# About the Materials **Research Society**

The Materials Research Society (MRS), a not-forprofit scientific association founded in 1973, promotes interdisciplinary goal-oriented basic research on materials of technological importance. Membership in the Society includes over 13,400 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 ASTRA 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. Copyright ©2006, Materials Research Society. Permission required to reproduce content. Period-ical 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 \$105 annually for regular members, \$30 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 \$230 for one calendar year (12 issues) within the U.S.A. and \$285 elsewhere. Single copies may be purchased for \$35 each. Requests from sub-scribers 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<sup>®</sup>/Physical, Chemical, and Earth Sciences, the SciSearch® online database, Research Alert®, Science Citation Index®, and the Materials Science Citation Index<sup>TM</sup>. Back volumes of MRS Bulletin are available on 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.

# www.mrs.org/bulletin BULLE S

M.E. Kaufold and D.L. Watterson

T.M. Tritt and M.A. Subramanian

M. Aldissi, S. Banerjee, M.J. Buehler, T.C.M. Chung, A. Giermann, M. Haller, N.E. Hayward, S. Lewis, C. McCormick,

D. Misra, V. Mora Grajales, K.L. Niece,

C. Trager-Cowan, S. Trohalaki, and

B. Poquette, T. Prasad, G. Rao, R. Skaggs,

Advertising

Circulation

**Guest Editors** 

**Special Contributors** 

S Forrest

M. Villegas

Laura Fornaro

A.L. Greer

University of Uruguay

Montevideo, Uruguay

Cambridge University

Aerospace Corporation

Los Angeles, CA

G.G. Long Argonne National Laboratory

Cambridge, UK

Argonne, IL

S.C. Moss

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

**Editorial Assistants** J. Guenther and K.D. Wilson

## **EDITORIAL BOARD**

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

V.S. Arunachalam Carnegie Mellon University Pittsburgh, PA

I.W. Boyd University College London London, UK

R.C. Cammarata Johns Hopkins University Baltimore. MD

## VOLUME ORGANIZERS

2004 P.S. Drzaic Alien Technology Corp.

T.E. Haynes Oak Ridge National Laboratory

President

P.F. Green

H. Van Swygenhoven Paul Scherrer Institute

2005 S.A. Carter University of California, Santa Cruz

M.E. Davis California Institute of Technology

T.P. Russell University of Massachusetts

> J.-C. Zhao **GE** Global **Research Center**

# **Special Consultants**

M.-I. Baraton, M.-G. Chow, R.L. Fleischer, R. Ford, M. Goodway, G. Jabbour, and A. Sellinger

Associate Technical Editor T. Palucka

### **Book Review Board**

J.H. Westbrook (Chair), C. Batich, G. Kellogg, D.C. Martin, R.J. Matyi, L. Olafsen, S. Sant, A. Sellinger, and J.-C. Zhao

## **MRS Office of Public Affairs**

499 South Capitol Street SW. Suite 600 Washington DC 20003

J.R. Weertman Northwestern University Evanston, IL

E. Werwa Washington, D.C.

J.H. Westbrook **Brookline Technologies** Ballston Spa, NY

S.M. Yalisove University of Michigan Ann Arbor. MI

## 2007

T.F. Kuech University of Wisconsin-Madison

T.E. Mallouk Pennsylvania State University

J.A. Nucci Max-Planck-Institute for Metals Research

R.A. Register Princeton University

## 2006 MRS OFFICERS

2006

P.A. Midgley

C.A. Orme

University of Cambridge

National Laboratory

J.A. Rogers University of Illinois at

Urbana-Champaign

Lawrence Livermore

Secretary C.A. Volkert Forschungszentrum Karlsruhe **Executive Director** Materials Research Society J.B. Ballance

University of Michigan Vice President and President-Elect A.J. Hurd Los Alamos National Laboratory

Immediate Past President D.J. Eaglesham

Applied Materials

**INTERNATIONAL UNION OF MATERIALS RESEARCH SOCIETIES** 

<b>President</b>	<b>First Vice President</b>	Second Vice President	<b>Secretary</b>	<b>Treasurer</b>	<b>Immediate Past President</b>	<b>General Secretary</b>	
L. Zhou	G.M. Crean	B.V.R. Chowdari	G. Zhang	H. Yamamoto	R.J. Nemanich	R.P.H. Chang	
NIN	Tyndall Natl. Inst.	National University of Singapore	BIAM	Nihon Univ.	North Carolina State Univ.	Northwestern University	
Xian, Shaanxi, China	Cork, Ireland	Singapore	Beijing, China	Chiba, Japan	Raleigh, NC, USA	Evanston, IL, USA	
IUMRS ADHERING BODIES							
Australian Materials R	esearch Society (A-MRS)		Materials Research Society of Argentina (MRS-Argentina)			Materials Research Society of Singapore (MRS-S)	
J.S. Williams, Australi	an National University		J. Ovejero García, CNEA			B.V.R. Chowdari, National University of Singapore	
Brazil Materials Research Society (B-MRS)			Materials Research Society of India (MRS-I)			Materials Research Society of Taiwan (MRS-T)	
E. Longo, UFSCar			D. Chakravorty, IACS			JM. Liu, ITRI	
Chinese Materials Res L. Zhou, NW Institute	earch Society (C-MRS) for Nonferrous Metal Res	Materials Research S earch O. Takai, Nagoya Uni	Materials Research Society of Japan (MRS-J) O. Takai, Nagoya University			Mexican Materials Research Society (Mexican-MRS) P.H. Hernández Tejeda, Benemérita Universidad Autónoma de Puebla	
European Materials Re H. Grimmeiss, Univers	esearch Society (E-MRS) sity of Lund		Materials Research Society of Korea (MRS-K) JW. Park, Hanyang University				

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

Materials Research Society (MRS) P.F. Green, University of Michigan