

*Micro/Nanoscale Heat Transfer—Part II*

**JOURNAL  
OF  
HEAT  
TRANSFER**



Editor, **YOGESH JALURIA** (2010)  
Assistant to the Editor, **S. PATEL**

Associate Editors

**Yutaka Asako**, Tokyo Metropolitan University, Japan (2010)  
**Gautam Biswas**, Indian Inst. of Tech., Kanpur (2009)  
**Cho Lik Chan**, The University of Arizona (2010)  
**Louis C. Chow**, University of Central Florida (2010)  
**Minking Chyu**, Univ. of Pittsburgh (2009)  
**Frank J. Cunha**, Pratt & Whitney (2011)  
**Ali Ebadian**, Florida International Univ. (2011)  
**Ofodike A. Ezekoye**, Univ. of Texas-Austin (2011)  
**Satish G. Kandlikar**, Rochester Inst. of Tech. (2010)  
**Sung Jin Kim**, KAIST, Korea (2010)  
**Sai C. Lau**, Texas A&M Univ. (2009)  
**Ben Q. Li**, Univ. of Michigan, Dearborn (2009)  
**Raj M. Manglik**, Univ. of Cincinnati (2009)  
**Jayanthi Y. Murthy**, Purdue University (2010)  
**Pamela M. Norris**, Univ. of Virginia (2011)  
**Patrick E. Phelan**, Arizona State Univ. (2011)  
**Roger R. Schmidt**, IBM Corporation (2010)  
**S. A. Sherif**, University of Florida (2010)  
**Heping Tan**, Harbin Institute of Technology (2011)  
**Peter Vadasz**, Northern Arizona University (2010)  
**Jamal Yagoobi**, Illinois Inst. of Tech. (2009)  
**Walter W. Yuen**, Univ. of California—Santa Barbara (2011)

Past Editors

**V. DHIR**  
**J. R. HOWELL**  
**R. VISKANTA**  
**G. M. FAETH**  
**K. T. YANG**  
**E. M. SPARROW**

HEAT TRANSFER DIVISION

Chair, **C. OH**  
Vice Chair, **V. CAREY**  
Past Chair, **T. TONG**

PUBLICATIONS COMMITTEE

Chair, **BAHRAM RAVANI**

OFFICERS OF THE ASME

President,  
**THOMAS M. BARLOW**  
Executive Director,  
**THOMAS G. LOUGHLIN**  
Treasurer,  
**THOMAS D. PESTORIUS**

PUBLISHING STAFF

Managing Director, Publishing  
**PHILIP DI VIETRO**  
Manager, Journals  
**COLIN MCATEER**  
Production Coordinator  
**JUDITH SIERANT**

# Journal of Heat Transfer

Published Monthly by ASME

VOLUME 131 • NUMBER 4 • APRIL 2009

## GUEST EDITORIAL

**040301 Special Issue on Micro/Nanoscale Heat Transfer—Part II**  
Ping Cheng, Steve Choi, Yogesh Jaluria, Dongqing Li, Pamela Norris, and “Robert” D. Y. Tzou

## MICRO/NANOSCALE HEAT TRANSFER—PART II

- 043201 Thermal Conductivity Measurements on Polycrystalline Silicon Microbridges Using the  $3\omega$  Technique**  
Patrick E. Hopkins and Leslie M. Phinney
- 043202 Molecular Dynamics Based Analysis of Nucleation and Surface Energy of Droplets in Supersaturated Vapors of Methane and Ethane**  
Jadran Vrabec, Martin Horsch, and Hans Hasse
- 043203 Heat Transfer Augmentation of Aqueous Suspensions of Nanodiamonds in Turbulent Pipe Flow**  
Shuichi Torii and Wen-Jei Yang
- 043204 Experimental Study of Flow Critical Heat Flux in Alumina-Water, Zinc-Oxide-Water, and Diamond-Water Nanofluids**  
Sung Joong Kim, Tom McKrell, Jacopo Buongiorno, and Lin-Wen Hu
- 043205 Effect of CuO Nanoparticle Concentration on R134a/Lubricant Pool-Boiling Heat Transfer**  
M. A. Kedzierski
- 043206 Atomic-Scale Three-Dimensional Phononic Crystals With a Very Low Thermal Conductivity to Design Crystalline Thermoelectric Devices**  
Jean-Numa Gillet, Yann Chalopin, and Sebastian Volz
- 043207 Examining Interfacial Diffuse Phonon Scattering Through Transient Thermoreflectance Measurements of Thermal Boundary Conductance**  
Pamela M. Norris and Patrick E. Hopkins
- 043208 Contribution of Ballistic Electron Transport to Energy Transfer During Electron-Phonon Nonequilibrium in Thin Metal Films**  
Patrick E. Hopkins and Pamela M. Norris
- 043209 Numerical Study of Thermally Targeted Liposomal Drug Delivery in Tumor**  
Aili Zhang, Xipeng Mi, Geer Yang, and Lisa X. Xu
- 043210 Experimental Investigation of Miniature Three-Dimensional Flat-Plate Oscillating Heat Pipe**  
S. M. Thompson, H. B. Ma, R. A. Winholtz, and C. Wilson
- 043211 Recent Work on Boiling and Condensation in Microchannels**  
Ping Cheng, Guodong Wang, and Xiaojun Quan

(Contents continued on inside back cover)

This journal is printed on acid-free paper, which exceeds the ANSI Z39.48-1992 specification for permanence of paper and library materials. ©™  
♻️ 85% recycled content, including 10% post-consumer fibers.

Transactions of the ASME, Journal of Heat Transfer (ISSN 0022-1481) is published monthly by The American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016. Periodicals postage paid at New York, NY and additional mailing offices.

POSTMASTER: Send address changes to Transactions of the ASME, Journal of Heat Transfer, c/o THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300.

CHANGES OF ADDRESS must be received at Society headquarters seven weeks before they are to be effective. Please send old label and new address.

STATEMENT from By-Laws. The Society shall not be responsible for statements or opinions advanced in papers or ... printed in its publications (B7.1, Para. 3).

COPYRIGHT © 2009 by The American Society of Mechanical Engineers. For authorization to photocopy material for internal or personal use under those circumstances not falling within the fair use provisions of the Copyright Act, contact the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923, tel: 978-750-8400, www.copyright.com. Request for special permission or bulk copying should be addressed to Reprints/Permission Department, Canadian Goods & Services Tax Registration #126148048