

**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)

**Louis C. Burmeister**, Univ. of Kansas (2008)

**Cho Lik Chan**, The University of Arizona (2010)

**Louis C. Chow**, University of Central Florida (2010)

**Minking Chyu**, Univ. of Pittsburgh (2009)

**A. Haji-Sheikh**, Univ. of Texas at Arlington (2008)

**Anthony M. Jacobi**, Univ. of Illinois (2008)

**Yogendra Joshi**, Georgia Inst. of Tech. (2008)

**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)

**Roger R. Schmidt**, IBM Corporation (2010)

**Jamal Seyed-Yagoobi**, Illinois Inst. of Tech. (2009)

**S. A. Sherif**, University of Florida (2010)

**Bengt Sunden**, Lund Inst. of Tech., Sweden (2008)

**Peter Vadasz**, Northern Arizona University (2010)

**Walter W. Yuen**, Univ. of California—Santa Barbara (2008)

Past Editors

**V. DHIR**

**J. R. HOWELL**

**R. VISKANTA**

**G. M. FAETH**

**K. T. YANG**

**E. M. SPARROW**

**HEAT TRANSFER DIVISION**

Chair, **T. W. TONG**

Vice Chair, **C. H. OH**

Past Chair, **R. W. DOUGLASS**

**PUBLICATIONS COMMITTEE**

Chair, **BAHRAM RAVANI**

**OFFICERS OF THE ASME**

President, **SAM Y. ZAMRIK**

Executive Director,

**VIRGIL R. CARTER**

Treasurer,

**THOMAS D. PESTORIUS**

**PUBLISHING STAFF**

Managing Director, Publishing

**PHILIP DI VIETRO**

Manager, Journals

**COLIN McATEER**

Production Coordinator

**JUDITH SIERANT**

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 © 2008 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

# Journal of Heat Transfer

Published Monthly by ASME

VOLUME 130 • NUMBER 2 • FEBRUARY 2008

## RESEARCH PAPERS

### *Electronic Cooling*

- 021401 Exergy Analysis of Data Center Thermal Management Systems  
Amip J. Shah, Van P. Carey, Cullen E. Bash, and Chandrakant D. Patel

### *Evaporation, Boiling, and Condensation*

- 021501 Direct Numerical Simulation of Condensing Stratified Flow  
Djamel Lakehal, Marco Fulgosi, and George Yadigaroglu

### *Forced Convection*

- 021701 Temperature Scalings and Profiles in Forced Convection Turbulent Boundary Layers  
Xia Wang, Luciano Castillo, and Guillermo Araya

### *Heat Transfer Enhancement*

- 021901 Heat Transfer Enhancement of Air Flowing Across Grooved Channels: Joint Effects of Channel Height and Groove Depth  
El Hassan Ridouane and Antonio Campo

### *Jets, Wakes, and Impingement Cooling*

- 022201 Influence of a Coflowing Ambient Stream on a Turbulent Axisymmetric Buoyant Jet  
S. Habli, N. Mahjoub Said, H. Mahmoud, H. Mhiri, G. Le Palec, and Ph. Bournot

### *Micro/Nanoscale Heat Transfer*

- 022401 Influence of Inelastic Scattering at Metal-Dielectric Interfaces  
Patrick E. Hopkins, Pamela M. Norris, and Robert J. Stevens
- 022402 Thermal Transport in a Microchannel Exhibiting Ultrahydrophobic Microribs Maintained at Constant Temperature  
D. Maynes, B. W. Webb, and J. Davies
- 022403 Study on Micropump Using Boiling Bubbles  
Yasuo Koizumi and Hiroyasu Ohtake

### *Porous Media*

- 022601 Effective Thermal Diffusivity of Porous Media in the Wall Vicinity  
H. Sakamoto and F. A. Kulacki
- 022602 Thermophysical Properties of Biporous Heat Pipe Evaporators  
Tadej Semenic, Ying-Yu Lin, and Ivan Catton

## TECHNICAL BRIEFS

- 024501 Heat-Transfer Enhancement by Chaotic Advection in the Eccentric Helical Annular Flow  
José P. B. Mota, António J. S. Rodrigo, and Estéban Saatdjian
- 024502 Analytical Solution for Heat Conduction Near an Encapsulated Sphere With Heat Generation  
Douglas L. Oliver
- 024503 Simulation of Thermal Transport in Open-Cell Metal Foams: Effect of Periodic Unit-Cell Structure  
Shankar Krishnan, Suresh V. Garimella, and Jayathi Y. Murthy

(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.