

## About the Materials Research Society

The Materials Research Society (MRS), a not-for-profit scientific association founded in 1973, promotes interdisciplinary goal-oriented basic research on materials of technological importance. Membership in the Society includes over 12,000 scientists, engineers, and research managers from industrial, government, and university research laboratories in the United States and close to 70 countries.

The Society's interdisciplinary approach differs from that of single-discipline professional societies because it promotes information exchange across the many technical fields touching materials development. MRS sponsors two major international annual meetings encompassing approximately 70 topical symposia, and also sponsors numerous single-topic scientific meetings. The Society recognizes professional and technical excellence and fosters technical interaction in local geographic regions through Sections and University Chapters.

MRS participates in the international arena of materials research through the International Union of Materials Research Societies (IUMRS). MRS is a member of the Federation of Materials Societies and is an affiliate of the American Institute of Physics.

MRS publishes symposium proceedings, *MRS Bulletin*, *Journal of Materials Research*, and other publications related to current research activities.

*MRS Bulletin* (ISSN: 0883-7694) is published 12 times a year by the Materials Research Society, 506 Keystone Drive, Warrendale, PA, 15086-7573. Periodical postage paid at Warrendale, PA and at additional mailing offices. POSTMASTER: Send address changes to *MRS Bulletin* in care of the Materials Research Society, at the address listed; tel. 724-779-3003; fax 724-779-8313. Printed in the U.S.A.

Membership in MRS is \$100 annually for regular members, \$25 for students. Dues include an allocation of \$29 (\$17 for students) to a subscription to *MRS Bulletin*. Individual member subscriptions are for personal use only. Non-member subscription rates are \$190 for one calendar year (12 issues) within the U.S.A. and \$245 elsewhere. Single copies may be purchased for \$20 each. Requests from subscribers for missing journal issues will be honored without charge only if received within six months of the issue's actual date of publication; otherwise, the issue may be purchased at the single-copy price.

*MRS Bulletin* is included in *Current Contents®/Engineering, Computing, and Technology*; *Current Contents®/Physical, Chemical, and Earth Sciences*, the *SciSearch®* online database, *Research Alert®*, *Science Citation Index®*, and the *Materials Science Citation Index™*. Back volumes of *MRS Bulletin* are available in 16 mm microfilm, 35 mm microfilm, or 105 mm microfiche through University Microfilms Inc., 300 North Zeeb Road, Ann Arbor, Michigan 48106, USA.

Send Letters to the Editor to:

**MRS Bulletin**  
Materials Research Society  
506 Keystone Drive  
Warrendale, PA 15086-7573 USA  
Fax 724-779-8313  
Bulletin@mrs.org

Letters must include your name, affiliation, and full contact information.

Editorial Office • 506 Keystone Drive • Warrendale, PA 15086-7573 USA  
Tel. 724-779-3004 ext. 522; fax 724-779-8313; Bulletin@mrs.org; http://www.mrs.org/

### Editor

E.L. Fleischer

### Managing Editor

J. Meiksin

### Technical Editor

A. Bertram Wilson

### Art Director

E. Stiller

### Design/Production

S. Franklin and H. Miller

### Editorial Assistants

M. Andrews, S.A. Novosel,  
and M. Wilmoth

### Advertising

M.E. Kaufold and D.L. Watterson

### Circulation

S. Forrest

### Guest Editors

H.H.K. Tang and N. Olsson

### Special Contributors

A.A. Eliseev, M.A. El-Sherif, R.G. Ford,  
H. Gabel, G. Khitrov, B. Lucht,  
M. Nikiforov, G.R. Rao, and S. Trohalaki

### Special Consultants

M.-I. Baraton, T. Besmann, D. Dimos,  
R.L. Fleischer, G. Jabbour, J. Williams

### Associate Technical Editor

T. Palucka

### Associate Editor—Europe

I.W. Boyd, University College London  
Dept. of Electronic and  
Electrical Engineering  
Torrington Place  
London WC1E 7JE, UK  
Tel. 44-171-380-7300 or 7302

### Book Review Board

J.M. Phillips (Chair), R.W. Cahn,  
M. Coltrin, J. Curro, G. Kellogg, and  
G.G. Long

### MRS Office of Public Affairs

499 South Capitol Street SW, Suite 420,  
Washington DC 20003  
Tel. 202-256-5211

## EDITORIAL BOARD

A.L. Greer, Chair  
Cambridge University  
Cambridge, UK

V.S. Arunachalam  
Carnegie Mellon University  
Pittsburgh, PA

E. Arzt  
Max-Planck-Institut  
für Metallforschung und  
University of Stuttgart  
Stuttgart, Germany

R.W. Cahn  
Cambridge University  
Cambridge, UK

D.J. Eaglesham  
Lawrence Livermore National Laboratory  
Livermore, CA

E.J. Kramer  
University of California—  
Santa Barbara  
Santa Barbara, CA

G.G. Long  
National Institute of Standards  
and Technology  
Gaithersburg, MD

S.C. Moss  
Aerospace Corporation  
Los Angeles, CA

S.T. Picraux  
Arizona State University  
Tempe, AZ

Y. Shiohara  
ISTEC  
Tokyo, Japan

C.C. Tsai  
Quanta Display Inc.  
Taiwan

J.H. Westbrook  
Brookline Technologies  
Ballston Spa, NY

## VOLUME ORGANIZERS

### 2002

R.W. Cahn  
Cambridge University  
Cambridge, UK

G.K. Celler  
SOITEC/USA  
Summit, NJ

M.E. Galvin  
University of Delaware  
Newark, DE

### 2003

L.A. Clevenger  
IBM Microelectronics  
Hopewell Junction, NY

A.M. Donald  
Cambridge University  
Cambridge, UK

J.R. Weertman  
Northwestern University  
Evanston, IL

### 2004

P.S. Drzaic  
Alien Technology Corp.  
Morgan Hill, CA

T.E. Haynes  
Oak Ridge National Laboratory  
Oak Ridge, TN

H. Van Swygenhoven  
Paul Scherrer Institute  
Villigen, Switzerland

## 2003 MRS OFFICERS

### President

M.J. Mayo  
GUIRR, National Research Council

### Secretary

A.J. Hurd  
Los Alamos National Laboratory

### Immediate Past President

A.H. King  
Purdue University

### Vice President and President-Elect

H.E. Katz  
Bell Labs/Lucent Technologies

### Treasurer

L. Horton  
Oak Ridge National Laboratory

### Executive Director Materials Research Society

J.B. Ballance

## INTERNATIONAL UNION OF MATERIALS RESEARCH SOCIETIES

### President

R.J. Nemanich  
North Carolina State Univ.  
Raleigh, NC, USA

### First Vice President

L. Zhou  
NIN  
Xian, Shaanxi, China

### Second Vice President

P. Rama Rao  
University of Hyderabad  
Hyderabad, India

### Secretary

M.J. Yacamán  
University of Texas  
at Austin  
Austin, TX, USA

### Treasurer

J.-W. Park  
Hanyang University  
Seoul, South Korea

### Immediate Past President

P.A. Glasow  
Erlangen, Germany

### General Secretary

R.P.H. Chang  
Northwestern University  
Evanston, IL, USA

### IUMRS ADHERING BODIES

Australian Materials Research Society (A-MRS)  
J.S. Williams, Australian National University

Chinese Materials Research Society (C-MRS)  
L. Zhou, NW Institute for Nonferrous Metal Research

European Materials Research Society (E-MRS)  
G. Marletta, Univerita degli Studi di Catania

Materials Research Society (MRS)  
M.J. Mayo, GUIRR, National Research Council

Materials Research Society of Argentina (MRS-Argentina)  
R. Romero, IFIMAT

Materials Research Society of India (MRS-I)  
D. Chakravorty, Indian Association for the Cultivation of Science

Materials Research Society of Japan (MRS-J)  
T. Kishi, National Institute for Materials Science

Materials Research Society of Korea (MRS-K)  
S.-G. Kang, Hanyang University

Materials Research Society of Russia (MRS-Russia)  
N.Z. Lyakhov, Russian Academy of Sciences

Materials Research Society of Singapore (MRS-S)  
B.V.R. Chowdari, National University of Singapore

Materials Research Society of Taiwan (MRS-T)  
L.J. Chen, National Tsing Hua University

Mexican Materials Research Society (Mexican-MRS)  
L.M. Torres Guerra, Universidad Autónoma de Nuevo León