# **Advisory Editors**

## R. J. Adrian

Theoretical and Applied Mechanics Dept., University of Illinois, Urbana, Illinois 61801, USA

#### Adrian Bejan

Dept. of Mechanical Engineering and Materials Science, School of Engineering, Duke University, Durham, North Carolina 27706, USA

## G. Bergeles

Department of Mechanical Engineering, National Technical University of Athens, 42, Patission St., 106 82 Athens, Greece

#### I. P. Castro

Department of Mechanical Engineering, University of Surrey, Guildford, Surrey GU2 5XH, UK

#### J. C. Chen

Institute of Thermo-Fluid Engineering and Science, Department of Chemical Engineering, Lehigh University, 111 Research Drive, Bethlehem, PA 18015-4791, USA

### M. M. Chen

Department of Mechanical Engineering and Applied Mechanics, University of Michigan, Ann Arbor, MI 48109, USA

#### B. R. Clayton

Mechanical Engineering Department, University of Nottingham, University Park, Nottingham, UK

#### V. K. Dhir

Mechanical, Aerospace and Nuclear Engineering Dept., University of California, Los Angeles, CA 90024-1597, USA

# M. P. Escudier

Department of Mechanical Engineering, Thermofluids Division, University of Liverpool, P.O. Box 147, Liverpool L69 3BX, UK

# R. W. Guo

Aero-Engine Department, Nanjing Aeronautical Institute, Nanjing 210002, People's Republic of China

The International Journal of Heat and Fluid Flow is published bimonthly by Elsevier Science Inc., 655 Avenue of the Americas, New York, NY 10010. Institutional subscription rate: \$570.00. Individual subscription rate: within the United States, \$115.00; outside the United States, \$192.00. Claims for missing issues can be honored only up to three months for domestic addresses, six months for foreign addresses. Duplicate copies will not be sent to replace one undelivered through failure to notify Elsevier of change of address. Single copy and back volume information available upon request.

This journal is indexed in Chemical Abstracts, Current Contents, Electronics and Communications Abstracts Journal, Engineering Index, Fluid Abstracts: Process Engineering, FLUIDEX, Materials Science Citation Index, Research Alert, and SciSearch.

POSTMASTER: Send address changes to The International Journal of Heat and Fluid

## P. J. Heggs

Department of Chemical Engineering, UMIST, P.O. Box 88, Manchester M60 1QD, UK

#### J. A. C. Humphrey

Department of Aerospace and Mechanical Engineering, University of Arizona, Tucson, AZ 85721, USA

## J. M. Hyun

Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology, Yusong-ku, Taejon 305-701, South Korea

## B. V. Johnson

ABB Corporate Research, CRBT.1, CH5405 Baden-Dattwil, Switzerland

## M. A. Leschziner

Department of Mechanical Engineering, UMIST, P.O. Box 88, Manchester M60 1QD, UK

#### J. H. Lienhard

Mechanical Engineering Department, University of Houston, Houston, Texas 77004, USA

### J. R. Lloyd

Michigan State University, Department of Mechanical Engineering, East Lansing, Michigan 48824, USA

#### M. Maeda

Mechanical Engineering Dept., Keio University, Hiyoshi 3-14-1, Kohoku-ku, Yokohama 223, Japan

# S. Murakami

Institute of Industrial Science, University of Tokyo, 7-22-1 Roppongi, Minato-ku, Tokyo 106, Japan

# Y. Nagano

Department of Mechanical Engineering, Nagoya Estitute of Technology, Gokisosche, Showa-ku, Nagoya 466, Japan

## J. M. Owen

School of Mechanical Engineering, University of Bath, Claverton Down, Bath BA2 7AY, UK

#### G. P. Peterson

Department of Mechanical Engineering, Texas A&M, College Station, TX 77843, USA

#### A. M. Savill

Department of Engineering, University of Cambridge, Trumpington Street, Cambridge CB2 1PZ, UK

## Robert J. Simoneau

Internal Fluid Mechanics Division, National Aeronautics and Space Administration, Lewis Research Center, Cleveland, OH 44135, USA

#### R. M. C. So

Department of Mechanical Engineering and Aerospace Engineering, Arizona State University, Tempe, AZ 85287-6106

#### P. Stow

Rolls Royce plc, P.O. Box 31, Derby DE2 8BJ, UK

#### N. E. Todreas

Department of Nuclear Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA

# C. Tropea

Lehrstuhl für Strömungsmechanik, Universität Erlangen-Nürnb-12, Egerlandstr. 13, 8520 Erlangen, Germany

#### K. Vafai

Department of Mechanical Engineering, Ohio State University, 206 West 18th St., Columbus, OH 43210, USA

# R. Viskanta

School of Engineering, Purdue University, West Lafayette, Indiana 47907, USA

# B. X. Wang

Institute for Thermal Science & Engineering, Tsinghua University, Beijing, China

Flow, Elsevier Science Inc., 655 Avenue of the Americas, New York, NY 10010

Please direct inquiries regarding the placing of advertising in this journal to Art Carlucci, Elsevier Science Inc., 655 Avenue of the Americas, New York, NY 10010.
Telephone: (212) 633–3806; Fax: (212) 633–3820.

No responsibility is assumed by the Publisher for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions or ideas contained in the material herein.

© Elsevier Science Inc., 1996. All rights reserved. Second class postage paid at New York, NY and at additional mailing offices. This journal has been registered with the Copyright Clearance Center Inc. Consent is given for copying of articles for personal or internal use, or for the personal or internal use of specific clients. This

consent is given on the condition that the copier pay through the Center the per-copy fee stated in the cost on the first page of each article for copying beyond that permitted by the U.S. Copyright Law. If no code appears on an article, the author has not given broad consent to copy and permission to copy must be obtained directly from the author. This consent does not extend to other kinds of copying; such as for general distribution, resale advertising and promotional purposes, or for creating new collective works.

All inquiries regarding copyrighted materials from this publication, other than reproduction through the Copyright Clearance Center, should be directed to: Rights and Permissions Department, Elsevier Science Inc., 655 Avenue of the Americas, New York, NY 10010. Fax: (212) 633–3977.