New Journal Proposal: SIAM Journal on Multiscale Analysis, Modeling, and Simulation

Introduction

Give a general description of the proposed journal, including the areas (generally) it is to address, who it is aimed at (readers), how it is to be used, and (briefly) any unique features. Explain why there is a need for such a journal.

We would like to propose to launch an interdisciplinary journal that focuses on multiscale analysis, modeling, and simulation. This is an emerging new research area which has already had a significant impact on many scientific disciplines, including biology, chemistry, environmental science, fluid dynamics, geophysics, information science, and materials science. There have been many exciting recent, but problem-specific, advances in multiscale analysis, modeling, and simulation. Despite considerable progress in a wide range of the sciences, and a growing awareness of the importance of multiscale approaches, currently there is fragmentation in multiscale methodology, its rigorous analysis, and its applications. Breakthroughs in specific domains could be applicable in a broader context, but remain isolated. As a result, multiscale descriptions are nowhere near their potential level of impact, including in education and industry. Creating a multiscale journal will integrate these isolated efforts and diverse developments, and provide a unique opportunity to make significant advances. Such a journal will also provide a special opportunity to connect domain experts from biology, chemistry, environmental science, geophysics, information science, fluids, and materials science with specialists in mathematical and computational analysis. This will help bridge the gap in research, education and knowledge transfer between mathematics, biology, chemistry, computer science, engineering, physics, and other disciplines.

We believe that there is a need for such a journal and this is a timely effort. We have already received enthusiastic responses from a number of leading applied mathematicians and leading experts from various application areas. However, in order to ensure the success of the proposed journal, we have to address a number of issues in the design and implementation of the proposed journal.

(1). What is the intended audience of the journal? Is this just another applied math journal or is it an interdisciplinary journal with a strong applied math focus?

(2). Is the proposed journal too narrow? Do we serve only a small community? Can our journal have an impact in the physics, engineering, and life science communities?

(3). Can this journal compete with well-established journals in various application fields? Would authors consider submitting their best multiscale papers to this journal? Or can they maximize the impact of their papers by submitting them to application-specific journals?

The intended audience of the proposed journal will go beyond the traditional applied mathematicians and include people from physics, engineering, and science. We tentatively
call the proposed journal “Multiscale Analysis, Modeling, and Simulation” (MAMS for short). MAMS is not just another applied math journal, it is an interdisciplinary journal with a strong applied math focus. The journal will consider papers from a broad range of application areas that use multiscale methods, including biology, chemistry, fluid dynamics, geophysics and environmental science, information science, and materials science.

The journal is intended to serve a large community. This community includes people from applied math, fluid dynamics, information science, materials science, engineering, and life science. The key to the success of the proposed journal is our ability to reach out to the physics, engineering, and life science communities and to enlist their support in this effort. Without their participation and support, this cannot be a successful interdisciplinary journal. This emphasis will be reflected in the composition of our editorial board. The editorial board will include leading experts from different application areas who have a strong appreciation of applied math modeling and computation. Each application area will have adequate representation in the editorial board so that people from that application field would feel comfortable to send their papers to our journal. The editorial board will be selected carefully with the help from an advisory board. The advisory board will consist of a small number of leading experts from various fields. They will help define the vision of the journal, decide on important policy issues, and provide guidance on the implementation of the journal.

We will also make an extra effort to promote interdisciplinary collaboration between applied mathematics and various application fields. One of the main barriers in generating interdisciplinary collaboration is the communication among these different fields. We need to learn to speak a common language. It would be a great service to a large community of researchers if they can identify and understand the important issues in another field without going through the overwhelming literature and learning the jargon. One of the special features of our journal is that we will devote a section to invited survey articles from research leaders in various fields (about one per issue). Such surveys should be pedagogical and jargon-limited, providing the essence of each type of approach in each subfield, explaining what are the most important current issues, challenges and opportunities. For example, survey articles describing multiscale problems from science and engineering and emphasizing their mathematical structure and computational bottlenecks would be of great interest to the computational and applied mathematics community and help to spur joint research. But these are not necessarily research papers. Similarly, papers on the state of the art in algorithms and software which are written in a way that scientists and engineers can understand would be of great interest to the scientists and engineers.

The majority of these survey articles will be generated from invited keynote speakers in our conference series on multiscale problems (see more discussion on our conference series below). We will organize students and postdocs to help the speaker generate a review article based on their lecture. Past experience has shown that articles generated this way can be of high quality and the help can convince someone who would not otherwise write a survey article. Lectures in Mathematics from ETH have been generated by this method. Such surveys can also be generated from workshops and/or summer schools on
related topics. For example, Prof. George Papanicolaou has organized a series of Mathematical Geophysics Summer Schools at Stanford for the last few years (see their website http://cartan.stanford.edu/mgss for more information). Many of the invited lectures are related to multiscale modeling and computation. Encouraged by the success of the workshop on Multiscale Modeling and Simulation of Flow and Transport in Porous Media in 1999 at Los Alamos (organized by T. Hou, D. Moulton, L. Winter, and D. Zhang), the organizers have planned to have the second workshop on the same topic but in the style of lecture series on various subjects. There will be the first joint China-US Symposium on Multiscale Analysis in Materials Science and Engineering sponsored by the US NSF and the Chinese NSF to be held in Beijing June 17-20, 2002 (organized by T. Hou, M. L. Wang and A. Masud). Twenty-four leading authorities from China and the US will participate in this event, including B. Engquist (UCLA), K. W. Liu (Northwestern), M. Ortiz (Caltech), and G. Papanicolaou (Stanford). The invited speakers are expected to give in-depth surveys on their research topics. These summer schools and multiscale workshops can provide an excellent source of survey articles for MAMS.

We do not intend to compete with well established journals within each application community. In our view, the proposed journal and those journals in different application fields serve a very different purpose. In fact, they complement each other. Application-oriented journals tend to focus more on the practical impact. Our journal on the other hand will emphasize more on the conceptually new ideas and methodology that have a clear mathematical structure and that can be potentially used in different application fields. For example, if a paper introduces a novel variational method to estimate effective conductivity in composite materials with a specific application (such as Milton’s work), it would be appropriate to submit it to a material science journal. But if a paper introduces a generalized variational method that has a very nice mathematical structure and can be potentially applied to several fields such as fluid dynamics, environmental science, and materials science (such as Fannjiang and Papanicolaou’s work on turbulent transport, Marsden and Shkoller’s work on averaged Euler equations, Hughes’ work variational multiscale methods), then it would be appropriate to submit it to the proposed multiscale journal. Such work may benefit several communities. If we implement our vision properly, the impact of submitting a multiscale paper to our journal may be even larger than submitting it to a specific application journal because the paper can reach out to several communities, not just one. As it is now, most application-specific journals do not have an emphasis on multiscale problems. Thus the impact of submitting an isolated multiscale paper to an application-specific journal could be limited.

To increase the impact of the proposed journal in other application communities, we will invite leading experts from various application disciplines to submit their papers to our journal and write survey articles. We envision that the majority of the papers published in the first year will be solicited. This will help set the right tone and the very high standard for the journal. A number of leading experts have indicated their willingness to do so, including Parviz Moin (Fluids), Emily Carter (BioChemistry), Dick James, Rob Phillips, Peter Voorhees (Materials), and Yanis Yortsos (Chemical Engineering and Geoscience).
We also plan to hold an international conference on multiscale modeling and simulation at the end of the first year of the introduction of our journal. The conference will bring together leading experts from various application fields to present the most recent progress and interesting questions in their fields. The conference will also provide introductory tutorials in multiscale modeling and simulation. The conference will serve to cross-fertilize across disciplines, defining the most important research issues in multiscale modeling and simulation. We plan to have this conference in every other year and turn it into a SIAM conference series. This will help integrate people from different communities and develop a sense of our own community. Caltech is in the process of applying for an NSF Science and Technology Center on Integrative Multiscale Modeling and Simulation, and already has formed a community base. Caltech would be a natural choice to host the first conference. NSF, DOE, ONR, AFOSR, and ARO are some of the potential sponsors for our conference. The topics of the proposed conference series will have a broad appeal to these funding agencies. Given the interdisciplinary nature of our conference, the funding can come from more than one discipline. There are also other multiscale centers that could provide strong support for the proposed journal. These include the DFG (the German counterpart of NSF) Center on Analysis, Modeling and Simulation of Multiscale Problems, and the proposed multiscale Institute centered at University of Wisconsin. As the importance of multiscale modeling and analysis increases in time, the community we serve will grow, and so will the impact of our journal.

Draft Editorial Policy

Centered around multiscale phenomena, MAMS is an interdisciplinary journal focusing on the fundamental modeling and computational principles underlying various multiscale methods. The mission of the journal is to bridge the gap in multiscale research between mathematics and various application disciplines by publishing research papers and survey articles that augment the fundamental ways we model and predict multiscale phenomena. The journal especially emphasizes the interplay between analysis and modeling, modeling and simulation, mathematics and various applications. The journal covers a broad range of areas including biology, chemistry, engineering, environmental science, fluid dynamics, geophysics, information science, materials science, and physical science. Research papers that explore new concepts and innovative computational paradigms, and reveal new physical phenomena are especially welcome. The journal emphasizes and values software and applications as much as it does fundamental analysis addressing the multiscale issues.

The journal also features survey articles in various subfields. Such surveys should be pedagogical and jargon-limited. They should provide the essence of each type of approach in each subfield, and explain the most important current issues, challenges and opportunities. The purpose of these survey articles is to convey the essential information in a subfield to a broad audience and to foster cross-disciplinary collaborations.

All papers should have a clear physical motivation, and the results should enhance our fundamental understanding of the underlying scientific problem. Except for survey articles,
all papers must contain substantially new results and relate them to existing literature in other disciplines to the extent possible. Because of the broad scope of the journal, it is hoped that authors will provide sufficient introductory material to appeal to a wider readership. All papers should have carefully written introduction and conclusion sections, which summarize and explain the results comprehensively to readers in other disciplines. Furthermore, the scientific importance of the paper and its conclusion should be made clear.

**Journal Description**

*Contents:* Delineate the topics the proposed journal is to address, e.g., methodologies and applications, as appropriate. Cite examples of articles for the proposed journal by selecting articles already published in existing journals during the past three years (author, title, journal, volume, issue, date, and number of pages).

By the nature of multiscale research, it must be an interdisciplinary effort. In this sense, the community is very broad and diverse. We need to focus the journal on the fundamental modeling and computational principles underlying various multiscale methods. This will integrate the diverse developments and provide a unique opportunity to make significant advances. All papers should address one (or a combination) of the following aspects: modeling across scales, computational analysis, model validation, and uncertainty management. These four themes cut across and unify multiscale research in many different disciplines.

Unlike application-oriented journals in specific application areas, our journal will focus more on conceptually new ideas and methodology that have a clear mathematical structure and that can potentially be used in different application fields. Some sample articles for the proposed journal already published in existing journals during the past few years are listed below:


Schulze, T.P and R. V. Kohn, A geometric model for coarsening during spiral-mode

Hou, T.Y. and X. H. Wu, A multiscale finite element method for elliptic problems in

Efendiev, Y., T. Y. Hou, and X. H. Wu, Convergence of a nonconforming multiscale finite

Jarvis, E.A. A., R. L. Hayes, and E. A. Carter, Effects of oxidation on the nanoscale

Bhattacharya, K., R. D. James, and G. Friesecke, The mathematics of microstructure

Candès, E. J. and D. L. Donoho, Ridgelets: the key to high-dimensional intermittency?
*Phil. Trans. R. Soc. Lond. A*, **357**, (1999), 2495-2509.

Candès, E.J. and D. L. Donoho, Curvelets: a surprisingly effective nonadaptive represen-
tation of objects with edges, in *Curve and Surface Fitting: Saint-Malo 1999*, Vanderbilt
Univ. Press.

Carlson, J. and J. C. Doyle, Highly optimized tolerance: A mechanism for power laws in

Fannjiang, A. and G. Papanicolaou, Convection enhanced diffusion for random flows, *J.

Farrell, D. F. and P.J. Ioannou, Perturbation structure and spectra in turbulent channel

Li, S. and L. Petzold, Software and algorithms for sensitivity analysis of large-scale

Petzold, L. and W. J. Zhu, Model reduction for chemical kinetics: An optimization

Mallat, S., G. Papanicolaou, and Z. Zhang, Adaptive covariance estimation of locally

Wall, C, B. J. Boersma, and P. Moin, An evaluation of the assumed beta probability
density function subgrid-scale model for large eddy simulation of nonpremixed, turbulent

Pierce, C.D, P. Moin, A dynamic model for subgrid-scale variance and dissipation rate

Andersson, U., B. Engquist, G. Ledfelt, and O. Runborg, A contribution to wavelet-based

Dorobantu, M and B. Engquist, Wavelet-based numerical homogenization, *SIAM J. Nu-

Glimm, J. and D. H. Sharp, Prediction and the quantification of uncertainty, *PHYSICA

Chorin, A. J, A. P. Kast, and R. Kupferman, Unresolved computation and optimal

Grote, M.J. and A.J. Majda, Crude closure for flow with topography through large-scale


**Format:** Describe the characteristics of the articles acceptable for the proposed journal, e.g., orientation to real problems and approach to be taken in presenting them, use of examples and illustrations, recognition of state-of-the-art and contemporary work, evaluation of methodologies and guidelines for use, emphasis on theory versus empirical approaches, and requirements regarding style and focus.

The journal will focus on the fundamental modeling and computational principles underlying various multiscale methods. To be considered by the journal, a paper should be in one (or a combination) of the four categories:

(a): papers that develop a new multiscale model which provides new insight into the scientific problem;

(b): papers devoted to mathematical analysis of modeling errors across scales which leads to an improved understanding of the underlying model;

(c): papers that develop new multiscale computational methods which give superior performance compared to existing methods;

(d): papers devoted to direct numerical simulations or experimental study of multiscale phenomena which leads to an improved understanding of the scientific problem. We especially encourage multiscale research combining two or more of the approaches mentioned above in an integrated fashion.

The journal emphasizes the interaction with various application areas, and the interplay between analysis and modeling, modeling and simulation, mathematics and engineering applications. So all papers should have a clear physical motivation, and the results must enhance our fundamental understanding of the underlying scientific problem. The journal values software and applications as much as it does fundamental analysis addressing the multiscale issues.

**Special Features:** Will the journal be electronic-only or print and electronic? Will there be any electronic-only sections or electronic enhancements to print articles? Will the articles themselves include special features such as guidelines for further reading, specific algorithms, computational programs, etc.?

It is essential to have both print and electronic version of the journal. Unlike SIADS, this will be the first journal fully dedicated to multiscale problems. Thus it is very important to set a high standard and a high profile of the journal. An essential element for the success of this interdisciplinary journal is that it can have appeal to readers and authors from a wide range of communities. We must make people feel that not only is our journal useful to them, but also it is prestigious to publish their work in it. Inviting the leading experts from various application areas to join the editorial board and featuring survey articles in various subfields represent some of our efforts to achieve this. We will invite first-rate scientists from various fields to send their papers to our journal and write survey articles for us. This will
set a very high standard for the journal and create a high profile for the journal in various communities. If people feel that they can get a lot of useful information about some of the best work on multiscale problems from our journal, then it is likely they will read and subscribe to this journal. This will increase our readership and in turn will encourage them to send their papers to this journal.

At the beginning, we must implement our strategy very carefully and set the right tone for the journal. We believe that a print and electronic journal is essential to achieve our goal. An electronic-only journal may give the perception that our journal is not a serious journal and the quality of the papers is not guaranteed. The slightest doubt will create unrepairable damage to the journal. This will not be the best way to serve the broad communities that the proposed journal is aimed at.

Except for isolated cases, we do not expect that the majority of the papers require further reading, specific algorithms, computational programs, or special graphics and movies. When such case arises, we will provide the website address in the paper so that the interested readers can have access to the additional materials.

**Editorial Board:** Supply a proposed list of editors for the journal, giving name, institution, address job title, and areas they would cover and indicating those who are more senior. What will be the editorial board structure?

We propose to adopt the following editorial structure for the journal.

1. There is one editor-in-chief who handles all the day to day editorial work, assigns manuscripts for review, and decides to accept or to reject manuscripts after consulting with the editorial board (SIAM J. Math. Anal. model).

2. There is an advisory board consisting of a small number of well-established experts in various areas related to multiscale problems. This advisory board, working together with the editor-in-chief, will make important policy decisions for the journal, provide advice and guidance to the journal, and define the vision, scope, and aim for the journal. The advisory board will also provide advice to the editor-in-chief in forming the editorial board.

3. The editorial board will consist of leading experts in various areas of multiscale research. The editor-in-chief will work closely with the editorial board in selecting appropriate referees to review manuscripts submitted to the journal. The editorial board will NOT contact the author(s) directly. The central editorial office will communicate with the authors, handle all inquiries, and inform them of our decisions.

As we indicated earlier, we need to have sufficient representation of various application disciplines in our journal. This should be reflected in the composition of our editorial board and the advisory board. To make a cohesive editorial board, it is important that all the board members from various disciplines have a strong appreciation of applied mathematics in their research and shares the same vision and philosophy of the journal.
Editor-in-Chief

hou@acm.caltech.edu; http://www.ama.caltech.edu/~hou

Advisory Board

We have not finalized the advisory board yet. The following people have agreed to serve on the advisory board.

David Donoho, Stanford, Statistics/Imaging
donoho@stat.stanford.edu; http://www-stat.stanford.edu/~donoho/

Bjorn Engquist, UCLA, Multiscale Analysis and Computation
engquist@math.ucla.edu; http://www.math.ucla.edu/people/faculty/

Robert Kohn, Courant Institute, Modeling and Analysis of Materials Microstructures
kohn@CIMS.NYU.EDU; http://www.math.nyu.edu/faculty/kohn/

Jerry Marsden, Caltech, Variational Multiscale Analysis
marsden@cds.caltech.edu; http://www.cds.caltech.edu/~marsden/

Jean-Michel Morel, ENS-Cachan, France, Imaging/Vision
Jean-Michel.Morel@cmla.ens-cachan.fr; http://www.cmla.ens-cachan.fr/Cmla/InfoMembre/Fiche/morel.html

Stefan Müller, Max-Plank Institute, Germany, Multiscale Analysis and Modeling
sm@mis.mpg.de; http://www.mis.mpg.de/sm/

George Papanicolaou, Stanford, Stochastic Processes, Geophysics, Materials
papanico@gauss.Stanford.EDU; http://georgep.stanford.edu/

Olivier Pironneau, Univ. of Paris VI, France, Fluids and Turbulence Modeling
pironneau@ann.jussieu.fr; http://www.ann.jussieu.fr/~pironnea/

The advisory board will also include representative experts from various application fields. Some of the candidates being considered are:

Emily Carter, UCLA, Chemistry and Bio-Chemistry
eac@chem.ucla.edu; http://www.chem.ucla.edu/carter/

Richard James, Univ of Minnesota, Mechanics/Materials
james@aem.umn.edu; http://www.aem.umn.edu/people/faculty/bio/james.shtml
We have made some initial contact with them and asked for their input and advice for the proposed journal. They all expressed strong interest in the proposed multiscale journal and provided some very constructive suggestions to ensure that the journal has a broad appeal to their communities.

Editorial Board

The editorial board will be appointed following the usual SIAM procedures. In addition to the people mentioned above, some possible candidates for the editorial board are listed below (note that they have not been formally contacted):

- Gregory Allaire, Ecole Polytechnique, Applied Math/Homogenization
- Tomas Arias, Cornell, Applied Phys, and Materials
- Marco Avellaneda, Courant Institute, Applied Math/Finance/Fluids/Materials
- Kaushik Bhattacharya, Caltech, Applied Mechanics/Materials
- Achi Brandt, Tel Aviv, Israel, Applied Math/Multigrid
- Russel Caflisch, UCLA, Mathematics/Fluids/Materials
- Gideon Dagan, Tel Aviv, Hydrology/Civil Engineering
- Lou Durlofsky, Chevron/Stanford, Chemical and Petroleum Engineering/Upscaling
- William Gray, Notre Dame, Porous Media/Upscaling
- Scott Fraser, Caltech, Biology/Imaging
- James Glimm, Stony Brook, Applied Math/Fluids/Uncertainty Management
- Bud Homsy, UCSB, Chemical Engineering/Mech Eng
Tom Hughes, Stanford, Comput. Mechanics
Mac Hyman, Los Alamos, Applied Math/Fluids/Biology
Yannis Kevrekidis, Princeton Univ, Chemical Engineering
Willi Jäger, Univ of Heildeberg, Applied Math/Biological Systems
Mitch Luskin, Univ. of Minnesota, Applied Math/Microstructures
Igor Mezic, Harvard, Control and Fluids
Graeme Milton, Univ. of Utah, Composite Materials
Richard Murray, Caltech, Control/Mechanical Engineering
Hans Othmer, University of Minnesota, Math/Biology
Alfio Quarteroni, EPFL, Switzerland, Math/Fluids/Biology
Boris Rozovskii, USC, Applied Math/Stochastic PDEs
Chris Schwab, ETH Zurich, Applied Math/Multiscale Computing
David Sharp, Los Alamos, Fluids/Physics
Richard Sommerville, Scrips Institute, Oceanography
Katepalli R. Sreenivasan, Yale, Applied Physics/Mechanical Engineering
Bill Symes, Rice University, Applied Math/Geophysics
Peter Voorhees, Northwestern Univ., Materials
Art Voter, Los Alamos, Materials/Atomistic Modeling
Michael Waterman, USC, Applied Math/CS/Biology
John Willis, Cambridge University, Mechanics/Composite Materials

**Production Information**

*a. Assuming 1 to 2 years of preparation prior to the introduction of the first issue, estimate the number of manuscripts by quarter that will be submitted and of those, the number that might be acceptable for publication.*

The first issue of MAMS will appear in the first quarter of 2003. In the first year, we expect to receive about 15 manuscripts per quarter, and of those, 6-8 will be accepted and published. The majority of them will come from solicited papers with high quality. In fact, we will ask each member of the advisory board and the editorial board to contribute one of their multiscale papers to MAMS and to help solicit one paper from people in his or her field. There will be about forty-five people from the advisory board and the editorial board.
If we implement the above strategy properly, we should receive at least 60 manuscripts per year.

b. *Indicate steps that will be taken to obtain enough accepted manuscripts for the first year of issues and what can be done to sustain that rate until there is a flow that does not depend on solicitation.*

Announce the journal at every conference attended by the editor, the advisory board, and the editorial board. We will get mailing lists from various conferences together for people in various subfields and advertise the journal, show that leading people are publishing in it. This will encourage people to send their papers to our journal. In addition, we will advertise in SIAM News, and have a feature article in SIAM News on multiscale problems. We plan to host a bi-annual conference series on multiscale problems to promote research and cross-disciplinary interactions in this field. This will help promote the journal and generate a core community for our journal. The best papers will be invited to publish in our journal.

A steady source of high quality papers will come from the proposed Caltech center on multiscale problems, as well as the German Multiscale Center, and the Wisconsin multiscale center (note that Caltech and Wisconsin centers are still pending). There are also many exciting multiscale research activities in the national labs such as Los Alamos, Lawrence Livermore Lab, JPL, NCAR, Scripps Institute of Oceanography, and the DOE ASCI projects in five participating universities. Multiscale modeling and simulation play a crucial role in these DOE ASCI projects. Recently there has been a strong push in establishing computational science and engineering (CSE) programs among a number of top engineering schools. A significant part of all CSE problems is related to multiscale modeling and simulation (see, e.g. SIAM Review, Vol. 43, No. 1, pp. 163-177, 2001). We also need to be very selective in choosing the manuscripts for our journal in order to have a clear focus. As we mentioned earlier, the journal should focus on the fundamental modeling and computational principles underlying these methods. This is how we integrate the diverse developments and provide a unique opportunity to make significant advances.

c. *Estimate the number of issues per year planned and the annual print pagination.*

We intend to keep a small number of issues each year and maintain a very high quality of the papers. There will be 4 issues per year, with about 150 pages per issue. We estimate there will be about 6-8 papers per issue with roughly 20 pages per paper.

d. *Will the accepted papers be primarily prepared in TeX? Will the journal be available on the web via SIAM’s paper-by-paper accelerated electronic publishing project?*

The accepted papers be primarily prepared in LaTex2e. We will make the journal available on the web via SIAM’s paper-by-paper accelerated electronic publishing project.
Market Information

a. List competing and similar journals, giving name, age, publisher, frequency, pagination, and price (both institutional [list] and individual [member]). Rank these journals as to their relevance to the proposed journal and clearly indicate the ways in which the proposed journal differs from them.

To our knowledge, there is no journal that reaches this broad audience. Nature has a broad audience but it is not a technical journal. So there are basically no direct competing journals for us. The only journals that may be remotely related to the proposed journal are

http://link.springer-ny.com/link/service/journals/00205/index.htm

Nonlinearity, IOP, 6 issues/year, 2186 pp in 2000, 2002 price: $1240  
http://www.iop.org/EJ/S/1/NCA143559/journal/no

http://link.springer.de/link/service/journals/00332/index.htm

http://www.elsevier.nl:80/inca/publications/store/5/0/5/7/1/4/

http://www.academicpress.com/jcp

http://ojps.aip.org/phf/

http://jfm-www.damtp.cam.ac.uk/

Modeling and Simulation in Materials Science and Engineering, IOP, 6 issues/year, 958 pp in 2000, 2002 price: $620  
http://www.iop.org/EJ/S/1/NCA143559/journal/ms

http://epubs.siam.org/sam-bin/dbq/toclist/SIAP,

http://epubs.siam.org/sam-bin/dbq/toclist/SISC.
b. Who are the readers for the proposed journal – give possible job titles and academic background and job environments (departments in colleges/universities, government agencies and labs, industry). List the societies whose members are potential readers of the proposed journal. What segment of the SIAM membership is best served by the journal?

The journal targets a broad audience, including applied mathematicians, biologists, chemists, computer scientists, engineers, environmental scientists, fluid dynamicists, geophysicists, and physicists.

The societies whose members are potential readers of the proposed journal include SIAM, APS, AICHE, Biology Society, Computational Biology and Computational Chemistry Society, Materials Science Society, Atmosphere/Meteorology/Oceanography Society, DOE labs, DOE ASCI Centers, ONR labs, NASA, JPL, NACR, AFOSR labs, Oil industry, Hydrology, Environmental Science and Engineering.

The potential readers also include SIAM members who are interested in applied math analysis, scientific computing, dynamical systems, linear algebra and FEM (model reduction and fast algorithms), math biology, geoscience, information science (imaging, multiscale and multiresolution analysis). If we implement our vision plan correctly, it will bring new members to SIAM. Unlike other traditional SIAM research journals, MAMS will directly interact with the physics, engineering, and life science communities. In this sense, this is very unique and will be a new experiment for SIAM. If the growth in multiscale research continues at its current rate, the community our journal will serve will grow rapidly. Investing in this journal at this early stage will put SIAM in the leadership position to develop and define new and exciting research activities of increasing importance to the national need.

c. Indicate those libraries/types of libraries (e.g., computer science, engineering, biological science) that are likely to subscribe to the journal, giving the type of organization (e.g., government lab, software engineering industry) and specific names. How many organizations worldwide have interests covered by the journal?

Now that many journals are readily accessed electronically with one site license for the entire university or laboratory, the past difficulty that interdisciplinary journals faced; namely “in which University branch library should the journal be located?” should no longer be an issue. With the strong composition of the advisory board and the editorial board, and the unique features of the journal, most major universities would find it attractive to subscribe to our journal. The editorial board members and the researchers in this community can also lobby their libraries to subscribe to it. In addition to the interest of the traditional applied math community, libraries in biology, chemistry, computer science, materials science, and mechanical engineering would also be interested in subscribing to it. Given the broad representation of leading experts from various application fields, this is likely to happen. The journal is also highly relevant to many on-going research in government labs, such as DOE labs, NASA, JPL, ONR labs, AFOSR labs, and the oil industry, environmental science agency, and earthquake centers. We expect that many people from other application disci-
plines will find our survey articles on various subjects very useful. These survey articles will be written by leaders in various fields in a language understandable to a broad audience, reviewing the recent developments in a subfield, and describing the remaining important issues to be solved. This will be a very valuable source of information needed by researchers working on multiscale problems. In addition, the proposed journal will be attractive to the worldwide Multiscale Centers such as DFG center on multiscale problems led by Prof. Dr. Alexander Milke, and UK center led by John Ball, whose host universities will surely want to subscribe.

\[d. \text{What is the proposed journal's relation to existing SIAM journals? Which SIAM journal(s)' readership comes closest/overlaps with the readership of the proposed journal?}\]

None of the existing SIAM journals has any significant overlap with the proposed journal. SIAM J. Applied Math and SIAM J. Sci. Computing or SIAM J. Numer. Anal. may be related in some remote sense. Most likely, the proposed journal will attract papers outside the scope of the traditional SIAM research journals. Although we will publish survey articles in MAMS (about one per issue), the majority of the papers in MAMS will be research papers. Moreover, a significant portion of these survey articles will come from various application fields, and the focus of these articles will be very different from those in SIAM Review. Thus, we expect that there is very little overlap between MAMS and SIAM Review.