

Editor-in-Chief



R. H. WOODWARD WAESCHE is a Senior Scientist at Science Applications International Corporation (SAIC) and received his B.A. in Physics from Williams College in 1952, his M.A. in 1962, and his Ph.D. in Aerospace and Mechanical Sciences from Princeton University in 1965. Before joining SAIC in 1993, he served in the U.S. Army, and held senior positions at Rohm & Haas Company (1954–1966), United Technologies Research Center (1966–1981), and Atlantic Research Corporation (1981–1992). His research interests center on propulsion-related combustion, especially on unsteady combustion in solid-propellant rockets and its suppression by additives. He has also performed extensive research on combustor flowfields; his most recent publications, one of which won the Solid Rockets Best Paper Award (1990), dealt with flow in the Space Shuttle Booster. Dr. Waesche chaired the AIAA Propellants & Combustion Technical Committee (1975–1977) and is currently Director-Technical of the AIAA Propulsion & Energy Group, a long-time member (since 1978) of the Technical Activities Committee, and a member of the AIAA Finance Committee. He served as Editor-in-Chief of the *Journal of Spacecraft and Rockets* from 1980 to 1986, when he assumed the post of Editor-in-Chief of this journal. Dr. Waesche is a Fellow of the AIAA, and has contributed an article on Spectroscopy to the *Dictionary of Science and Technology*, among numerous technical publications.

Associate Editors



JOHN BROPHY has been the supervisor of the Advanced Propulsion Technology Group at the Jet Propulsion Laboratory (JPL) since 1991, and is responsible for determining the direction and execution of NASA's advanced propulsion technology program. He has been with JPL since 1985, except for two years, from 1988 to 1990, which he spent working for a small business specializing in electric propulsion. John Brophy received a Ph.D. in 1984 in Mechanical Engineering from Colorado State University. Prior to that he worked at NASA's Marshall Space Flight Center from 1980 to 1981. In addition he received an M.S. degree in Mechanical Engineering from Colorado State University in 1980 and a B.S. degree in Mechanical Engineering from the Illinois Institute of Technology in 1978. Dr. Brophy is the author of over 50 conference papers, journal articles, and reports dealing with electric and advanced propulsion technology development, he holds three patents related to electric propulsion and has received six NASA Certificates of Recognition and one AIAA Certificate of Merit for contributions to electric propulsion.



RODNEY L. BURTON received his Ph.D. in the area of Electric Propulsion from Princeton University in 1966. He has been a faculty member at the University of Illinois at Urbana-Champaign, in the Department of Aeronautical and Astronautical Engineering, since 1989. His primary research interests are electric rocket propulsion, high pressure combustion, high velocity guns, and high energy arc discharges, and he advises the thesis research of graduate and undergraduate student students in these areas. He was General Chairman of the AIAA International Electric Propulsion Conference in 1990. From 1981–1989 he was with G.T.-Devices, Inc., Alexandria, Virginia, performing basic research on electrothermal arc discharges and electromagnetic railguns. From 1979–1981 he was with the Plasma Propulsion Laboratory, Princeton University, where he measured the performance of the "benchmark" MPD thruster. He is the author of 100 journal articles and reports.



PATRICK BARRY BUTLER is Professor of Mechanical Engineering at the University of Iowa and received B.S. and M.S. degrees in Aeronautical and Astronautical Engineering from the University of Illinois at Urbana-Champaign and a Ph.D. in Mechanical Engineering from the same university. Dr. Butler is active in a number of aerospace-related instructional and research activities at the University of Iowa, where he also serves as campus coordinator of the Iowa Space Grant Consortium. His current research interests include multi-phase reactive flows, shock initiation of energetic materials, and combustion of solid propellants and pyrotechnics. Dr. Butler has worked as a visiting research Fellow for the U.S. Navy and Sandia National Laboratories where he conducted research in the area of solid propellant and energetic materials modeling. In addition to his editorial duties with the AIAA *Journal of Propulsion and Power*, Dr. Butler is a member of the AIAA Technical Committee on Propellants and Combustion. In 1991 he was awarded the Society of Automotive Engineers' Ralph R. Teetor Educational Award from the Aerospace Division, and the American Society of Mechanical Engineers' Outstanding Professor Award from the student chapter at the University of Iowa.



WILLIAM W. COPENHAVER is currently director of the Compressor Aero Research Lab within the Wright Laboratory, Aero Propulsion and Power Directorate, Turbine Engine Division. He is responsible for identifying and directing compressor component basic and applied research to meet Air Force air breathing engine development requirements. Air Force research under his direction is related to the development of physics-based models that accurately represent the loss, blockage, and stability of advanced transonic fans and compressors. The models developed in the Lab are used in an advanced design system to explore innovative component designs. Prior to his current position, Dr. Copenhaver was assigned to the Air Force, Compressor Research Facility (CRF), Test Group and Data Acquisition Group. While in the test and data groups, he was responsible for the planning, development, and preparation of full scale compressor component test programs. Dr. Copenhaver holds an M.S. degree from Virginia Tech, and a Ph.D. in Mechanical Engineering from Iowa State University. He is a Senior Member of AIAA serving on the Air Breathing Propulsion Technical Committee, and a member of ASME serving on the International Gas Turbine Institute Turbomachinery Committee.



GEORGE B. COX JR. is a Project Engineer at Pratt & Whitney/Government Engines & Space Propulsion in West Palm Beach, Florida. He graduated in 1966 from The Johns Hopkins University with a Bachelor of Engineering Science degree, and was awarded a Master of Mechanical Engineering degree in 1968 from North Carolina State University. He has worked for 26 years at Pratt & Whitney in combustion and fluid dynamics, including rocket engine, gas dynamic and chemical laser, and gas turbine engine component design and development. His most recent activity includes analytical and CFD modeling for the Space Shuttle Engine Study program, direction of CFD support for National Aerospace Plane effort at Pratt & Whitney, and combustion and aerodynamic support for the Alternate Turbopump Development Program. Mr. Cox has 12 publications on gas turbine and rocket engine design systems, component design and development, and modeling. He also has three patents awarded, and one pending, in the fields of gas turbine, gas dynamic laser, and rocket combustion.



DANIEL B. FANT was selected as the new program manager for the Advanced Gas Turbine Systems Research (AGTSR) program and started working at the South Carolina Energy R&D Center at Clemson University on August 29, 1994. The AGTSR program is a university-industry research consortium dedicated to advancing stationary gas turbine engine design for the next generation of land-based power generation systems. Dan recently retired from the U.S. Air Force after 15 years of service, and during his career he served in various engineering capacities: as project officer for advanced space transportation concepts at the Space Division in Los Angeles, CA; laboratory research associate at MIT-Draper Laboratory in Cambridge, MA; assistant professor of aerospace engineering at the Air Force Institute of Technology in Wright Patterson AFB, Dayton, OH; and in his last assignment, at Bolling AFB in Washington, D.C. as program manager of basic research in turbomachinery flows and high angle-of-attack unsteady aerodynamics. He received his B.S. in Mechanical Engineering from the University of Connecticut, his M.S. in Aeronautical Engineering from the Air Force Institute of Technology, and his Ph.D. from Iowa State University in Mechanical Engineering. Dan is also a licensed professional engineer in the State of Ohio.



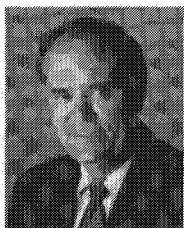
ROBERT FREDERICK received a B.S.M.E. from Purdue University in 1980 and later completed his Ph.D. at Purdue University in Aeronautics and Astronautics in 1988. His industrial experience comes from two years at Phillips Laboratory in propellant development and three years at Arnold Engineering Development Center in solid motor diagnostics and analysis. He is currently an Assistant Professor of Mechanical and Aerospace Engineering at the University of Alabama in Huntsville and a member of the UAH Propulsion Research Center. His work at the university involves research in hybrid combustion, plume diagnostics, and solid propellant development. Professor Frederick has also been active in developing design courses that integrate industry mentors into the classroom. Professor Frederick is a Senior Member of the AIAA and the chairman of the Hybrid Rocket Technical Committee.



ASHWANI GUPTA is Professor of Mechanical Engineering at the University of Maryland. His academic experience includes six years as member of the research staff at MIT in the Energy Laboratory and Department of Chemical Engineering, three years as senior research associate and independent research worker at Sheffield University in the Department of Chemical Engineering and Fuel Technology, and thirteen years at the University of Maryland. He spent four months in Japan as a consultant to several companies. Presently he serves as an international consultant on a major project sponsored by the Japanese Government. He is the author of over 150 publications in the areas of combustion, swirl flows, diagnostics, fuel sprays, hazardous waste thermal destruction, pollution, and alternative fuels. He has coauthored two books and edited seven books. Presently he is coeditor of the Energy and Environmental Series of books published by CRC Press. He has been the recipient of the Energy System Award of AIAA and four best paper awards from AIAA and ASME. Dr. Gupta received his Ph.D. from Sheffield University in 1973. He was awarded a D.Sc. from Sheffield University in 1986 for international recognition and published high quality original research. Dr. Gupta is chairman of the Terrestrial Energy Technical Committee of AIAA and was previously chairman of the Propellant and Combustion Technical Committee. Dr. Gupta is a Fellow of AIAA and the Institute of Energy (England, UK) and a member of ASME, SAE, ASEE and the Combustion Institute.



ANN R. KARAGOZIAN received her B.S. in Engineering from UCLA in 1978 and her Ph.D. in Mechanical Engineering from the California Institute of Technology in 1982. She has been a faculty member at UCLA since then, and is currently a Professor in the Department of Mechanical, Aerospace, and Nuclear Engineering. Her research interests lie in the fluid mechanics of combustion systems, with current emphasis on numerical simulation and experimental interrogation of acoustically driven reacting flows and high speed combustion systems. Recent research activities have applications to NO_x emissions reduction for the High Speed Civil Transport and Advanced Subsonic Transport aircraft, fuel-air mixing enhancement for hypersonic aircraft, and hazardous waste incineration for land-based as well as shipboard waste treatment. Professor Karagozian is currently a member of the NASA Aeronautics Advisory Committee, and has served on the NASA Federal Lab Review Task Force, the Defense Science Study Group, and on technical panels for the Environmental Protection Agency, the Department of Energy, the Aeronautics and Space Engineering Board, and the National Science Foundation. She is an Associate Fellow of the AIAA and in 1987 was the recipient of the TRW-UCLA Excellence in Teaching Award.



LAWRENCE A. KENNEDY is currently the Ralph W. Kurtz Distinguished Professor of Mechanical Engineering at Ohio State University. Beginning in January 1995 he will be Dean, College of Engineering at the University of Illinois at Chicago. At OSU he served as Chairman of Mechanical Engineering for the period 1983–1993. He also served as Acting Director of the Center for Automotive Research and is a Professor at the Ohio Aerospace Institute at NASA Lewis Research Center. Prior to joining Ohio State he was on the faculty of the State University of New York at Buffalo. He has been a Visiting Professor at Princeton University, the University of Michigan, the von Karman Institute of Fluid Dynamics, and the University of California/San Diego. Professor Kennedy received his Ph.D. and M.S. degrees from Northwestern University in 1964 and 1962, respectively, and his B.S. degree in 1960 from the University of Detroit. His technical interests include the broad areas of combustion, fluid mechanics, and heat transfer. Professor Kennedy is a Fellow of ASME, an Associate Fellow of AIAA and a member of the Combustion Institute, SAE, APS, and ASEE. He is a registered Professional Engineer in New York. He has been a NATO Senior Fellow in Science, a U.S. Consultant to AGARD, NSF Senior Science Fellow, and a Goebel Visiting Professor at Michigan. In 1993 he received the Ralph Coats Roe Award.



MICHAEL M. MICCI is an Associate Professor of Aerospace Engineering and is associated with the Propulsion Engineering Research Center at the Pennsylvania State University. He received a B.S. and M.S. in Aeronautical and Astronautical Engineering from the University of Illinois at Urbana—Champaign, and a Ph.D. in Mechanical and Aerospace Engineering from Princeton University. He joined the faculty at Penn State in 1981, where he teaches and conducts research in rocket propulsion. He spent 1987 as a Visiting Scientist at the Air Force Office of Scientific Research and the 1990–1991 academic year on sabbatical leave at ONERA, Palaiseau, France. He is a member of the AIAA Liquid Propulsion Technical Committee.



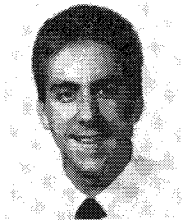
ROGER M. MYERS received his B.S. in Aerospace Engineering from the University of Michigan and his Ph.D. in Mechanical and Aerospace Engineering from Princeton University while working in the Electric Propulsion Laboratory. He joined the NASA Lewis Research Center Group of Sverdrup Technology in 1988 and became supervisor of the Space Propulsion Technology Section in 1989. He continues in this capacity at NASA Lewis, now working for Nyma, Inc. Since joining the On-Board Propulsion team at NASA Lewis, he has worked on a wide range of propulsion technologies and system/mission analyses. The propulsion systems include solid propellant pulsed plasma thrusters, pulsed and steady-state magnetoplasmadynamic thrusters, low power arcjets, electrostatic ion thrusters, Russian Hall thrusters, and small chemical rockets. The mission studies have included a range of both Earth-space and planetary missions, most recently focusing on small satellite applications. His research has also included the development of plasma diagnostics for thruster and spacecraft integration studies and fundamental research on electrode physics in plasma discharges. He has authored over 37 publications and is a member of the AIAA Electric Propulsion Technical Committee.



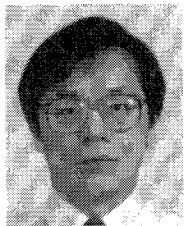
CARLSON C. P. PIAN received his B.S., M.S., and Ph.D. degrees from the University of Michigan in Aerospace Engineering. He did post-doctoral work in the field of MHD power conversion at the Eindhoven Technical University in The Netherlands. Dr. Pian is currently on the research staff at Molten Metals Technologies, involved in research and development of plasma torches and remediation technologies for hazardous waste treatment. Previously, Dr. Pian was on the faculty of the Diagnostic Instrumentation and Analysis Laboratory at the Mississippi State University. At Textron Defense System's Everett Laboratory (formerly the Avco Everett Research Laboratory), Dr. Pian was the Director of Commercial MHD Component Development. He was also the manager of MHD Integrated Topping Cycle Program, was responsible for the technical direction and administration of the program, including research and development, and the design and fabrication of MHD power generators. Dr. Pian was also involved in system design studies and analyses of MHD power conversion experiments and worked on analytical modeling of flows in gas turbine combustors. Prior to joining Avco, Dr. Pian was a research engineer at NASA Lewis Research Center where he was engaged in research and analysis relevant to MHD power generators and systems. Dr. Pian is a Senior Member of AIAA and previously served on both the Plasmadynamics and Lasers and the Terrestrial Energy Systems Technical Committees. He was also a member of the Board of Directors of the Symposium on the Engineering Aspects of MHD. Dr. Pian has authored or co-authored over 60 technical papers related to MHD power conversion and space plasma.



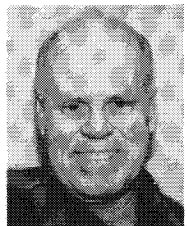
M. FRANK ROSE is Director of the Space Power Institute and Professor of Electrical Engineering at Auburn University, Auburn, Alabama. He holds 16 patents and is the author of 125 technical papers on various aspects of advanced power systems, space environmental effects, hypervelocity impact phenomena, energy storage, advanced composites, and energy conversion technology. He received a Ph.D. in Solid State Science from the Pennsylvania State University in 1966 and a B.A. in Physics from the University of Virginia in 1961. He is a Senior Member of the AIAA, Fellow of the IEEE, and a member of Sigma Xi.



IAN A. WAITZ is Assistant Professor of Aeronautics and Astronautics at Massachusetts Institute of Technology, where he is Director of the MIT Aero-Environmental Research Laboratory and a member of the MIT Gas Turbine Laboratory. His principal fields of interest include propulsion, fluid-mechanical mixing, reacting flows, aeroacoustics, and in particular, aspects of the above that relate to environmental issues associated with aircraft design and operation. Professor Waitz currently directs a variety of experimental and computational research in these areas including studies of streamwise-vorticity-enhanced mixing, mixer-ejector design, jet noise reduction, mixing technology for low-emissions combustors, wake management strategies for fan noise reduction, pollutant chemistry in turbine and nozzle flows, mutagenicity of gas turbine exhaust emissions, combustion processes for microgas turbine engines, and vortical flows in compressor endwall flowfields. Professor Waitz received a Ph.D. in Aeronautics from the California Institute of Technology in 1991, an M.S. in Aeronautics from George Washington University's Joint Institute for Advancement of Flight Sciences at NASA Langley Research Center in 1988, and a B.S. in Aerospace Engineering from Pennsylvania State University in 1986.



VIGOR YANG received his B.S.M.E. from National Tsing Hua University in Taiwan in 1976 and Ph.D. from the California Institute of Technology in 1984. Following one year as a Research Fellow in Jet Propulsion at Caltech, he joined the faculty at the Pennsylvania State University in 1985. He is currently a Professor of Mechanical Engineering and serves as a consultant to several industrial and government laboratories. His research mainly involves combustion instabilities in propulsion systems, high-pressure droplet/spray combustion, rocket interior ballistics, and combustion of energetic materials. He has organized several international meetings and workshops devoted to various combustion aspects of liquid and solid propellants in rocket engines. He was the recipient of the Penn State Engineering Society Outstanding Teaching and Research Awards in 1989 and 1992, respectively. Professor Yang is an Associate Fellow of AIAA.



JAMES L. YOUNGHANS is Manager of Advanced System Design and Analysis at General Electric Aircraft Engines and is located in Evendale, Ohio. He received his B.S. and M.S. from the University of Cincinnati and an M.B.A. from Xavier University. He joined the technical staff at General Electric in 1963 and has held positions of increasing responsibility in Turbine Heat Transfer, Installation Aerodynamics, Low Observables, and System Design. He is a member of the AIAA Air Breathing Propulsion Technical Committee and the ASME Aircraft Engine Committee.