DESCRIPTION

Biosensors & Bioelectronics has an open access mirror journal Biosensors & Bioelectronics: X, sharing the same aims and scope, editorial team, submission system and rigorous peer review.

Biosensors are defined as analytical devices incorporating a biological material, a biologically derived material or a biomimic intimately associated with or integrated within a physicochemical transducer or transducing microsystem, which may be optical, electrochemical, thermometric, piezoelectric, magnetic or micromechanical (Turner et al., 1987; Turner, 1989). Biosensors & Bioelectronics is the principal international journal devoted to research, development and application of biosensors and bioelectronics. It is an interdisciplinary journal serving professionals with an interest in the exploitation of biological materials and designs in novel diagnostic and electronic devices including sensors, DNA chips, electronic noses, lab-on-a-chip and μ-TAS. Biosensors usually yield a digital electronic signal which is proportional to the concentration of a specific analyte or group of analytes. While the signal may in principle be continuous, devices can be configured to yield single measurements to meet specific market requirements. Examples of Biosensors include immunosensors, enzyme-based biosensors, organism- and whole cell-based biosensors. They have been applied to a wide variety of analytical problems including uses in medicine, biomedical research, drug discovery, the environment, food, process industries, security and defence. The design and study of molecular and supramolecular structures with molecular biorecognition and biomimetic properties for use in analytical devices is also included within the scope of the journal. Here the focus is on the complementary intersection between molecular recognition, nanotechnology, molecular imprinting and supramolecular chemistry to improve the analytical performance and robustness of devices.

The emerging field of Bioelectronics seeks to exploit biology in conjunction with electronics in a wider context encompassing, for example, biological fuel cells, bionics and biomaterials for information processing, information storage, electronic components and actuators. A key aspect is the interface between biological materials and micro- and nano-electronics.

While endeavouring to maintain coherence in the scope of the journal, the editors will accept reviews and papers of obvious relevance to the community, which describe important new concepts, underpin understanding of the field or provide important insights into the practical application, manufacture and commercialisation of biosensors and bioelectronics.
AUDIENCE

Biotechnologists, biochemists, bioelectrochemists, analytical chemists, chemical engineers, electronic engineers.

IMPACT FACTOR

2019: 10.257 © Clarivate Analytics Journal Citation Reports 2020

ABSTRACTING AND INDEXING

Pollution Abstracts
Environmental Abstracts
PubMed/Medline
Current Contents
Current Biotechnology Abstracts
Biotechnology Research Abstracts
BIOSIS Citation Index
AGRICOLA
Bioengineering Telegen Abstracts
Cambridge Scientific Abstracts
Embase
Chemical Abstracts
Science Citation Index
INSPEC
Scopus

EDITORIAL BOARD

Co-Editors-in-Chief
Man Bock Gu, Korea University College of Life Sciences and Biotechnology, Seongbuk-gu, Korea, Republic of aptamers, nanobiosensors, nanofibers, nanocomposites, and microbeads, and bioluminescent bacterial biosensor
Chenzhong Li, Florida International University Department of Biomedical Engineering, Miami, Florida, United States
Cell/Organ on a chip, whole cell analysis, wearable/portable biosensors, POCT and IVDs sensors
Arben Merkoçi, Catalan Institute of Nanoscience and Nanotechnology, Barcelona, Spain
Nanotechnology and nanoscience-based cost-efficient biosensors using DNA, Antibodies, Cells and enzymes and other (bio)receptors with micro- and nanostructures/motors and Applications in diagnostics, environmental monitoring or safety and security

Editorial Office
Contact us at biosensors@elsevier.com, For all enquiries please contact the Editors via the Editorial Office. All Book Review enquiries and proposals for Editorials should be sent to the Editorial Office.

Section Editors
Aziz Amine, University Hassan II Casablanca, Casablanca, Morocco
Biosensors using enzymes, cells, antibodies, DNA, molecular imprinting polymers, Applications in food safety and environmental monitoring
Juewen Liu, University of Waterloo, Dept. of Chemistry, Waterloo, Ontario, Canada
DNAzymes, aptamers, nanozymes, bioconjugate chemistry, gold nanoparticles, metal oxide nanoparticles, graphene oxide, fluorescence, FRET, metal ions, environmental monitoring
Tautgirdas Ruzgas, Malmö University Department of Biomedical Science, Malmö, Sweden
Direct and mediated electron transfer, wireless biosensors, biosensor and bioelectronics principles in pharmaceutics, studies of biological barriers and noninvasive sensing.
Koji Sode, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, United States

Founding Editor-in-Chief
Anthony Turner, Cranfield University, Cranfield, Bedford, United Kingdom
**Associate Editors**

**Loïc Blum**, Institute of Molecular and Supramolecular Chemistry and Biochemistry, Villeurbanne Cedex, France  
Biocatalysis, Bioluminescence, Chemiluminescence, Electrochemiluminescence, Enzyme kinetics, Biochips, Lab-on-a-chip

**Huan-Tsung Chang**, National Taiwan University Chemistry Department, Taipei, Taiwan  
Optical Sensors, Capillary Electrophoresis, Green Chemistry, Fluorescence, Nanotechnology

**Jun Chen**, University of California Los Angeles, Los Angeles, California, United States  
Wearable biosensors, wearable bioelectronics, biomaterials, nanotechnology, personalized health care, body sensor network

**Can Dincer**, University of Freiburg, Freiburg Center for Interactive Materials and Bioinspired Technologies, Freiburg, Germany  
Bioanalytical microsystems, Sensors, Microfluidics, Lab-on-a-chip (LoC), Electrochemistry, Multiplexed point-of-care testing (xPOCT), Microfluidic paper-based analytical devices (µPADs)

**Pedro Estrela**, University of Bath Department of Electronic and Electrical Engineering, Bath, United Kingdom  
Electrochemical sensors, Impedance spectroscopy, Biologically sensitive field-effect transistors, Aptasensors, Lab-on-Chip, DNA sensors, Protein sensors, SPR, QCM, Multiplexed systems.

**Hisakage Funabashi**, Hiroshima University, Higashi-Hiroshima, Japan  
Development of recombinant proteins and aptamers for biosensing, Genetic engineering and nucleic acid engineering to create biosensing molecules, sensor cells, and whole cell biosensors

**Jiri Homola**, Czech Academy of Sciences, Prague, Czech Republic  
Optical biosensors, optical instrumentation, plasmonics, plasmonic biosensors, label-free optical biosensors

**Kazunori Ikebukuro**, Tokyo University of Agriculture and Technology, Fuchu, Japan  
Aptameric sensor, Nucleic acid or its epigenetic modification sensor, Evolutionary molecular engineering

**Heinz-Bernhard Kraatz**, University of Toronto, Department of Physical and Environmental Sciences, Toronto, Ontario, Canada  
Electrochemistry; DNA sensors; biomaterials; bioconjugates; modified surfaces

**Juozas Kulys**, Vilnius University, Life Sciences Center, Vilnius, Lithuania  
Antibodies and antibody fragments, Enzymes, Electrochemical/Electrical biosensors, Amperometry, Potentiometry, Screen printed electrodes, Chemiluminescence, Surface plasmon resonance, Thermometric biosensors, Biochemical oxygen demand, Glucose, Biomarkers, Nanotechnology, Bioelectronics, Biofuel cells/Biological fuel cells, Molecular recognition, Modelling

**Genxi Li**, Nanjing University Department of Biochemistry, Nanjing, China  
Electrochemical biosensor, Colorimetric biosensor, Nano-based biosensor; Biosensor with clinical application, Biosensor with biomedical implication

**Cheng-Te Lin**, Chinese Academy of Sciences, Beijing, China  
Nucleic acid, electrochemical biosensors, electrical biosensors, field effect transistors, wearable/portable devices, graphene, 2D materials, and nanomaterials

**Mariana Medina-Sánchez**, Leibniz Institute for Solid State and Materials Research Institute for Integrative Nanosciences, Dresden, Germany  
Electrochemical biosensors, impedimetric sensors, label-free, quantum dots, microfluidics, 3D microsensors, rolled-up microsensors, single cell analysis, pathogen detection, lateral flow, flexible electronics

**Danila Moscone**, University of Rome Tor Vergata Department Chemical Sciences and Technologies, Roma, Italy  
Paper-based “all-in-one” electrochemical devices, wearable (bio)sensors, Screen-Printed Electrodes, sensors, biosensors and immunosensors modified with nanomaterials and nanocomposites, microbeads, real applications in clinical, food and environmental analytical chemistry

**Hyun Gyu Park**, Korea Advanced Institute of Science and Technology Department of Chemical and Biomolecular Engineering, Daejeon, Korea, Republic of  
Nucleic and engineering, Aptamer and DNAzyme, Microarray technology, Electrochemical biosensor, Nanobiotechnology

**Serban Peteu**, Michigan State University, East Lansing, Michigan, United States  
Enzymes, cells, and other bioreceptors/biocatalysts based electrochemical/optical biosensors with micro- and nano-structures and commercial applications

**Jianfeng Ping**, Zhejiang University, Hangzhou, China  
Electrochemical biosensor, nanomaterials-enabled sensor, flexible and wearable sensor, optical sensor, stretchable sensor, and self-powered sensor

**Olof Ramström**, KTH Royal Institute of Technology Department of Chemistry, Stockholm, Sweden

**Aldo Roda**, University of Bologna Department of Chemistry Giacomo Ciamician, Bologna, Italy  
Bio-Chemiluminescence-biosensors-lateral flow assay, POCT, Smartphone-based biosensors, Thermochemiluminescence, reflectance
Hyun Chul Yoon, Ajou University Department of Applied Chemistry & Biological Engineering, Suwon, Korea, Republic of
Fluorescent microspheres, Retroreflection-based sensing, Bioelectrocatalysis, Smartphone-based diagnostics

Jeong-Yeol Yoon, The University of Arizona Department of Biomedical Engineering, Tucson, Arizona, United States
Smartphone based biosensors, Machine learning, Paper microfluidics, Environmental monitoring, Handheld LAMP and PCR, Organ-on-a-chip

Editorial Board
Chris Allender, Cardiff School of Pharmacy and Pharmaceutical Sciences, Cardiff, United Kingdom
Lucio Angnes, University of Sao Paulo Institute of Chemistry, Sao Paulo, Brazil
Antje Bäumner, University of Regensburg, Regensburg, Germany
Ursula Billitewski, HZI Workgroup Compound Profiling and Screening, Braunschweig, Germany
Luigi Campanella, University of Rome La Sapienza Department of Chemistry, Roma, Italy
Jürgen Fritz, Jacobs University Bremen gGmbH, Bremen, Germany
Li Fu, Hangzhou Dianzi University College of Materials and Environmental Engineering, Hangzhou, China
Szilveszter Gaspar, International Centre of Biodynamics, Bucuresti, Romania
Handan Gülce, Selçuk University, Konya, Turkey
Evgeny Katz, Clarkson University Department of Chemistry and Biomolecular Science, Potsdam, New York, United States
Guosong Lai, Hubei Normal University College of Chemistry and Chemical Engineering, Huangshi, China
Jinghong Li, Tsinghua University Department of Chemistry, Beijing, China
Frances Ligler, UNC/NCSU Joint Department of Biomedical Engineering, Raleigh, North Carolina, United States
Yuehe Lin, Washington State University, School of Mechanical and Materials Engineering, Pullman, Washington, United States
Bansi Dhar Malhotra, Delhi Technological University Department of Biotechnology
Shelley D. Minteer, University of Utah Department of Chemistry, Salt Lake City, Utah, United States
Chad A. Mirkin, Northwestern University Department of Chemistry, Evanston, Illinois, United States
Kohji Mitsubayashi, Tokyo Medical and Dental University Institute of Biomaterials and Bioengineering, Chiyoda-Ku, Japan
Fumio Mizutani, University of Hyogo Faculty of Science Graduate School of Material Science Mathematical Science Section, Himeji, Japan
Dan Nicolaou, McGill University Department of Bioengineering, Montréal, Quebec, Canada
Frieder Scheller, University of Potsdam, Potsdam, Germany
Wolfgang Schumann, Ruhr University Bochum Faculty of Chemistry and Biochemistry, Bochum, Germany
Fatih Sen, Kütahya Dumlupınar University Department of Biochemistry, Kütahya, Turkey
Kenneth J. Shea, University of California San Francisco Department of Dermatology, San Francisco, California, United States
Aleksandr Simonian, Auburn University Materials Research and Education Center, Auburn, Alabama, United States
Kemin Wang, Hunan University, Changsha, China
George Wilson, University of Kansas Department of Chemistry, Lawrence, Kansas, United States
Lidong Wu, Chinese Academy of Fishery Sciences, Beijing, China
Yibin Ying, Zhejiang University, Department of Biosystems Engineering, Hangzhou, China
Rolf Zehbe, TU Berlin Department of Languages and Communication, Berlin, Germany
Xian-En Zhang, Institute of Biophysics Chinese Academy of Sciences, Beijing, China
Xueji Zhang, Shenzhen University, School of Biomedical Engineering, Shenzhen, China
GUIDE FOR AUTHORS

Aims and Scope

Biosensors & Bioelectronics has an open access mirror journal, Biosensors & Bioelectronics:X.

Biosensors & Bioelectronics is the principal international journal devoted to research, design, development and application of biosensors and bioelectronics. It is an interdisciplinary journal serving professionals with an interest in the exploitation of biological materials and designs in novel diagnostic and electronic devices including sensors, DNA chips, electronic noses, lab-on-a-chip and μ-TAS.

Biosensors are defined as analytical devices incorporating a biological material (e.g. tissue, microorganisms, organelles, cell receptors, enzymes, antibodies, nucleic acids, natural products etc.), a biologically derived material (e.g. recombinant antibodies, engineered proteins, aptamers etc) or a biomimic (e.g. synthetic receptors, biomimetic catalysts, combinatorial ligands, imprinted polymers etc) intimately associated with or integrated within a physicochemical transducer or transducing microsystem, which may be optical, electrochemical, thermometric, piezoelectric, magnetic or micromechanical (Turner et al., 1987; Turner, 1989). Biosensors usually yield a digital electronic signal which is proportional to the concentration of a specific analyte or group of analytes. While the signal may in principle be continuous, devices can be configured to yield single measurements to meet specific market requirements. Examples of Biosensors include immunosensors, enzyme-based biosensors, organism- and whole cell-based biosensors. They have been applied to a wide variety of analytical problems including uses in medicine, biomedical research, drug discovery, the environment, food, process industries, security and defence. The design and study of molecular and supramolecular structures with molecular biorecognition and biomimetic properties for use in analytical devices is also included within the scope of the journal. Here the focus is on the complementary intersection between molecular recognition, nanotechnology, molecular imprinting and supramolecular chemistry to improve the analytical performance and robustness of devices.

The emerging field of Bioelectronics seeks to exploit biology in conjunction with electronics in a wider context encompassing, for example, biological fuel cells, bionics and biomaterials for information processing, information storage, electronic components and actuators. A key aspect is the interface between biological materials and micro- and nano-electronics.

While endeavouring to maintain coherence in the scope of the journal, the editors will accept reviews and papers of obvious relevance to the community, which describe important new concepts, underpin understanding of the field or provide important insights into the practical application, manufacture and commercialisation of biosensors and bioelectronics.

Types of papers

Full papers should describe original research work not previously published, and should be complete descriptions of full investigations comprising around 5000 words and with up to 6 figures and/or tables.

Short Communications should be concise but complete descriptions of original limited investigations comprising around 3000 words with up to 3 figures and/or tables.

Review Articles should present a thorough and comprehensive overview of the chosen subject and be extensively referenced and comprise around 8000-10000 words. Authors are expected to go beyond a simple compilation of references and analyse trends, shortcomings and accomplishments in their chosen field, charting possible future directions of the research. Illustrations and summary tables are encouraged. Flexibility of presentation is permitted, but authors are urged to arrange the subject matter clearly under the general headings of Abstract, Keywords, Introduction, Main text (The heading and the sub-headings of the main text are left to author's discretion), Summary and Conclusions, Future Perspectives, Acknowledgements, References. When writing reviews authors should take proper account of all the literature especially recent papers published over the past five years.

Exceptions to these criteria may be permitted if you discuss your requirements in advance with an Editor.
Proposal
Please download the proposal Template for the special issue North America Special Issue on Biosensing

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.

Policy and ethics
The work described in your article must have been carried out in accordance with Directive 86/609/EEC for animal experiments http://europa.eu.int/scadplus/leg/en/s23000.htm. This must be stated at an appropriate point in the article.

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. 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. These guidelines are meant as a point of reference to help identify appropriate language but are by no means exhaustive or definitive.

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.
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.

Open access
Authors wishing to publish open access can choose to publish open access in Biosensors & Bioelectronics:X https://ees.elsevier.com/bios/default.asp, the open access mirror journal of Biosensors & Bioelectronics. One, unified editorial team manages the peer-review for both titles using the same submission system. The difference between the journals is the access model under which the journals will publish your work and the indexation status. Biosensors & Bioelectronics:X will be indexed in Scopus if the parent is also indexed there; if the parent is indexed in MEDLINE, then Biosensors & Bioelectronics:X will also be eligible for fast inclusion in PubMed Central. However, please note that Biosensors & Bioelectronics:X will not have a CiteScore or Impact Factor initially. Applications for inclusion in Science Citation Index / Social Sciences Citation Index and any other relevant citation indexing databases will be made as soon as possible.

The author’s choice of publishing model will determine in which journal, Biosensors & Bioelectronics or Biosensors & Bioelectronics:X, the accepted manuscript will be published. The choice of publishing model will be blinded to referees, ensuring the editorial process is identical.

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.

Language
Papers will be published in English. Authors' manuscripts must be consistent in style, spelling and syntax.

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.

Please submit your article via https://www.elsevier.com/locate/bios

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

PREPARATION

Peer review
This journal operates a 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.
Use of word processing software

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

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

LaTeX

You are recommended to use the latest Elsevier article class to prepare your manuscript and BibTeX to generate your bibliography. Our Guidelines has full details.

Article structure

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. Where the family name may be ambiguous (e.g., a double name), please indicate this clearly. 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. Ensure that the telephone number (with country and area code) is provided in addition to the e-mail address and the complete postal address.

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.

Abstract

The abstract is the part of your paper which will be read by the largest number of scientists so it plays a crucial role. The abstract is a condensation of the information (facts) in the paper and should be brief (150 - 250 words), specific and self-contained including the methods of the research and the principal results. The abstract should not include trivial experimental details, references, figures or equations.

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.

Divide your article into clearly defined sections. Each subsection is given a brief heading. Each heading should appear on its own separate line. Subsections should be used as much as possible when cross-referencing text: refer to the subsection by heading as opposed to simply "the text".

1.Introduction

This section should state the objectives of the work and provide an adequate background. It should also describe briefly the work presented in the paper. Avoid a detailed literature survey or a summary of the results.

2. Material and methods

It should provide sufficient detail to allow the work to be reproduced. Methods already published should be indicated by a reference: only relevant modifications should be described.
3. Results
Results should be clear and concise.

4. Discussion
This should explore the significance of the results of the work, not repeat them. Avoid extensive citations and discussion of published literature. A combined Results and Discussion section is often appropriate. The Results and Discussion should deal with the interpretation of the results in the light of previously published findings.

5. Conclusions
It should be kept short and must be fully supported by the results reported. The Conclusions section should include the major conclusions, the limitations of the work and the future work.

Acknowledgements
Collate acknowledgements in a separate section at the end of the article before the references. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

Subdivision - unnumbered sections
Divide your article into clearly defined sections. Each subsection is given a brief heading. Each heading should appear on its own separate line. Subsections should be used as much as possible when cross-referencing text: refer to the subsection by heading as opposed to simply 'the text'.

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

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

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

Results
Results should be clear and concise.

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

Conclusions
The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

Appendices
If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

Essential title page information
• Title. Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.
• Author names and affiliations. Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. You can add your name between parentheses in your own script behind the English transliteration. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lowercase superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name and, if available, the e-mail address of each author.
• **Corresponding author.** Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. This responsibility includes answering any future queries about Methodology and Materials. **Ensure that the e-mail address is given and that contact details are kept up to date by the corresponding author.**

• **Present/permanent address.** If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

**Highlights**
Highlights are 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**
The abstract is the part of your paper which will be read by the largest number of scientists so it plays a crucial role. The abstract is a condensation of the information (facts) in the paper; it is not a description of the contents of the paper. The abstract should present as much as possible of the qualitative and quantitative information contained in the paper yet it should be brief (150 - 250 words), specific and self-contained.

The abstract may include the following:
1. The context for the work.
2. The purpose or objectives of the work (what was the research question or problem and why it is important).
3. Theoretical or experimental methods used.
4. Results (qualitative and quantitative).
5. Conclusions and their limitations (what was the meaning of the results).
6. Safety information concerning dangerous compounds or procedures if relevant.

If the paper reports a new instrument or method then the abstract should include a description of its advantages and disadvantages compared to other established techniques. The abstract should not include trivial experimental details, references, figures or equations.

**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.

**Nomenclature and Units**
Follow internationally accepted rules and conventions: use the international system of units (SI). If other quantities are mentioned, give their equivalent in SI. You are urged to consult IUPAC: http://www.iupac.org for further information.

**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 can build footnotes into the text, and this feature may be used. Otherwise, please indicate the position of footnotes in the text and list the footnotes themselves separately at the end of the article. Do not include footnotes in the Reference list.

**Artwork**

**Electronic artwork**

*General points*
- Make sure you use uniform lettering and sizing of your original artwork.
- Save text in illustrations as ‘graphics’ or enclose the font.
- Only use the following fonts in your illustrations: Arial, Courier, Times, Symbol.
- Number the illustrations according to their sequence in the text.
- Use a logical naming convention for your artwork files.
- Provide captions to illustrations separately.
- Produce images near to the desired size of the printed version.
- Submit each figure as a separate file.
- The figures/schemes/tables should be inserted directly where the authors want them in the text.

A detailed guide on electronic artwork is available on our website: https://www.elsevier.com/artworkinstructions

**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 finalised, 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: Vector drawings. Embed the font or save the text as ‘graphics’.
- TIFF: Color or grayscale photographs (halftones): always use a minimum of 300 dpi.
- TIFF: Bitmapped line drawings: use a minimum of 1000 dpi.
- TIFF: Combinations bitmapped line/half-tone (color or grayscale): a minimum of 500 dpi is required.

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

**Please do not:**
- Supply files that are optimised 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. Supply captions separately, not attached to the figure. A caption should comprise a brief title (not on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used. The preferred positions for all figures should be indicated in the text.

Tables
Please note that a full paper should contain no more than 6 single figures/tables/schemes. A short communication should contain no more than 3 single figures/tables/schemes.

Tables should be typed in double spacing on separate pages and provided with a suitable heading. Tables should be clearly referred to in the text using Arabic numerals. Considerable thought should be given to layout so that the significance of the results can be easily grasped. Each table should have a title which makes the general meaning understandable without reference to the text. Vertical lines should not be used to separate columns. Column headings should be sufficiently explanatory, and presented in a way consistent with the column width. Columns of figures multiplied by the same power of ten should not be presented as such. The power of ten should be indicated in the column heading, e.g.:

104[NaCl]/mol l-1
4.2
3.5
0.26
rather than
[NaCl]/mol l-1
4.2 x 10^{-4}
3.5 x 10^{-4}
2.6 x 10^{-5}

In order to demonstrate the repeatability/reproducibility of the method, Authors are asked to include relative standard deviations (RSD) or the coefficient of variations (CV) in tables.

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. This identifier will not appear in your published article.

Examples:

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/biosensors-and-bioelectronics

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

Reference Style
Text: All citations in the text should refer to:
1. Single author: the author's name (without initials, unless there is ambiguity) and the year of publication;
2. Two authors: both authors' names and the year of publication;
3. Three or more authors: first author's name followed by "et al." and the year of publication.

Citations may be made directly (or parenthetically). Groups of references should be listed first alphabetically, then chronologically.

Examples: "as demonstrated (Allan, 1996a, 1996b, 1999; Allan and Jones, 1995). Kramer et al. (2000) have recently shown ....".

List: References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication.

Examples:
Reference to a journal publication:
Reference to a book:
Reference to a chapter in an edited book:

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

Video
Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our video instruction pages. 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. Before submitting your article, you can deposit the relevant datasets to Mendeley Data. Please include the DOI of the deposited dataset(s) in your main manuscript file. 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 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**
To ensure a fast publication process of the article, we kindly ask authors to provide us with their proof corrections within two days. 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.

Guide For Authors last updated on 28 August, 2012

© Copyright 2018 Elsevier | https://www.elsevier.com