will be guided stepwise through the creation and uploading of your files. The system automatically converts your files to a single PDF file, which is used in the peer-review process. As part of the Your Paper Your Way service, you may choose to submit your manuscript as a single file to be used in the refereeing process. This can be a PDF file or a Word document, in any format or layout that can be used by referees to evaluate your manuscript. It should contain high enough quality
figures for refereeing. If you prefer to do so, you may still provide all or some of the source files at the initial submission. Please note that individual figure files larger than 10 MB must be uploaded separately.

References
There are no strict requirements on reference formatting at submission. References can be in any style or format as long as the style is consistent. Where applicable, author(s) name(s), journal title/book title, chapter title/article title, year of publication, volume number/book chapter and the article number or pagination must be present. Use of DOI is highly encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct.

Formatting requirements
There are no strict formatting requirements but all manuscripts must contain the essential elements needed to convey your manuscript, for example Abstract, Keywords, Introduction, Materials and Methods, Results, Conclusions, Artwork and Tables with Captions.
If your article includes any Videos and/or other Supplementary material, this should be included in your initial submission for peer review purposes.
Divide the article into clearly defined sections.

Figures and tables embedded in text
Please ensure the figures and the tables included in the single file are placed next to the relevant text in the manuscript, rather than at the bottom or the top of the file. The corresponding caption should be placed directly below the figure or table.

Peer review
This journal operates a single 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.

REVISED SUBMISSIONS
Use of word processing software
Regardless of the file format of the original submission, at revision you must provide us with an editable file of the entire article. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the Guide to Publishing with Elsevier). 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.

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**

A concise and factual abstract is required. The abstract should state briefly the purpose of the research, the principal results and major conclusions, and should not exceed 200 words. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

**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.).

**Data Availability**

Authors are encouraged to include a 'Data Availability' section in their manuscript which is visible in ALL reading formats and may refer to data hosted in ANY repository. It should be placed before the references to provide readers with information about where they can obtain the research data required to reproduce the work reported in the manuscript, and typically consists of a simple sentence giving the URL(s) of and citation(s) to the dataset(s). Full information can be found here.

**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, yyyyy]; 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.

Math formulae
Please submit math equations as editable text and not as images. Present simple formulae in line with normal text where possible and use the solidus (/) instead of a horizontal line for small fractional terms, e.g., X/Y. In principle, variables are to be presented in italics. Powers of e are often more conveniently denoted by exp. Number consecutively any equations that have to be displayed separately from the text (if referred to explicitly in the text).

Footnotes
Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors build footnotes into the text, and this feature may be used. Should this not be the case, indicate the position of footnotes in the text and present the footnotes themselves separately at the end of the article.

Artwork
Electronic artwork
General points
- Make sure you use uniform lettering and sizing of your original artwork.
- Preferred fonts: Arial (or Helvetica), Times New Roman (or Times), Symbol, Courier.
- Number the illustrations according to their sequence in the text.
- Use a logical naming convention for your artwork files.
- Indicate per figure if it is a single, 1.5 or 2-column fitting image.
- For Word submissions only, you may still provide figures and their captions, and tables within a single file at the revision stage.
- Please note that individual figure files larger than 10 MB must be provided in separate source files.

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
Regardless of the application used, 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 the font or save the text as 'graphics'.
- TIFF (or JPEG): Color or grayscale photographs (halftones): always use a minimum of 300 dpi.
- TIFF (or JPEG): Bitmapped line drawings: use a minimum of 1000 dpi.
- TIFF (or JPEG): Combinations bitmapped line/halftone (color or grayscale): a minimum of 500 dpi is required.

Please do not:
- Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); the resolution is too low.
- 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. 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.

Text graphics
Text graphics may be embedded in the text at the appropriate position. See further under Electronic artwork.
Tables
Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

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

Reference formatting
There are no strict requirements on reference formatting at submission. References can be in any style or format as long as the style is consistent. Where applicable, author(s) name(s), journal title/book title, chapter title/article title, year of publication, volume number/book chapter and the article number or pagination must be present. Use of DOI is highly encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct. If you do wish to format the references yourself they should be arranged according to the following examples:

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).

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. 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.

Data visualization

Include interactive data visualizations in your publication and let your readers interact and engage more closely with your research. Follow the instructions here to find out about available data visualization options and how to include them with your article.

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.

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.

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.

To maximise the visibility of your data, authors are invited to add a citation to their datasets by including a data reference in their Reference List as per the 'Data References' instructions elsewhere on this page.

Data in Brief
You have the option of converting any or all parts of your supplementary or additional raw data into one or multiple data articles, a new kind of article that houses and describes your data. Data articles ensure that your data is actively reviewed, curated, formatted, indexed, given a DOI and publicly available to all upon publication. You are encouraged to submit your article for Data in Brief as an additional item directly alongside the revised version of your manuscript. If your research article is accepted, your data article will automatically be transferred over to Data in Brief where it will be editorially reviewed and published in the open access data journal, Data in Brief. Please note an open access fee of 600 USD is payable for publication in Data in Brief. Full details can be found on the Data in Brief website. Please use this template to write your Data in Brief.

MethodsX
You have the option of converting relevant protocols and methods into one or multiple MethodsX articles, a new kind of article that describes the details of customized research methods. Many researchers spend a significant amount of time on developing methods to fit their specific needs or setting, but often without getting credit for this part of their work. MethodsX, an open access journal, now publishes this information in order to make it searchable, peer reviewed, citable and reproducible. Authors are encouraged to submit their MethodsX article as an additional item directly alongside the revised version of their manuscript. If your research article is accepted, your methods article will automatically be transferred over to MethodsX where it will be editorially reviewed. Please note an open access fee is payable for publication in MethodsX. Full details can be found on the MethodsX website. Please use this template to prepare your MethodsX article.
**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.

**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