

PREFACE

This special issue includes invited papers presented at the Workshop “Multiscale Computational Mechanics for Materials and Structures” that was held on September 18–20, 2002, at Cachan in France. A large number of invited papers have been already published in the special issue of the *Computer Methods in Applied Mechanics and Engineering*, Vol. 192, (2003). The workshop was co-organized by Pierre Ladevèze from LMT-Cachan in France and Jacob Fish from Rensselaer Polytechnic Institute in the US.

The workshop was devoted to recent advances in multiscale computational mechanics for materials and structures and their impacts on the next-generation material-structure-fabrication design, which will require an integrated approach where the distinction between the material and structure is completely removed.

Multiscale modeling and associated computational strategies are extremely promising to elaborate efficient and robust engineering tools for predicting, for example, damage evolution up to and including the final fracture of composite structures. Various scientific areas are involved. Multiscale computational mechanics for materials and structures is built on the synergy of such areas as materials science and computational mechanics, which until recently advanced nearly independently.

The topics covered in the special issue include multiscale methods: theory and computation, experimental tests and identification for multiscale modeling, multiscale modeling of damage and fracture, verification and validation of multiscale models, engineering applications, hierarchical multiscale models, adaptive parallel computational strategies for multiscale problems, multiscale multiphysics problems, and coupled continuum-atomistic models.

We are indebted to the authors for their contributions to this special issue and for their cooperation. We wish to thank the reviewers for their careful reviews and constructive comments and suggestions. We hope that this collection of papers will provide the reader a clear vision of the recent developments in multiscale computational mechanics for materials and structures.

Pierre Ladevèze
École Normale Supérieure de Cachan/
CNRS/University Paris 6
Laboratoire de Mécanique et Technologie, 61
Avenue du Président Wilson
94235 Cachan Cedex, France

Jacob Fish
Rensselaer Polytechnic Institute
Troy, NY 12180, USA

The *International Journal for Multiscale Computational Engineering* (ISSN 1543-1649) is published quarterly and owned by Begell House, Inc., 145 Madison Avenue, New York, NY 10016, telephone (212) 725-1999. US rate for 2003 is \$396 to institutions; \$125 to individuals. Add \$10.00 per issue for foreign airmail shipping and handling fees to all orders shipped outside the United States or Canada. Personal (individual) subscriptions are available to home address only and must be paid for by personal check or credit card. All subscriptions are payable in advance. Subscriptions are entered on an annual basis, i.e., January to December. For immediate service and charge card sales, call (212) 725-1999 Monday through Friday 9 AM–5 PM EST. Fax orders to (212) 213-8368. Send written orders to **Subscriptions Department, Begell House, Inc., 145 Madison Avenue, New York NY 10016.**

This journal contains information from authentic and highly regarded sources. Reprinted material is quoted with permission, and sources are indicated. A wide variety of references is listed. Reasonable efforts have been made to publish reliable data and information, but the editor and the publisher assume no responsibility for any statements of fact or opinion expressed in the published papers or in the advertisements.

Copyright © 2003 by Begell House, Inc. All rights reserved. Printed in the United States of America. Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by Begell House, Inc., for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$5.00 per copy, plus .00 per page, is paid directly to CCC, 27 Congress St., Salem, MA 01970, USA. For those organizations that have been granted a photocopy license by CCC, a separate payment system has been arranged. The fee code for users of the Transactional Reporting Service is: [ISSN 1543-1649/03 \$5.00+\$0.00]. The fee is subject to change without notice. Begell House, Inc.'s, consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific permission must be obtained from Begell House, Inc., for such copying.