

A Twenty-first Successful Year for *JTHT*

SUPPORT from the thermophysics and heat transfer community for the *Journal of Thermophysics and Heat Transfer (JTHT)* continues to be strong. Between October 31, 2006 and November 1, 2007, 158 papers were submitted to *JTHT* with 27% originating from technical meetings. During this same time period, over 325 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 3.0 months for the articles appearing in 2007. Fifty percent of the decisions were made in less than 2.6 months. The average time between final acceptance and publication was 6.7 months in 2007. The total number of pages was 831, and all four issues of volume 21 were on schedule.

A Full-Spectrum Publication

It should be re-emphasized 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

Re-entry
Thermal protection
Low density
Laser interaction
Ablation
Plumes
Computational

Radiative Heat Transfer

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

Thermal Control

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

Conduction/Phase Change

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

Nonintrusive Diagnostics

IR signatures
Remote sensing
Laser techniques
Particle sizing
Scattering techniques

Convective Heat Transfer

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

Thermophysical Properties

Thermodynamic
Transport
Optical/radiative

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 elsewhere 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. AIAA has developed a web-based manuscript tracking system called WriteTrack. Starting on March 3, 2003, authors have been required to submit their manuscripts to *JTHT* using WriteTrack. PDF format is preferred. Please check AIAA's Web site at <http://www.aiaa.org> for more details.

2007 AIAA Thermophysics Award Recipient

Dr. Graham Candler, Professor in the Department of Aerospace



Engineering and Mechanics at the University of Minnesota, was selected as the 2007 recipient of the AIAA Thermophysics Award. Dr. Candler was chosen for outstanding contributions toward development, validation, and application of state-of-the-art numerical techniques for high temperature gas dynamics flows in thermochemical nonequilibrium. 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 39th Thermophysics Conference on 26 June 2007 in Miami, FL.

2008 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. Allie Smith has retired as Associate Editor, after serving for 22 years. Greg Naterer has been appointed Associate Editor. 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 Luke McCabe (Managing Editor) and Norma Brennan (Director of Publications) 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 the 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 (1976–78), 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* (1981–83), and Chairman of the AIAA Thermophysics Technical Committee (1984–86). He is a Fellow of AIAA, AAAS, and ASME, a recipient of the AIAA Thermophysics Award (1987) and the ASME Heat Transfer Memorial Award (1990), and an Associate Editor for the *Journal of Quantitative Spectroscopy and Radiative Transfer* (1979–2008). 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 Mechanical and Power 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 (1987–94) and as Head of Mechanical Engineering at Hong Kong University of Science and Technology (1995–2002). His recent research centers on transport in micro-systems, fuel cells, heat transfer in porous media, and reciprocating compressible flow. Dr. Cheng is a Fellow of ASME and AIAA. He is a recipient of the ASME Heat Transfer Memorial Award (1996), the AIAA Thermophysics Award (2003), and the ASME/AICHE Max Planck Memorial Award (2005). He is an editor of the *International Journal of Heat and Mass Transfer* and *International Communications in Heat and Mass Transfer*, and is a member of editorial boards of *Numerical Heat Transfer*, *Experimental Heat Transfer*, *Journal of Porous Media*, *Acta Mechanica*, *Revue Generale de Thermique*, and *International Journal of Green Energy*. He is author or coauthor of over 200 publications.



RONALD L. DOUGHERTY, Professor and Chair of Mechanical Engineering at the University of Kansas (KU), received his B.S. in 1972, M.S. in 1974, and 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 (1978–83), Terra Tek, Inc. (1983–85), and Oklahoma State University (1985–99). 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 (1986–89), Thermophysics Technical Program Chair at the AIAA 30th Aerospace Sciences Meeting (1992), and Chair of the Oklahoma Section of AIAA (1995–96). 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 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 (1976–80) as a R&D 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 AIAA 38th Aerospace Sciences Meeting (2000). He is the recipient of the ASME Heat Transfer Memorial Award (2002) and the AIAA Thermophysics Award (2004). Dr. Han is a Fellow of ASME and an Associate Fellow of AIAA. He was an Associate Technical Editor of *ASME Journal of Heat Transfer* (1997–2000). He is author or coauthor of over 170 papers in archival journals and a book on gas turbine heat transfer.



DEBORAH A. LEVIN, Professor of Aerospace Engineering at The Pennsylvania State University (PSU), received her B.S. in 1974 from State University of New York at Stony Brook and her Ph.D. in 1979 from California Institute of Technology, both in chemistry. Before joining PSU in 2000, she held positions at the Institute for Defense Analyses (IDA) (1979–98) and George Washington University (1998–2000). Her recent research centers around chemically-reacting hypersonic flows, radiation from supersonic rocket plumes, and modeling with the Direct Simulation Monte Carlo (DSMC) method. She has been a member of the AIAA Plasmadynamics and Lasers Committee since 1994, and she was Technical Program Chair for Plasmadynamics and Lasers at the AIAA 36th Aerospace Sciences Meeting (1998). She is an Associate Fellow of AIAA. She is the author or coauthor of over 50 archival journal articles.



GREG F. NATERER, Tier 1 Canada Research Chair in Advanced Energy Systems and Professor of Mechanical Engineering at the University of Ontario Institute of Technology (UOIT), received his B.Math. in applied mathematics in 1989, his M.A.Sc. in mechanical engineering in 1991, and his Ph.D. in mechanical engineering in 1995, all from the University of Waterloo, Ontario, Canada. Before joining UOIT in 2005, he held faculty positions at the University of New Brunswick (1995–96), Lakehead University (1996–99), and the University of Manitoba (1999–2005). His recent research centers on convective heat transfer, multiphase flows, second law methods, and micro-scale heat transfer. He was a member of the AIAA Thermophysics Technical Committee (2000–2006), Thermophysics Technical Program Chair at the AIAA 42nd Aerospace Sciences Meeting (2004), and Conference Chair of the AIAA 39th Thermophysics Conference (2007). Dr. Naterer is an Associate Fellow of AIAA and a Fellow of CSME. He is the author and coauthor of over 80 archival journal articles and two books.



ZHUOMIN ZHANG, Professor of Mechanical Engineering at Georgia Institute of Technology, received his B.S. in 1982 and M.S. in 1985 from University of Science and Technology of China (USTC) in engineering thermophysics, and his Ph.D. in 1992 from Massachusetts Institute of Technology in mechanical engineering. Before joining Georgia Tech in 2002, he held positions at National Institute of Standards (NIST) (1992–95) and at the University of Florida (1995–2002). His recent research centers around micro/nanoscale heat transfer, especially thermophysical properties, radiative transfer, and radiation thermometry. He was a member of the AIAA Thermophysics Technical Committee (2001–2006) and Technical Program Chair for the 37th AIAA Thermophysics Conference (2004). He served as chair of ASME Heat Transfer Division's Committee on Low Temperature Heat Transfer (2000–2003). He is an Associate Fellow of AIAA and a Fellow of ASME. He is the author or coauthor of over 60 archival journal articles.

Editorial Advisory Board



DONALD K. EDWARDS, Professor Emeritus of Mechanical Engineering at the University of California, Irvine (UCI), received his B.S. in 1954, M.S. in 1956, and Ph.D. in 1959 from the University of California, Berkeley, all in mechanical engineering. In 1959 he joined the faculty of the University of California, Los Angeles, where he was promoted to Professor in 1968 and served as Chairman of Chemical, Nuclear, and Thermal Engineering (1975–78). At UCI he served as Chairman of Mechanical Engineering and Associate Dean of Engineering before retiring in 1991. He received the ASME Heat Transfer's Memorial Award (1973) and was the first recipient of the AIAA Thermophysics Award (1976). He was a Technical Editor for the ASME *Journal of Heat Transfer* (1975–81) and an Associate Editor for the *International Journal of Solar Energy* (1983–85). He is a Fellow of AIAA and ASME and a member of the Editorial Advisory Board for the *International Journal of Heat and Mass Transfer*.



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 (1963–72). He was a member of the AIAA Thermophysics Technical Committee (1970–72), an Associate Editor for the AIAA *Journal* (1972–75), and an Associate Editor for ASME *Journal of Bioengineering* (1976–79). He is a Fellow of AIAA and ASME. Dr. Love is a recipient of the AIAA Thermophysics Award (1984) and of the ASME Memorial Heat Transfer Award (1989).



JAMES N. MOSS, Senior Research Engineer for Aerothermodynamics at the NASA Langley Research Center, received his B.S. in engineering science from the Tennessee Polytechnic Institute in 1962, his M.S. in aerospace engineering from the University of Virginia in 1968, and his Ph.D. in aerospace engineering from Virginia Polytechnic Institute and State University in 1972. He also received an M.S. in engineering administration in 1988 from George Washington University. Dr. Moss joined NASA in 1962, where his early research assignments dealt with ablating systems. His current research concerns transitional and rarefied flows. Dr. Moss has been active in the AIAA thermophysics community: member of the AIAA Thermophysics Technical Committee (1978–80), Technical Program Chairman of the 16th AIAA Thermophysics Conference (1981), General Program Chairman of the 20th AIAA Thermophysics Conference (1985), Co-Editor of a thermophysics volume in the AIAA Progress in Astronautics and Aeronautics book series (1986), Chairman of the AIAA Thermophysics Technical Committee (1986–88), and Associate Editor of the *Journal of Thermophysics and Heat Transfer* (1986–89). He is a Fellow of AIAA and a member of the International Advisory Committee on Rarefied Gas Dynamics. Dr. Moss is a recipient of the AIAA Thermophysics Award (1989) and the NASA Exceptional Engineering Achievement Medal (1990).



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* (1973–83) and an Associate Editor of the *Journal of Thermophysics and Heat Transfer* (1986–98). Dr. Siegel is a Fellow of AIAA and 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 (1972–75), 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 ASME Heat Transfer Division's Memorial Award (1976), the AIAA Thermophysics Award (1979), the ASME Senior Research Award (1984), the ASME/AIChE Max Jakob Memorial Award (1986), the ASME Melville Medal (1988), and the 1991 Nusselt-Reynolds Prize of the Assembly of World Conferences on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics. Dr. Viskanta is a Fellow of ASME and AIAA, a member of the National Academy of Engineering, a foreign member of the Academy of Engineering Sciences of the Russian Federation, and a Dr.-Ing. E.h. (Honorary Doctor of Engineering Degree) from Technical University of Munich. He was an Associate Editor for the *Journal of Quantitative Spectroscopy and Radiative Transfer* (1969–72), an Associate Technical Editor for the *Journal of Heat Transfer* (1981–87) and *Experimental Heat Transfer* (1987–90), and the Technical Editor of the ASME *Journal of Heat Transfer* (1990–95). He is a member of the Editorial Advisory Boards of the *International Journal of Heat and Mass Transfer*, *International Journal of Heat and Fluid Flow*, *AIAA Journal*, and *Numerical Heat Transfer* and was Chair of the Committee on Microgravity Research and member of the Space Studies Board of the National Research Council (1997–2000).



M. MICHAEL YOVANOVICH, Distinguished Professor Emeritus of Mechanical 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. After a brief period with the University of Poitiers in France, 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 (1971–74, 85–88, 91–94), 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 (1984) and the AIAA Award for Best Technical Paper in Thermophysics (1983 and 1994). Dr. Yovanovich is a Fellow of AAAS, AIAA, and ASME. He was an Associate Technical Editor of the ASME *Journal of Heat Transfer* (1984–86) and Associate Senior Editor of the ASME *Journal of Electronic Packaging* (1988–93). 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*.