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# *SMAI-JCM*

## SMAI JOURNAL OF COMPUTATIONAL MATHEMATICS

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DOUGLAS N. ARNOLD & THIERRY GOUDON

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## The SMAI Journal of Computational Mathematics

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A widely accessible, carefully peer-reviewed scientific literature is truly important. It is crucial to effective research, and hence has significant impact upon the world's health, security, and prosperity. However, the high cost of many journals blocks access to many researchers and institutions, and places an unsustainable drain on the resources of others. Addressing this issue, the Société de Mathématiques Appliquées et Industrielles or SMAI, the French professional society for applied and industrial mathematics, has committed to the founding of a new journal of computational mathematics: the *SMAI Journal of Computational Mathematics*, or SMAI-JCM, which will be freely accessible to all, and will not require the payment of fees for publication.

The journal, which has just commenced operations and is reviewing its first submissions, intends to publish high quality research articles on the design and analysis of algorithms for computing the numerical solution of mathematical problems arising in applications. Such mathematical problems may be continuous or discrete, deterministic or stochastic. Relevant applications span the sciences, social sciences, engineering, and technology. SMAI-JCM, reflecting the broad interests of a strong and diverse international editorial board, takes a broad view of computational mathematics, ranging from the more analytical (numerical analysis) to the more applied (scientific computing and computational science). In particular, the journal welcomes submissions addressing:

- Computational linear and nonlinear algebra
- Numerical solution of ordinary and partial differential equations
- Discrete and continuous optimization and control
- Computational geometry and topology
- Image and signal processing
- Processing of large data sets
- Numerical aspects of probability and statistics; assessment of uncertainties in computational simulations
- Computational issues arising in the simulation of physical or biological phenomenon, engineering, the social sciences or other applications
- Computational issues arising from new computer technologies
- Description, construction and review of test cases and benchmarks

As this list indicates, the editorial board recognizes that excellence in computational math arises from a broad spectrum of researchers and viewpoints, and encourages submissions of different sorts, with varying balance between computational results and theoretical analysis. Typically the strongest submissions are expected to involve both aspects. The journal will also provide for the publication of supplementary materials such as computer codes or animations.

Peer review will be carried out at SMAI-JCM just as in top traditional journals, and the journal will strive to maintain the highest ethical standards and to employ the best practices of modern scholarly journal publication. However the journal's business model is a radical departure from current practice. All papers accepted by SMAI-JCM will be electronically published in full open access, downloadable by anyone, without delay and in perpetuity. Publication in SMAI-JCM is also entirely free to authors, with the only barrier being scientific quality as determined by careful peer review, not financial. Of course, the publication of a high quality journal does incur costs, in addition to the freely given efforts of authors, editors, and referees. For SMAI-JCM these financial costs are directly borne by SMAI and other sponsoring organizations. We believe that this approach is the most promising way to achieve the goal of universal access to the scientific literature, and we hope that a successful SMAI-JCM will not only improve the publishing of computational mathematics, but serve as a model for other journals.

Context for the new journal can be found in a recent report<sup>1</sup> by ICSU, the International Council for Science, whose members are primarily scientific unions, such as the International Mathematical Union, and national academies of science. The report advocated the following goals: "The scientific record should be:

- free of financial barriers for any researcher to contribute to;
- free of financial barriers for any user to access immediately on publication;
- made available without restriction on reuse for any purpose, subject to proper attribution;
- quality-assured and published in a timely manner; and
- archived and made available in perpetuity."

Unfortunately, these goals are far from realization. In the area of computational mathematics, for example, a single well-known computational physics journal charges annual subscription fees that vary between \$6,652 and \$11,396 for online institutional access, well more than many institutions can afford,<sup>2</sup> and numerous other journals charge very steep fees. Despite the massive revenues generated for the publisher by these fees, the articles published are not "free of financial barriers for any user to access immediately on publication," but only freely available to users from subscriber institutions. Authors wishing to have their papers placed in open access, are required to pay an additional fee of \$2,200.<sup>3</sup>

After studying the situation the ICSU report concludes that the resources used to support scientific publication are sufficient to bring about a scientific literature as described above: free of financial barriers to access or contribution, while maintaining quality peer review and the best practices in publishing. The obstacle to such a system comes not from the available resources, but rather from the current business models predominant in scholarly publishing. If these models are to change, it will surely have to be researchers themselves, the people who provide the content for the journals and carry out the key editorial and refereeing roles, to bring this about. Similar conclusions have

<sup>1</sup><http://www.icsu.org/general-assembly/news/ICSU%20Report%20on%20open%20Access.pdf>

<sup>2</sup><http://store.elsevier.com/product.jsp?issn=00219991>

<sup>3</sup><http://www.elsevier.com/journals/journal-of-computational-physics/0021-9991/guide-for-authors#>

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been arrived at in other reports, as well. An October 2014 report<sup>4</sup> of the French Academy of Sciences called on scientists to “regain control of costs for activities that relate to dissemination of scientific information,” while reaffirming “the primary need for peer-reviewing of articles before publication by academic research scientists,” and the importance of “participation of academics in the final approval decisions.”

SMAI-JCM is responding to these calls, offering a model of journal publication which, if widely deployed, can make these goals a reality. Our success in this depends crucially on the acceptance and support of SMAI-JCM by the community. We very much encourage the submission of strong papers in computational mathematics to the journal. Please visit the journal at

<https://ojs.math.cnrs.fr/index.php/SMAI-JCM>

and help us take a step towards quality, accessible, ethical publishing in mathematics.

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<sup>4</sup>[http://www.academie-sciences.fr/presse/communique/rads\\_241014.pdf](http://www.academie-sciences.fr/presse/communique/rads_241014.pdf)