DESCRIPTION

Computational Statistics and Data Analysis (CSDA), an Official Publication of the network Computational and Methodological Statistics (CMStatistics) and of the International Association for Statistical Computing (IASC), is an international journal dedicated to the dissemination of methodological research and applications in the areas of computational statistics and data analysis. The journal consists of four refereed sections which are divided into the following subject areas:

I) Computational Statistics - Manuscripts dealing with: 1) the explicit impact of computers on statistical methodology (e.g., Bayesian computing, bioinformatics, computer graphics, computer intensive inferential methods, data exploration, data mining, expert systems, heuristics, knowledge based systems, machine learning, neural networks, numerical and optimization methods, parallel computing, statistical databases, statistical systems), and 2) the development, evaluation and validation of statistical software and algorithms. Software and algorithms can be submitted with manuscripts and will be stored together with the online article.

II) Statistical Methodology for Data Analysis - Manuscripts dealing with novel and original data analytical strategies and methodologies applied in biostatistics (design and analytic methods for clinical trials, epidemiological studies, statistical genetics, or genetic/environmental interactions), chemometrics, classification, data exploration, density estimation, design of experiments, environmetrics, education, image analysis, marketing, model free data exploration, pattern recognition, psychometrics, statistical physics, image processing, robust procedures.

Statistical methodology includes, but not limited to: bootstrapping, classification techniques, clinical trials, data exploration, density estimation, design of experiments, pattern recognition/image analysis, parametric and nonparametric methods, statistical genetics, Bayesian modeling, outlier detection, robust procedures, cross-validation, functional data, fuzzy statistical analysis, mixture models, model selection and assessment, nonlinear models, partial least squares, latent variable models, structural equation models, supervised learning, signal extraction and filtering, time-series modelling, longitudinal analysis, multilevel analysis and quality control.

III) Special Applications - Manuscripts at the interface of statistics and computing (e.g., comparison of statistical methodologies, computer-assisted instruction for statistics, simulation experiments). Advanced statistical analysis with real applications (social sciences, marketing, psychometrics, chemometrics, signal processing, medical statistics, environmetrics, statistical physics).
IV) **Annals of Statistical Data Science** - The manuscripts concern with well-founded theoretical and applied data-driven research, with a significant computational or statistical methodological component for data analytics. Emphasis is given to comprehensive and reproducible research, including data-driven methodology, algorithms and software.

**AUDIENCE**

Statisticians (university, government, business, industry), Statistical Software users.

**IMPACT FACTOR**

2020: 1.681 © Clarivate Analytics Journal Citation Reports 2021

**ABSTRACTING AND INDEXING**

ACM Computing Reviews
Engineering Index
Current Index to Statistics
Mathematical Reviews
Statistical Theory and Method Abstracts
INSPEC
QCAS
OR/MS
CompuMath Citation Index
Research Alert
Science Citation Index Expanded
Zentralblatt MATH
Science Citation Index
Scopus

**EDITORIAL BOARD**

*Co-Editors*
Ana Maria Colubi, University of Giessen, 35390, Gießen, Germany
Erricos Kontoghiorghes, Birkbeck University of London, WC1E 7HX, London, United Kingdom and Cyprus University of Technology, Malet Street, 3036, Lemesos, Cyprus
Byeong Park, Seoul National University Department of Statistics, 1 Gwanak-ro, Gwanak-gu, 08826, Seoul, South Korea

*Advisory Board*
Peter Bühlmann, ETH Zurich, Zurich, Switzerland
Statistics, machine learning, computational biology
Manfred Gilli, University of Geneva, Geneva, Switzerland
Numerical Methods with Applications to Statistics and Econometric; Algorithms for Statistical Model Selection Techniques; Heuristic Optimization Methods in Statistics; and High Performance Computing
Jae Chang Lee, Korea University Department of Statistics, Seongbuk-gu, South Korea
Nonparametric change point problems, multivariate categorical analysis, data matching and classification tree methods
Joyce Niland, City of Hope, Duarte, California, United States of America
(Managing Co-Editor - IASC News)
Stephen Pollock, Queen Mary University of London, London, United Kingdom
Statistical analysis in the frequency domain, filtering methods, wavelets, econometric methods, time series analysis, functional analysis
Jane-Ling Wang, University of California Davis, Davis, California, United States of America
Dimension reduction methods, Functional data analysis, Longitudinal data analysis, Survival analysis, Joint modeling of survival/longitudinal data and neuroimaging data
Associate Editors

Andreas Anastasiou, University of Cyprus Department of Mathematics and Statistics, Lefkosia, Cyprus
Change-point detection, Stein's method, maximum likelihood estimation, distributional approximations

Andreas Artemiou, Cardiff University School of Mathematics, Cardiff, United Kingdom
Dimension Reduction, High-dimensional Statistics, Kernel methods, Machine Learning, Regression, Classification,

Eric Beutner, VU Amsterdam, Amsterdam, Netherlands
Dependent data, Differentiability in statistics, Empirical processes, Non- and semi-parametric methods in reliability/survival analysis, Statistical functionals

Enea Bongiorno, University of Eastern Piedmont, Vercelli, Italy
Small Ball Probability, Functional Statistics, High dimensional data

Antonio Canale, University of Padua, Padova, Italy
Bayesian computation, Bayesian inference, Bayesian nonparametrics, mixture models, skew distributions

Eva Cantoni, University of Geneva, Geneva, Switzerland
Robust statistics, generalized linear and additive (mixed) models, zero-inflated and zero-altered models, variable / model selection

Stefano Castruccio, University of Notre Dame, Notre Dame, Indiana, United States of America
Spatio-temporal statistics, environmental statistics, global models, spectral methods, time series, climate model emulation

Ray-bin Chen, National Cheng Kung University, Tainan, Taiwan
Experimental design, computer experiment, machine learning, Bayesian variable selection

Taeryon Choi, Korea University Department of Statistics, Seongbuk-gu, South Korea
Bayesian methods, Bayesian hierarchical models, Bayesian model selection, Bayesian nonparametric inference, Non/Semiparametric regression models

Bertrand Clarke, University of Nebraska-Lincoln, Lincoln, Nebraska, United States of America
Data mining and machine learning, prediction, statistical techniques for complex or high-dimensional data, model bias and uncertainty

Radu Craiu, University of Toronto, Toronto, Ontario, Canada
Bayesian inference, Copula modelling, Markov chain Monte Carlo, Model choice, Statistical Genetics

Christophe Croux, EDHEC Business School, Roubaix, France
Data science in business and economics, Time series analysis, Outlier Detection

Fabrizio Durante, University of Salento, Lecce, Italy
Dependence Models, Copulas, Multivariate Analysis

Takeshi Emura, Kurume University, Kurume, Japan
Copulas, Cox regression, Dependent censoring/truncation, Double-truncation, Dynamic prediction, Meta-analysis, Multivariate survival analysis, High-dimensional data analysis, Joint models, Survival prediction

Maria Brigida Ferraro, University of Rome La Sapienza, Roma, Italy
Clustering and Classification, Imprecise Data, Bootstrap

Frédéric Ferraty, Paul Sabatier University, Toulouse, France
Functional data analysis, high dimensional data, non/semi-parametric modelling, model selection, theory and practice

Cristian Gatu, Alexandru Ioan Cuza University, Iasi, Romania
Algorithms for model selection, Combinatorial Algorithms, Parallel Computing

Armelle Guillou, University of Strasbourg, Strasbourg, France
Bootstrap methods, extreme value, censoring

Michele Guindani, University of California Irvine, Irvine, California, United States of America
Bayesian Analysis, Bayesian Nonparametrics, Biostatistics, Statistical decision making, multiple hypotheses testing

Xuming He, University of Michigan, Ann Arbor, Michigan, United States of America
Robust statistics, quantile regression, subgroup analysis, model selection

Daniel Henderson, Newcastle University, Newcastle Upon Tyne, United Kingdom
Bayesian inference and computation, Rank ordered data, Mixture models, computer models, Model selection, General applications including sports analytics

Salvatore Ingrassia, University of Catania, Catania, Italy
Model-based clustering, Mixture Models, Computational Statistics, Classification and Discrimination

Ci-Ren Jiang, Institute of Statistical Sciences Academia Sinica, Taipei, Taiwan
Classification, Dimension Reduction, Functional Data Analysis, Longitudinal Data Analysis, Nonparametric Regression, Smoothing

Mikyoung Jun, University of Houston Department of Mathematics, Houston, Texas, United States of America
Spatial and spatio-temporal covariance models on spheres, statistical application to climate and environmental problems, computational methods for big data, numerical (computer) model validation

Sungkyu Jung, Seoul National University Department of Statistics, Seoul, South Korea
Multivariate statistics, Non-Euclidean data, Shape analysis

Sangwook Kang, Yonsei University, Seoul, South Korea
Survival analysis

Yongdai Kim, Seoul National University Department of Statistics, Seoul, South Korea
Machine learning/ Data Mining, Survival analysis, Bootstrap, Bayesian methods and MCMC algorithms and E-M algorithm.

Claudia Kirch, Otto von Guericke University, Magdeburg, Germany
Change point analysis and data segmentation, time series analysis, resampling methods, nonparametric statistics, functional data analysis

Ivan Kojadinovic, University of Pau and Pays de l’Adour, Pau, France
Copulas, Change-point detection, Resampling techniques, Empirical processes, Non-parametric multivariate analysis, Environmental and financial applications

Frank Konietschke, Charite University Hospital Berlin, Berlin, Germany
Ranking Procedures in Factorial Designs, Nonparametric Statistics, Resampling and Permutation Methods

Jae-Won Lee, Korea University, Seoul, South Korea
Genomical statistics, bioinformatics, clinical trials, forensic science

Seokho Lee, Hankuk University of Foreign Studies Department of Statistics, Yongin, South Korea
Multivariate analysis, classification and clustering, dimension reduction, statistical learning

Young Kyung Lee, Kangwon National University - Samcheok Campus, Samcheok, South Korea
Curve estimation, Functional data analysis, Statistical computing

Chenlei Leng, University of Warwick, Coventry, United Kingdom
Statistics of networks, high-dimensional statistics, model selection

Weiming Li, Shanghai University of Finance and Economics, School of Statistics and Management, Shanghai, China
Random Matrix Theory and High-dimensional Statistical Inference

Chae Young Lim, Seoul National University Department of Statistics, Seoul, South Korea
Spatial Statistics, Spatial Epidemiology, Biomedical Engineering Analysis, Environmental Statistics, Spectral Analysis, Fixed domain asymptotics

Tsung-I Lin, National Chung Hsing University, Taichung, Taiwan
Multivariate mixed models, missing data using non-normal distributions, robust factor analysis

Chun-ling, Catherine Liu, The Hong Kong Polytechnic University, Hong Kong, Hong Kong
Biomedical studies and related issues; Incomplete data analysis; Longitudinal/multivariate data analysis; Functional data analysis; Non- and semi-parametric statistics; Survival analysis.

Xavier de Luna, Umea University, Umeå, Sweden
Causal inference, Causal discovery and causal machine learning, Covariate selection and dimension reduction, Large-scale observational studies

Shujie Ma, University of California Riverside, Riverside, California, United States of America
High-dimensional data analysis, Tensor data analysis, Machine learning, Semiparametric and nonparametric statistics, Dimension reduction

Taps Maiti, Michigan State University, East Lansing, Michigan, United States of America
Statistical Learning with high-dimensional spatio-temporal data, Machine Learning with small training data, Statistically efficient Computational modeling.

Matthieu Marbac, National School of Statistics and Information Analysis, Bruz, France
Biostatistics, Clustering and classification, Empirical Likelihood, Mixture models

M. Dolores Martinez-Miranda, University of Granada, Granada, Spain
Nonparametric and semiparametric estimation, Bandwidth selection, Structured models, Random effects, Statistics in actuarial science

Geoffrey McLachlan, University of Queensland, Brisbane, Queensland, Australia
Supervised and unsupervised classification; finite mixture models; skew distributions

Martina Mittlböck, Medical University of Vienna, Vienna, Austria
Clinical trials, explained variation, survival analysis, meta analysis

Domingo Morales, Miguel Hernandez University of Elche, Elche, Alicante, Spain
Small Area Estimation, Statistical Information Theory, Simulation and Resampling Methods, Survey Sampling, Asymptotic Statistics, Statistical Models

Hans-Georg Mueller, University of California Davis, Davis, California, United States of America
Functional data, longitudinal data

Hidetoshi Murakami, Tokyo University of Science Faculty of Science Division I Graduate School of Science Department of Applied Mathematics, Tokyo, Japan
Nonparametric Statistics, Nonparametric Multivariate Analysis, Saddlepoint Approximation

Kalliopi Mylona, King's College London Department of Mathematics, London, United Kingdom
Design of experiments, Analysis of experimental data

Bernardo Nipoti, The University of Dublin Trinity College, Dublin, Ireland
Bayesian nonparametrics, Bayesian survival analysis, Mixture models, Species sampling.

Hernando Ombao, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia
Time series, spectral analysis, functional data analysis, longitudinal data analysis, imaging, statistical learning, applications to neuroimaging and brain science.

Cheolwoo Park, University of Georgia, Athens, Georgia, United States of America
Multiscale analysis, Nonparametric function estimation, Statistical learning

Taesung Park, Seoul National University Department of Statistics, Seoul, South Korea
Bioinformatics, gene-gene interaction, genome-wide association studies, microarray data analysis, longitudinal data analysis, next-generation sequencing data analysis, statistical genetics.

Heng Peng, Hong Kong Baptist University, Hong Kong, Hong Kong
Nonparametric Regression, Model Selection, High dimensional modeling, Robust methods, Statistical Learning

François Portier, Telecom Paris, Paris, France
Monte Carlo methods, semiparametric inference, nonparametric estimation

Igor Pruenster, Bocconi University Department of Decision Sciences, Milano, Italy
Bayesian asymptotics, Bayesian inference, Bayesian nonparametrics, Bayesian survival analysis, distribution theory, mixture models, predictive inference, random measures, species sampling

Juan Romo, University Carlos III of Madrid, Madrid, Spain
Functional Data Analysis, Robust Statistics, Time Series, Resampling Methods

Elvezio Ronchetti, University of Geneva, Geneva, Switzerland
Robust statistics, Small sample asymptotics, saddlepoint methods, empirical likelihood, Estimation and inference in latent variable models.

F. Javier Rubio, King's College London, London, United Kingdom
Bayesian Statistics, Model Selection, Survival Models, Models for Longitudinal Data, Flexible parametric distributions, Biostatistics

Anne Ruiz-Gazen, Toulouse School of Economics, Toulouse, France
Computational statistics, Covariance estimation, Outlier detection, Robust statistics, Survey sampling

Sylvain Sardi, University of Geneva, Geneva, Switzerland
Machine learning, sparsity, regularization

Alexandra M. Schmidt, McGill University, Montreal, Quebec, Canada
Bayesian inference, Dynamic models, Hierarchical models and Spatial Statistics

Michael Schweinberger, University of Missouri, Department of Statistics, Missouri, Colombia
Statistical learning from dependent data, statistical learning with graphs, including graphs representing network data (random graph models), graphs representing model structure (e.g., conditional independence structure, graphical models), and graphs representing mathematical and computational operations (e.g., neural networks)

Xin-Yuan Song, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong

Jianguo Sun, University of Missouri, Columbia, Missouri, United States of America
Longitudinal data analysis, panel data analysis, survival analysis

Chih-Li Sung, Michigan State University Department of Statistics and Probability, East Lansing, Michigan, United States of America
Computer experiment, Uncertainty quantification, Machine learning, Gaussian process, Applications of statistics in engineering

Cheng Yong Tang, Temple University, Philadelphia, Pennsylvania, United States of America
Empirical likelihood, financial statistics, longitudinal and dependent data analysis, model and variable selection

Tim Verdonck, KU Leuven, Leuven, Belgium
Robust statistics, High-dimensional data analysis, Actuarial models, Fraud detection

Stanislav Volgushev, University of Toronto, Toronto, Ontario, Canada
Quantile regression, Copulas, Empirical process theory and Bootstrap

Roy Welsch, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States of America
USA Data Science with applications in finance, biology and imaging

Peter Winker, University of Giessen, Gießen, Germany
Time series modeling, forecasting, model selection, optimization heuristics in statistics and econometrics

Yingcun Xia, University of Electronic Science and Technology of China, Chengdu, Sichuan, China
Time series analysis, Nonparametric Smoothing, Nonlinear Dimension Reduction

Liming Xiang, Nanyang Technological University, Singapore, Singapore
Clustered/longitudinal data analysis, Survival analysis including multivariate survival data analysis and cure models, Statistical diagnostics, Mixture models.

Kam Yuen, The University of Hong Kong, Pok Fu Lam, Hong Kong
Applications of computational methods to actuarial science, insurance risk modeling, investment risk analysis, survival analysis, goodness-of-fit test for semiparametric models via resampling methods

Ping-Shou Zhong, Michigan State University, East Lansing, Michigan, United States of America
Statistical inference for high dimensional data, empirical likelihood methods, nonparametric smoothing methods, statistical analysis for longitudinal and functional data, missing values and change point problems

Lixing Zhu, Hong Kong Baptist University, Hong Kong, Hong Kong
Multivariate Data analysis, Dimension-reduction and variable selection, Monte Carlo methods in statistical inference, Non- and Semi-parametric regression analysis

Editorial Assistant
Elena Fernandez, University of Oviedo, Oviedo, Spain

Publisher
Darren Sugrue

Founding Editor
Stanley Azen, University of Southern California, Los Angeles, California, United States of America
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.

Scope of the journal
The focus of the papers submitted to CSDA must include either a computational or data analysis component. Papers, which are purely theoretical are not appropriate for CSDA, and will be returned to the authors. Whenever appropriate the manuscript should present an illustrative example of application.

Manuscripts describing simulation studies must a) be thorough with regard to the choice of parameter settings, b) not over-generalize the conclusions, c) carefully describe the limitations of the simulations studies, and d) should guide the user regarding when the recommended methods are appropriate. In addition, it is recommended that the author(s) indicate why comparisons cannot be made theoretically and why therefore simulations are necessary.

Papers reporting results based on computations should provide enough information so that readers can evaluate the quality of the results, as well as descriptions of pseudo-random-number generators, numerical algorithms, computer(s), programming language(s), and major software components that were used.

Types of paper
In addition to research papers and short communications, the journal welcomes review papers and book reviews.

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 on Ethics in publishing.

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 competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double anonymized) or the manuscript file (if single anonymized). If there are no interests to declare then please state this: ‘Declarations of interest: none’. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal’s official records. It is important for potential interests to be declared in both places and that the information matches. 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. Content should make no assumptions about the beliefs or commitments of any reader; contain nothing which might imply that one individual is superior to another on the grounds of age, gender, race, ethnicity, culture, sexual orientation, disability or health condition; and use inclusive language throughout. Authors should ensure that writing is free from bias, stereotypes, slang, reference to dominant culture and/or cultural assumptions. We advise to seek gender neutrality by using plural nouns ("clinicians, patients/clients") as default/wherever possible to avoid using "he, she," or "he/she." We recommend avoiding the use of descriptors that refer to personal attributes such as age, gender, race, ethnicity, culture, sexual orientation, disability or health condition unless they are relevant and valid. When coding terminology is used, we recommend to avoid offensive or exclusionary terms such as "master", "slave", "blacklist" and "whitelist". We suggest using alternatives that are more appropriate and (self-) explanatory such as "primary", "secondary", "blocklist" and "allowlist". These guidelines are meant as a point of reference to help identify appropriate language but are by no means exhaustive or definitive.

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 a '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 it is recommended to state this.

Access Policy
Elsevier journals comply with current NIH public access policy.

Open access
Please visit our Open Access page for more information.

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 Services
Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who require information about language editing and copyediting services pre- and post-submission please visit https://www.elsevier.com/languagepolishing or our customer support site at service.elsevier.com for more information. Please note Elsevier neither endorses nor takes responsibility for any products, goods or services offered by outside vendors through our services or in any advertising. For more information please refer to our Terms & Conditions: https://www.elsevier.com/termsandconditions.

Please ask a native English speaker to comment and/or correct the language in your article before you submit it to the journal.

Suggesting reviewers
Please submit the names and institutional e-mail addresses of several potential reviewers.

You should not suggest reviewers who are colleagues, or who have co-authored or collaborated with you during the last three years. Editors do not invite reviewers who have potential competing interests with the authors. Further, in order to provide a broad and balanced assessment of the work, and ensure scientific rigor, please suggest diverse candidate reviewers who are located in different countries/
regions from the author group. Also consider other diversity attributes e.g. gender, race and ethnicity, career stage, etc. Finally, you should not include existing members of the journal's editorial team, of whom the journal are already aware.

Note: the editor decides whether or not to invite your suggested reviewers.

**Additional Information**
For the name and specializations of the Associate Editors, please refer to the list of editors in each issue of the journal or on the journal's homepage.

**PREPARATION**

**Queries**
For questions about the editorial process (including the status of manuscripts under review) or for technical support on submissions, please visit our Support Center.

**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.

Please note that the instructions related to the Abstract, Highlights, and Keywords still apply to all new submissions.

**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 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.

**Peer review**
This journal operates a single anonymized 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. Editors are not involved in decisions about papers which they have written themselves or have been written by family members or colleagues or which relate to products or services in which the editor has an interest. Any such submission is subject to all of the journal's usual procedures, with peer review handled independently of the relevant editor and their research groups. 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.

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 lower-case 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 optional yet highly encouraged for this journal, as they 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. 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.

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.
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.

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 JPG): Color or grayscale photographs (halftones): always use a minimum of 300 dpi.
TIFF (or JPG): Bitmapped line drawings: use a minimum of 1000 dpi.
TIFF (or JPG): Combinations bitmapped line/half-tone (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.

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.

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.

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:

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.

**Inline supplementary computer code**

Elsevier now offers you the possibility to place supplementary computer code, data snippets, algorithms and other machine readable structures at the right place in your online article in reusable .txt format. This will allow readers to easily view this material in the appropriate context, and to directly copy it to the clipboard or download the original source file for testing or re-use. If you would like to have reusable "computer code" inserted into the body of your online article please indicate in your manuscript where they should be placed and number them in order of appearance, e.g. "Insert Inline Supplementary Computer Code 1 here". To support discoverability and reusability please submit these items in *\.txt format and make sure to include a descriptive title and caption that references the characteristics and the appropriate environment of this material, e.g. 'An algorithm for filtering text files in R'. For more information please visit [https://www.elsevier.com/ism](https://www.elsevier.com/ism).

**Code and data deposit to RunMyCode.org**

You can enrich your online article by uploading relevant computer code and data to the RunMyCode repository. Once published, your article on ScienceDirect will be linked to a dedicated RunMyCode companion website via the "Data for this article" application displayed next to the article, in the right hand side panel. This linkage will allow readers to access your code and data via the RunMyCode companion website. To create a companion website, please go to: [http://www.runmycode.org/home](http://www.runmycode.org/home).

**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/ism).

**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/ism).

For [supported data repositories](https://www.elsevier.com/ism) 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 in Brief**
You have the option of converting any or all parts of your supplementary or additional raw data into a data article published in Data in Brief. A data article is a new kind of article that ensures that your data are actively reviewed, curated, formatted, indexed, given a DOI and made publicly available to all upon publication (watch this video describing the benefits of publishing your data in Data in Brief). You are encouraged to submit your data 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, published open access and linked to your research article on ScienceDirect. Please note an open access fee 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 data article.

**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**

**Proofs**
One set of page proofs (as PDF files) will be sent by e-mail to the corresponding author (if we do not have an e-mail address then paper proofs will be sent by post) or a link will be provided in the e-mail so that authors can download the files themselves. To ensure a fast publication process of the article, we kindly ask authors to provide us with their proof corrections within two days. Elsevier now provides authors with PDF proofs which can be annotated; for this you will need to download the free Adobe Reader, version 9 (or higher). Instructions on how to annotate PDF files will accompany the proofs (also given online). The exact system requirements are given at the Adobe site. If you do not wish to use the PDF annotations function, you may list the corrections (including replies to the Query Form) and return them to Elsevier in an e-mail. Please list your corrections quoting line number. If, for any reason, this is not possible, then mark the corrections and any other comments (including replies to the Query Form) on a printout of your proof and scan the pages and return via e-mail. 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. We will do everything possible to get your article published quickly and accurately. 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 Benefits**
No page charges. Publishing in Computational Statistics and Data Analysis is free. Discount. Contributors to Elsevier journals are entitled to a 30% discount on all Elsevier books. Science Direct. The published article will be available via Science Direct.

**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