

A Twenty-Fourth Successful Year for the *Journal of Thermophysics and Heat Transfer*

SUPPORT from the thermophysics and heat transfer community for the *Journal of Thermophysics and Heat Transfer (JTHT)* continues to be strong. Between 31 October 2009 and 1 November 2010, 176 papers were submitted to *JTHT*, with 30% originating from technical meetings. During this same time period, over 350 reviews were completed by volunteers to ensure the quality of *JTHT*. The average time between the receipt of a manuscript and the Associate Editor's decision to accept or revise was 4.3 months for the articles appearing in 2010. Fifty percent of the decisions were made in less than 3.5 months. The average time between final acceptance and publication was 5.0 months in 2010. The total number of pages was 852, and all four issues of Volume 24 were on schedule.

A Full-Spectrum Publication

It should be reemphasized that *JTHT* is a full-spectrum publication in the field of thermophysics and heat transfer, a breadth illustrated by the following list of pertinent topics:

Aerothermodynamics

Reentry
Thermal protection
Low density
Laser interaction
Ablation
Plumes
Computational

Thermal Control

Heat pipes
Thermal modeling
Electronics cooling
Large space structures
Contamination
Cryogenics
Insulation

Nonintrusive Diagnostics

IR signatures
Remote sensing
Laser techniques
Particle sizing
Scattering techniques

Thermophysical Properties

Thermodynamic
Transport
Optical/radiative

Radiative Heat Transfer

Surface interchange
Absorbing/emitting media
Multiple scattering
Nongray analysis
Multidimensional
Coupled with conduction
Coupled with convection

Conduction/Phase Change

Contact conductance
Composite materials
Inverse problems
Conjugate problems
Nonlinear problems
Analytical techniques
Melting/solidification

Convective Heat Transfer

Forced convection
Natural convection
Mixed convection
Internal/external flows
Boiling/condensation

Numerical Heat Transfer

Finite difference
Finite element
Parallel processing

A discipline-oriented publication, *JTHT* presents both original contributions of a fundamental nature and application-type papers. Analytical, numerical, and experimental approaches are all encouraged. Papers on the topics of aerothermodynamics, thermal control, and numerical heat transfer are especially encouraged. Although *JTHT* is published by AIAA, papers are not restricted to aerospace topics. Authors from the international thermophysics and heat transfer community are invited to submit papers.

Accuracy and Ethics

The AIAA Publications Committee approved the following: "The AIAA journals will not accept for publication any paper

reporting 1) numerical solutions of an engineering problem that fails to adequately address accuracy of the computed results or 2) experimental results unless the accuracy of the data is adequately presented." The purpose of this statement is to reiterate the desire to have high-quality investigations with properly documented results published in the AIAA journals and to clarify acceptable standards for presentation of numerical and experimental results. The editors and reviewers will remain the final judges. An ethical standards document was also approved by the Publications Committee and is reproduced in its entirety in this issue. Prospective authors and reviewers are encouraged to study it carefully.

Manuscript Submission

Authors are requested to prepare their manuscripts electronically to reduce publication delays. Starting on 1 August 2010, authors have been required to submit their manuscripts to *JTHT* using ScholarOne. PDF format is preferred. Please check AIAA's web site at <http://mc.manuscriptcentral.com/aiaa-jtth> for more details.

2010 AIAA Thermophysics Award Recipient



Dr. Datta Gaitonde, Research Aerospace Engineer, U.S. Air Force Research Laboratory, Wright-Patterson Air Force Base, was selected as the 2010 recipient of the AIAA Thermophysics Award. Dr. Gatonde was chosen in recognition of his technical expertise and innovation, leadership within the international thermophysics community, and commitment to the development of researchers across government, industry, and academia. The

AIAA Thermophysics Award is presented for an outstanding singular or sustained technical or scientific contribution by an individual in thermophysics, specifically as related to the properties and mechanisms involved in thermal energy transfer and the study of environmental effects on such properties and mechanisms. This award was presented to him at the 10th AIAA/ASME Joint Thermophysics and Heat Transfer Conference on 29 June 2010 in Chicago, Illinois.

2011 Editorial Team

The editorial team includes Associate Editors and members of the Editorial Advisory Board. The Associate Editors are responsible for the technical evaluation of manuscripts, and the burden of maintaining quality rests predominantly with them. I encourage you to discuss your views of *JTHT* with members of the editorial team.

Appreciation

I would like to express my personal thanks to the authors who have chosen *JTHT* as the vehicle for their research work. I also want to thank the reviewers who have contributed their time to ensure the success of *JTHT*. Their names are listed in this issue. I would like to express my appreciation to Becky Rivard (Managing Editor) and Amanda Maguire (Product Manager, Journals) for their help in keeping *JTHT* on schedule.

Alfred L. Crosbie
Editor-in-Chief

Editor-in-Chief



ALFRED L. CROSBIE, Curators' Professor of mechanical engineering at the Missouri University of Science and Technology (S&T), received his B.S. from the University of Oklahoma in 1964, his M.S. in 1966, and his Ph.D. in 1969 from Purdue University, all in mechanical engineering. He joined the faculty of Missouri S&T in 1968, where he was promoted to Professor in 1975. He has been an active researcher in the field of radiative heat transfer since 1964. His current research interests include multidimensional radiative heat transfer, multiple scattering, numerical heat transfer, and laser interaction. Dr. Crosbie has served as a Member of the AIAA Thermophysics Technical Committee (1976–1978), Technical Program Chairman for the AIAA 15th Thermophysics Conference (1980), Editor of two thermophysics volumes in the AIAA Progress in Astronautics and Aeronautics book series (1981), Associate Editor for the *AIAA Journal* (1981–1983), and Chairman of the AIAA Thermophysics Technical Committee (1984–1986). He is a Fellow of the AIAA, the American Association for the Advancement of Science, and the American Society of Mechanical Engineers (ASME); a recipient of the AIAA Thermophysics Award (1987), the ASME Heat Transfer Memorial Award (1990), and the AIAA Sustained Service Award (2004); and an Associate Editor for the *Journal of Quantitative Spectroscopy and Radiative Transfer* (1979–2011). He was a Member of the Editorial Advisory Board for *Heat Transfer—Recent Contents* (1996–2000). Dr. Crosbie is the author or coauthor of over 80 papers in archival journals.

Associate Editors



PING CHENG, Chair Professor of the School of Mechanical Engineering at Shanghai Jiaotong University, received his B.S. in mechanical engineering from Oklahoma State University in 1958, his M.S. in mechanical engineering from Massachusetts Institute of Technology in 1960, and his Ph.D. in aeronautics and astronautics from Stanford University in 1965. He served as Chair of mechanical engineering at the University of Hawaii (1987–1994) and as Head of mechanical engineering at Hong Kong University of Science and Technology (1995–2002). His recent research centers on transport in microsystems, fuel cells, and heat transfer in porous media. Dr. Cheng is a Fellow of the American Society of Mechanical Engineers (ASME) and AIAA. He is a recipient of the ASME Heat Transfer Memorial Award (1996), the AIAA Thermophysics Award (2003), the ASME/AIChE Max Jakob Memorial Award (2005), and the ASME Heat Transfer Division's Classic Paper Award (2006). He is an Editor of the *International Journal of Heat and Mass Transfer*, *International Communications in Heat and Mass Transfer*, and *International Communications in Heat and Mass Transfer*; and he is a Member of the Editorial Boards of *Numerical Heat Transfer*, *Experimental Heat Transfer*, *Journal of Porous Media*, *Acta Mechanica*, *Revue Generale de Thermique*, *Advances in Fuel Cells*, *Computational Thermal Sciences*, *International Journal of Green Energy*, and *Computational Thermal Sciences*. He is the author or coauthor of over 200 papers in archival journals.



RONALD L. DOUGHERTY, Professor and Chair of mechanical engineering at the University of Kansas (KU), received his B.S. in 1972, his M.S. in 1974, and his Ph.D. in 1978 from the University of Missouri–Rolla, all in mechanical engineering. Before joining KU in 1999, he held positions at Pratt & Whitney Aircraft (1978–1983), Terra Tek, Inc. (1983–1985), and Oklahoma State University (1985–1999). His recent research centers on radiative transfer in participating media, dynamic light scattering/photon spectroscopy, and particle characterization by nonintrusive laser diagnostics. Dr. Dougherty was a Member of the AIAA Thermophysics Technical Committee (1986–1989), Thermophysics Technical Program Chair at the 30th AIAA Aerospace Sciences Meeting (1992), and Chair of the Oklahoma Section of the AIAA (1995–1996). He has been a Member of the American Society of Mechanical Engineers Heat Transfer Division's Committee on Theory and Fundamental Research since 1993. He is an Associate Fellow of the AIAA. He has chaired 10 thermophysics sessions at AIAA meetings. He is the author or coauthor of over 40 publications.



JE-CHIN HAN, Distinguished Professor and endowed Marcus C. Easterling Chair of mechanical engineering at Texas A&M University, received his B.S. from National Taiwan University in 1970, his M.S. from Lehigh University in 1973, and his Sc.D. from Massachusetts Institute of Technology in 1976, all in mechanical engineering. After working at Ex-Cell-O Corporation (1976–1980) as a Research and Development Engineer, he joined the faculty of Texas A&M University in 1980, where he was promoted to Professor in 1989. His research centers on augmentation in gas turbine blade cooling, heat transfer in rotating flows, and film cooling in unsteady high turbulent flows. He was a Member of the AIAA Thermophysics Technical Committee (1997–2000) and was Thermophysics Program Chair at the 38th AIAA Aerospace Sciences Meeting (2000). He is the recipient of the American Society Mechanical Engineers (ASME) Heat Transfer Memorial Award (2002) and the AIAA Thermophysics Award (2004). Dr. Han is a Fellow of ASME and an Associate Fellow of the AIAA. He was an Associate Technical Editor of the *Journal of Heat Transfer* (1997–2000) and the *Journal of Turbomachinery* (2004–2011). He is author or coauthor of over 190 papers in archival journals and a book on gas turbine heat transfer.



DEBORAH A. LEVIN, Professor of aerospace engineering at Pennsylvania State University (PSU), received her B.S. in 1974 from the State University of New York at Stony Brook and her Ph.D. in 1979 from the California Institute of Technology, both in chemistry. Before joining PSU in 2000, she held positions at the Institute for Defense Analyses (1979–98) and George Washington University (1998–2000). Her recent research centers around chemically reacting hypersonic flows, radiation from hypersonic flows, and modeling with the direct simulation Monte Carlo method. She has been a Member of the AIAA Plasmadynamics and Lasers Technical Committee since 1994 and is a past chair. She is an Associate Fellow of the AIAA. She has coauthored over 100 archival journal articles.



GREG F. NATERER is an Associate Dean and Canada Research Chair Professor in Mechanical Engineering at the University of Ontario Institute of Technology (UOIT) in Oshawa, Canada. His research interests include multiphase heat transfer, hydrogen production, and clean energy systems, including over 320 journal and conference papers, six patents, and two textbooks in these fields. He is a Fellow of the Canadian Society for Mechanical Engineering (CSME), the American Society of Mechanical Engineers (ASME), and the Engineering Institute of Canada (EIC). Dr. Naterer received his Ph.D. in Mechanical Engineering from the University of Waterloo in 1995.



ZHUOMIN ZHANG, Professor of mechanical engineering at Georgia Institute of Technology, received his B.S. in 1982 and his M.S. in 1985 from the University of Science and Technology of China (USTC) in engineering thermophysics and his Ph.D. in 1992 from the Massachusetts Institute of Technology in mechanical engineering. Before joining Georgia Institute of Technology in 2002, he held positions at National Institute of Standards and Technology (NIST) (1992–1995) and at the University of Florida (1995–2002). His recent research centers around micro/nanoscale heat transfer, especially thermophysical properties, radiative transfer, radiation thermometry for microelectronics, and energy conversion systems. He was a Member of the AIAA Thermophysics Technical Committee (2001–2007) and Technical Program Chair for the 37th AIAA Thermophysics Conference (2004). He served as Chair of the American Society of Mechanical Engineers (ASME) Heat Transfer Division's Committee on Low Temperature Heat Transfer (2000–2003). He was a recipient of the Presidential Early Career Award for Scientists and Engineers (1999), the ASME Heat Transfer Division's Best Paper Award (2000), and the AIAA Thermophysics Best Paper Award (2005). He is an Associate Fellow of the AIAA and a Fellow of ASME. He is the author or coauthor of over 100 archival journal articles and author of textbooks on nano/microscale heat transfer.

Editorial Advisory Board



TOM J. LOVE, George Lynn Cross Professor Emeritus of aerospace, mechanical, and nuclear engineering and Halliburton Professor of engineering at the University of Oklahoma, received his B.S. from the University of Oklahoma in 1948, his M.S. from the University of Kansas in 1956, and his Ph.D. from Purdue University in 1963, all in mechanical engineering. In 1956, he joined the faculty of the University of Oklahoma, where he was promoted to Professor (1965) and served as Director of the School of Aerospace, Mechanical, and Nuclear Engineering (1963–1972). He was a Member of the AIAA Thermophysics Technical Committee (1970–1972), an Associate Editor for the *AIAA Journal* (1972–1975), and an Associate Editor for the *Journal of Bioengineering* (1976–1979). He is a Fellow of the AIAA and the American Society of Mechanical Engineers (ASME). Dr. Love is a recipient of the AIAA Thermophysics Award (1984) and of the ASME Memorial Heat Transfer Award (1989).



ROBERT SIEGEL, Heat Transfer Consultant, received his B.S. in 1950 and M.S. in 1951 from the Case Institute of Technology and his Sc.D. from the Massachusetts Institute of Technology in 1953, all in mechanical engineering. He worked at NASA John H. Glenn Research Center at Lewis Field from 1955 to 1999 and became a Senior Research Scientist. Before joining NASA, he worked for General Electric as a heat transfer engineer and analyst. He has been an active researcher in heat transfer since 1950. The majority of his research is in radiative heat transfer, reduced-gravity boiling, transient convection, and solidification. He invented the first drop tower. He served as an Associate Technical Editor for the *Journal of Heat Transfer* (1973–1983) and an Associate Editor of the *Journal of Thermophysics and Heat Transfer* (1986–1998). Dr. Siegel is a Fellow of the AIAA and the American Society of Mechanical Engineers (ASME) and a Member of the Honorary Advisory Boards of the *International Journal of Heat and Mass Transfer* and *International Communications in Heat and Mass Transfer*. He is the recipient of the ASME Heat Transfer Division's Memorial Award (1970), the NASA Exceptional Scientific Achievement Award (1986), a Space Act Award (1993), the AIAA Thermophysics Award (1993), and the ASME/AICHE Max Jakob Memorial Award (1996).



RAYMOND VISKANTA, W.F.M. Goss Distinguished Professor Emeritus of engineering at Purdue University, received his B.S. from the University of Illinois in 1955 and his M.S. in 1956 and Ph.D. in 1960 from Purdue University, all in mechanical engineering. After a brief period with Argonne National Laboratory, he joined the faculty of Purdue University, where he was promoted to Professor in 1966. He was a Member of the AIAA Thermophysics Technical Committee (1972–1975), General Chairman of the 2nd AIAA/ASME Joint Thermophysics and Heat Transfer Conference (1978), and Editor of two volumes in the AIAA Progress in Astronautics and Aeronautics book series (1979). He is a recipient of the AIAA Thermophysics Award (1979), the ASME/AlChE Max Jakob Memorial Award (1986), and the 1991 Nusselt-Reynolds Prize. Dr. Viskanta is a Fellow of the American Society of Mechanical Engineers and the AIAA, a Member of the National Academy of Engineering, a Dr.-Ing. E.h. (Honorary Doctor of Engineering Degree) from the Technical University of Munich, and has an Honorary Doctor of Engineering degree from Purdue University. He was an Associate Editor for the *Journal of Quantitative Spectroscopy and Radiative Transfer* (1969–1972), and the Technical Editor of the *Journal of Heat Transfer* (1990–1995). He is a Member of the Editorial Advisory Boards of the *International Journal of Heat and Mass Transfer*, the *AIAA Journal*, and *Numerical Heat Transfer*. He was Chair of the Committee on Microgravity Research and a Member of the Space Studies Board of the National Research Council (1997–2000).



M. MICHAEL YOVANOVICH, Distinguished Professor Emeritus of mechanical and mechatronics engineering at the University of Waterloo, Ontario, Canada, received his B.S. from Queen's University in 1957, his M.S. from the State University of New York at Buffalo in 1963, and his M.E. and Sc.D. from the Massachusetts Institute of Technology in 1965 and 1967, respectively. He joined the faculty of the University of Waterloo, where he was promoted to Professor in 1972. He was a Member of the AIAA Thermophysics Technical Committee (1971–1974, 1985–1988, and 1991–1994), General Chairman of the first AIAA/ASME Joint Thermophysics and Heat Transfer Conference (1974), and Editor of a thermophysics volume in the AIAA Progress in Astronautics and Aeronautics book series (1975). He is a recipient of the AIAA Thermophysics Award (1985) and the AIAA Award for Best Technical Paper in Thermophysics (1983 and 1994). Dr. Yovanovich is a Fellow of the American Association for the Advancement of Science, the AIAA, the American Society of Mechanical Engineers, the Canadian Society of Mechanical Engineers, and the Royal Society of Canada. He was an Associate Technical Editor of the *Journal of Heat Transfer* (1984–1986) and Associate Editor of the *Journal of Electronic Packaging* (1988–1993). He was a Member of the Editorial Advisory Boards of the *Transactions of the Canadian Society of Mechanical Engineers* and the *International Journal of Heat and Fluid Flow*.