

member of the Editorial Advisory Board of the journal; his service in providing editorial guidance to the journal is very much appreciated. In addition, we all owe a debt of gratitude to the individuals who reviewed papers for the journal this year; a list of their names follows.

Finally, December 2002 marks the end of my appointment as the Editor-in-Chief of the *AIAA Journal*; thus, I would like to express

my personal thanks to the management, staff and members of the American Institute of Aeronautics and Astronautics for their cooperation and support during my six-year association with the journal.

G. M. Faeth  
Past Editor-in-Chief

## A Thank You and a New Beginning

**B**EGINNING with this first issue of the *AIAA Journal* for 2003, there is a new Editor-in-Chief, Dr. Elaine S. Oran. Dr. Oran, an AIAA Fellow, is Senior Scientist for Reactive Flow Physics at the Naval Research Laboratory. She is the sixth Editor-in-Chief selected to serve the *AIAA Journal* since its inception in 1963. Beginning with Volume 1, Number 1, Dr. Oran's predecessors were William R. Sears of the Institute of Aerospace Sciences and Martin Summerfield of the American Rocket Society (coeditors of the first three issues of the new *AIAA Journal*), Leo Steg, George W. Sutton, and now Gerard M. Faeth. On behalf of the entire AIAA, I would like to thank Jerry for his six years of service as Editor-in-Chief and for his dedication to high standards for all aspects of the *AIAA Journal*. There is no aerospace journal held in higher esteem than the *AIAA Journal*.

Elaine Oran is not new to AIAA Publication activities. She is a former AIAA Vice-President-Publications and has served the

Publications Committee with dedication for many years. She, too, is a person with high standards for her own publications and the journals that she has served. Elaine served as an Associate Editor for the *Journal of Computational Physics* from 1990 to 2000, has been Managing Editor for *Shock Waves*, and served on the Advisory Board for *Progress in Energy and Combustion Science*. She will be the first *AIAA Journal* Editor-in-Chief to use the new AIAA Write-Track software for electronic journal administration. The AIAA Board of Directors, the AIAA Publications Committee, and I feel very fortunate that Dr. Oran has agreed to serve this journal as Editor-in-Chief. Her photograph and biographical sketch follow.

Roger L. Simpson  
AIAA Vice-President-Publications

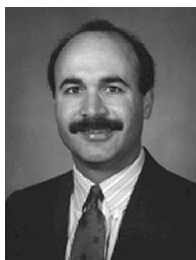


**ELAINE S. ORAN** received an A.B. degree in both Physics and Chemistry from Bryn Mawr College in 1966, an M.Ph. from the Department of Physics at Yale University in 1968, and a Ph.D. from the Department of Engineering and Applied Sciences at Yale University in 1972. She began research in the fields of statistical mechanics and applied mathematics at Yale University. In 1972 she joined the Plasma Physics Division at the Naval Research Laboratory (NRL), where she developed atomic physics models for computing the properties of laser-produced plasmas and the properties of low-density oxygen plasmas. She then expanded her work into the areas of ionospheric physics and then into computational fluid dynamics, specializing in reactive-flow dynamics and combustion. In 1978, she became part of the Laboratory for Computational Physics, where she later started the Center for Reactive Flow and Dynamical Systems. Since 1988, Dr. Oran has held the position of Senior Scientist for Reactive Flow Physics at the NRL. In this capacity, she is responsible for developing, supervising, advising on, and carrying out theoretical and numerical research on the fluid and molecular properties of complex dynamic systems. Current research topics include chemically reactive flows; deflagrations and detonations; computational science and numerical analysis; high-performance computing and parallel architectures; shocks and shock interactions in gas and condensed phases; computational methods for rarefied gas flow; turbulence in reacting and nonreacting flows; numerical solution of constrained second-order wave equations; and biofluidics. Application areas include combustion and propulsion; reentry and microdynamical flows; design of rocket motors; materials engineering; atmospheric physics; and astrophysical phenomena, particularly supernova explosions. Dr. Oran is a Fellow of AIAA, for which she served a term on the Board of Directors in the capacity of Vice President of Publications. She is also a Fellow of the American Physical Society, for which she is a past Chair and founding member of the Division of Computational Physics, past Vice-Chair of the Division of Fluid Dynamics, and former member of the Committee on the Status of Women in Physics. She has recently completed 12 years on the Board of Directors of the Combustion Institute and is now Vice President of the Institute for the Dynamics of Energetic and Reactive Systems. She was the Program Chair of the 25th International Symposium on Combustion in Irvine in 1994, Physics Computing '91 (meeting of the American Physical Society Division of Computational Physics, 1991), and 16th International Colloquium on the Dynamics of Energetic and Reactive Systems in 1997. In 1979, Dr. Oran received the Arthur S. Fleming Award (given yearly to 10 employees of the U.S. Government), the WISE Award in Science (given for achievement in science by Women in Science and Engineering) in 1988, the Oppenheim Prize of the Institute of Dynamics of Energetic and Reactive Systems in 1999 for contributions to the theory of explosions and reactive systems, the Zeldovich Gold Medal of the Combustion Institute in 2000, and the Dryden Distinguished Lectureship in Aerospace Research for 2001–2002 by AIAA. In 2001 she was made Honorary Professor of the University of Wales. In 2002 she was inducted into the Hall of Fame of Women in Technology, International. Dr. Oran has published over 300 hundred technical papers, written many review papers, and coauthored (with Jay P. Boris) the book *Numerical Simulation of Reactive Flow* (Elsevier, 1987; 2nd ed., Cambridge, 2001). She was Associate Editor of the *Journal of Computational Physics* for 10 years and has been Managing Editor of the journal *Shock Waves* and on the advisory board of *Progress in Energy and Combustion Science*. She has lectured extensively in the United States and abroad and presented a number of short courses. In conjunction with faculty from universities in the United States and Europe, she has guided many graduate students, primarily in aerospace engineering but also in physics, astrophysics, and physical chemistry.

## Associate Editors



**SURESH K. AGGARWAL** is Professor of Mechanical Engineering at the University of Illinois at Chicago and received his Ph.D. in Aerospace Engineering from the Georgia Institute of Technology in 1979. Since then, he has served on the Professional Research Staff at Princeton University and as a Senior Research Engineer at Carnegie–Mellon University. He joined the faculty of the University of Illinois at Chicago in 1984. His research interests include gaseous and spray combustion phenomena, direct numerical simulation of multiphase flows, nanoscale flows, high-pressure and multicomponent droplet phenomena, partially premixed flames, and microgravity combustion. Dr. Aggarwal has served as a Member of the AIAA Propellants and Combustion Technical Committee (1985–1989, 1991–1994, 2001–). He is currently serving as a Member of the AIAA Terrestrial Energy Technical Committee and the International Gas Turbine Institute (IGTI)–American Society for Mechanical Engineers (ASME) Fuels and Combustion Technical Committee. He has been a Technical Organizer for the Propellants and Combustion Technical Committee at the AIAA Aerospace Sciences Meeting (1989) and Joint Propulsion Conference (1993) and for the ASME Turbo Expo-Fuel and Combustion Program (1994). He has also served on numerous occasions as a consultant to government and industrial organizations. Dr. Aggarwal is a recipient of the University of Illinois Scholar Award and a biographee in *Who's Who in Science and Engineering* and *Who's Who in America*. He is an Associate Fellow of AIAA and a Member of ASME and the Combustion Institute. He has authored or coauthored more than 180 articles and papers.



**MEHDI AHMADIAN** is Professor of Mechanical Engineering at Virginia Polytechnic Institute and State University (Virginia Tech), where he also holds the position of Director of the Advanced Vehicle Dynamics Laboratory. He received his B.S. (1980), M.S. (1982), and Ph.D. (1984) from the State University of New York at Buffalo. Dr. Ahmadian joined the faculty at Clemson University (Clemson, South Carolina) in 1984 as Assistant Professor in the Department of Mechanical Engineering. He performed research in adaptive and decentralized control of high-order structures for aerospace applications. In 1987 he joined the Lord Corporation (Erie, Pennsylvania), where he worked for the next six years developing various advanced isolation systems and ride improvement packages for vehicles. His efforts led to the development and first-ever successful testing of a semi-active suspension system for heavy trucks. In 1993, Dr. Ahmadian joined General Electric (GE) Transportation Systems (Erie, Pennsylvania), where he continued his research and development work in transportation-related systems for the next two years. His accomplishments at GE Transportation Systems included developing a patented electropneumatic valve and designing and developing an innovative steerable truck (bogie) for heavy freight locomotives. He received the General Manager's Award and two Manager's Awards for his efforts at GE Transportation Systems. Dr. Ahmadian joined Virginia Tech in 1995 as an Assistant Professor and was promoted to Associate Professor in 1998 and Professor in 2001. He currently serves as Director of the Advanced Vehicle Dynamics Laboratory at Virginia Tech, and he continues his research in advanced transportation systems and vehicle dynamics analysis, modeling, and testing. He has authored more than 85 archival papers, made more than 100 technical presentations, holds 6 U.S. and international patents, and served as major advisor for more than 30 Ph.D. and M.S. students. He further served as an Associate Editor for the American Society of Mechanical Engineers (ASME) *Journal of Vibration and Acoustics* from 1989 to 1997. Dr. Ahmadian is a Fellow of ASME and a Senior Member of AIAA. Dr. Ahmadian serves as a consultant to the transportation industry and regularly teaches a short course to field engineers on vehicle dynamics.



**HAFIZ M. ATASSI** is the Viola D. Hank Professor of Aerospace and Mechanical Engineering at the University of Notre Dame. He received his *licence es sciences* from the University of Paris and a diploma in Aerospace Engineering from the Ecole Centrale de Paris, both in 1963, and doctorate degree from the Sorbonne (Paris) in 1966. After one year as a Research Engineer at the Office National d'Etudes et de Recherches Aérospatiales and two years as Research Associate at Cornell University, he joined the faculty of the University of Notre Dame in September 1969, and he was Director of the Notre Dame Center for Applied Mathematics from 1987 to 1997. His current research interests include aeroacoustics, unsteady aerodynamics, aeroelasticity, hydroacoustics, turbulence modeling, and mathematical computational methods. He has served as a Member of the AIAA Structural Dynamics Committee (1979–1982) and the Aeroacoustics Committee (1992–1995). Dr. Atassi is a Fellow of both AIAA and the American Society of Mechanical Engineers. He received the NASA Addison P. Rothrock Distinguished Scientist Award (1983), the Japan International Aircraft Fund Award (1996), the AIAA Aeroacoustics Award (2000), and the American Society of Mechanical Engineers Moody Award (2001) and was named *Chevalier des Palmes Academiques* by the French Government (1993). Dr. Atassi was a Member of the *Applied Mechanics Reviews* Editorial Board and Associate Editor for *Aerodynamics and Aeroelasticity* (1985–1990). He is author or coauthor of more than 130 articles and papers.



**JOSETTE BELLAN** is a Senior Research Scientist at the Jet Propulsion Laboratory (JPL) and a Visiting Associate at the California Institute of Technology (Caltech). She has also been a Lecturer at Caltech and a Chancellor's Distinguished Lecturer at the University of California, Irvine. Following the completion of her Ph.D. at Princeton University, she became a Postdoctoral Fellow and further a Member of Research Staff there. Since 1978, Dr. Bellan has conducted research at the JPL in a variety of topics. Her current interests include drop and spray evaporation and combustion; multi-component fuel modeling; reactive porous materials, particularly biomass; granular materials; direct numerical simulations and large eddy simulations of multiphase flows; and supercritical fluid behavior in fluid-drops, mixing layers, and sprays. Dr. Bellan is the coauthor of five books and has numerous publications in refereed journals. She is also an Amelia Earhart Fellow, is the recipient of the 2000 Marshall Award for the Best Paper at the International Conference for Liquid Atomization and Spray Systems, and has numerous NASA Certificates of Recognition. Dr. Bellan is an American Society of Mechanical Engineers Fellow, an AIAA Associate Fellow, a member of the Combustion Institute, where she was on the Western States Section Board for 12 years; a member of the Propellant and Combustion Technical Committee within the AIAA; and a member of the Board of Directors in the Institute for Liquid Atomization and Spray Systems. In addition to the *AIAA Journal*, Dr. Bellan is on the Editorial Boards of *Atomization and Sprays* and *Progress in Energy and Combustion Science*.



**ALEX BERMAN** is a retired Aerospace Engineer. He received a B.A. and an M.A. in Physics from the University of Connecticut in 1949 and 1952, respectively. He was employed by Kaman Aerospace Corporation from 1951 until 1991, when he retired. At that time, he was the Head of the Research Department as Assistant Director for Research. He was responsible for projects that included advanced structural dynamics, vibration analysis, structural system identification, generalized component synthesis, and advanced computer program architecture. He directed and was a major participant in numerous research projects funded by NASA, the U.S. Army, and the U.S. Air Force. He has published over 50 technical papers. He has made presentations at numerous technical conferences and workshops and has given seminars at universities in his fields of expertise. He has been an Associate Editor since 1995. He is a Member of AIAA and the American Helicopter Society.



**GRAHAM V. CANDLER** is Professor of Aerospace Engineering and Mechanics at the University of Minnesota. He received his B.Eng. in Mechanical Engineering from McGill University in 1984 and his M.S. and Ph.D. in Aeronautics and Astronautics from Stanford University in 1985 and 1988, respectively. After one year as an aerospace engineer at the NASA Ames Research Center, he joined the faculty of North Carolina State University as an Assistant Professor. He then moved to the University of Minnesota in 1992. Prof. Candler's current research activities include the numerical simulation of high-temperature reacting flows, with application to reentry aerodynamics, hypersonic aerodynamics, aerothermodynamics, high-temperature gas physics, and plasma physics. He is also interested in low-density flows with application to microscale devices and high-altitude hypersonic flows. He is the author of over 150 papers on these topics. His work has twice won the AIAA Best Paper in Thermophysics Award. He has served as a Member of the AIAA Fluid Dynamics Technical Committee and is currently a Member of the AIAA Thermophysics Technical Committee. He also served as Associate Editor of the *Journal of Thermophysics and Heat Transfer*. He is an Associate Fellow of AIAA.



**ADITI CHATTOPADHYAY** is a Professor in the Department of Mechanical and Aerospace Engineering at Arizona State University (ASU). She received her M.S. and Ph.D. degrees from the School of Aerospace Engineering at the Georgia Institute of Technology, Atlanta, Georgia. Her current research interests include mechanics of composites, adaptive structures, rotary wing dynamics, and multidisciplinary design optimization. Dr. Chattopadhyay is a Member of the AIAA Structures Technical Committee and is the Chair of the Composite Structures Subcommittee. She is a Member of the American Helicopter Society Aircraft Design Committee (Chair, 1996–1998) and Education Committee. Dr. Chattopadhyay is an Associate Editor of *Inverse Problems in Engineering* and is a Member of the Editorial Board of *Engineering Optimization*. She is the recipient of several academic, research and best paper awards. Dr. Chattopadhyay was inducted into the Georgia Institute of Technology Hall of Fame and received the Outstanding Engineering Alumni Award in 1995. She is also the recipient of the Faculty Achievement Award–Excellence in Research, 2000, Arizona State University. Dr. Chattopadhyay is the Principal Investigator of several research grants funded by agencies such as U.S. Army Research Office, Air Force Office of Scientific Research, NASA Langley and Ames Research Centers, and industry. She has published 86 archival journal papers and over 150 other publications (conference papers, book chapters, and NASA Technical Memoranda). Dr. Chattopadhyay is a Fellow of the American Society of Mechanical Engineers and an Associate Fellow of AIAA.



**WERNER J. A. DAHM** is Professor of Aerospace Engineering and Head of the Laboratory for Turbulence and Combustion in the Department of Aerospace Engineering at the University of Michigan. He is a Fellow of the American Physical Society and an Associate Fellow of AIAA. He was a recipient of the William F. Ballhaus Aeronautics Prize from the California Institute of Technology (Caltech) in 1985 and the 1938E Distinguished Achievement Award from the University of Michigan in 1991. Professor Dahm is an author of over 120 journal papers, conference papers, and technical publications and has given over 80 invited and plenary lectures, in the areas of fluid dynamics, turbulence, combustion, and microsystems. He has served on technical advisory and organizational committees for numerous technical conferences and as a consultant for industry. He received his Ph.D. degree from Caltech in 1985 and has an M.S. degree in Mechanical Engineering from the University of Tennessee Space Institute in Tullahoma, Tennessee, and a B.S.E. in Mechanical Engineering from the University of Alabama in Huntsville. Prior to his Ph.D. degree, he worked in industry as a Research Engineer in the Transonic Wind Tunnel Section of the Propulsion Wind Tunnel Facility at the U.S. Air Force Arnold Engineering Development Center. Professor Dahm is a past member of the Defense Science Study Group at the Institute for Defense Analyses in Washington, D.C., and has served on numerous task forces of the Defense Science Board.



**WILLIAM J. DEVENPORT** is a Professor in the Department of Aerospace and Ocean Engineering at Virginia Polytechnic Institute and State University. He received his B.Sc. Degree from the University of Exeter in 1981 and his Ph.D., in Experimental and Computational Fluid Dynamics, from the University of Cambridge in 1985. His research interests include experimental studies of turbulence and turbulent flows and theoretical descriptions of turbulence, particularly as they relate to aeroacoustic problems. He has published over 60 technical papers on wing-body junction flows, wing tip vortices, blade vortex interaction, wakes, cascade flows, airfoil aerodynamics, and wind-tunnel instrumentation. His work has been supported by NASA, the Office of Naval Research, the Defense Advanced Research Projects Agency, and the National Science Foundation. He has served on the AIAA Fluid Dynamics Technical Committee and is currently a Member of the American Helicopter Society and the American Society of Mechanical Engineers and a Senior Member of AIAA.



**KOZO FUJII** is Professor of the Space Transportation Research Division at the Institute of Space and Astronautical Science (ISAS), Sagami-hara, Japan. He received his Ph.D. from the Department of Aeronautics, University of Tokyo, in 1980. From 1981 to 1983, he was a NRC Research Associate at NASA Ames Research Center, and he became a Research Scientist at the National Aerospace Laboratory (NAL), Tokyo, Japan, in 1984. He became a Senior Research Scientist in 1987 and spent another one and half years at NASA Ames Research Center as a Senior NRC Research Associate from 1986 to 1987. In 1988, He joined the ISAS as an Associate Professor of high-speed aerodynamics, and he was promoted to Professor in 1997. He has served also as a Professor of the Department of Aeronautics and Astronautics, University of Tokyo, since 1998. His research interests include high-speed aerodynamics, high-angle-of-attack aerodynamics, and flow visualization mainly by the computational fluid dynamics approach. He has recently become interested in wind-tunnel testing and serves as a Chairman of the wind-tunnel facility at the ISAS. He is a member of the MOSAIC project on the technology of the pressure-sensitive paint measurement system. He recently has been working on the aerodynamics and system design of reusable launch vehicles. He served as a Directors' Board Member of the Japan Society for Aeronautical and Space Sciences five times and is currently a director of general affairs. He has been an Associate Editor of the series "Notes on Numerical Fluid Mechanics" since 1987 and an Editorial Board Member of *Communications on Numerical Methods in Engineering* since 2000 and is a Managing Editor of *Journal of Visualization*. He is a Fellow of the Japan Society of Mechanical Engineers (JSME) and has been an Associate Fellow of AIAA since 1995. He received several awards from JSME, the Japanese Government, AIAA, and others. He is an author or coauthor of more than 200 papers. He wrote many review papers and books that include *Physics of Skiing* (in Japanese) and the translation of *Physics of Golf*.



**KIRTI "KARMÁN" N. GHIA** is Herman Schneider Professor of Aerospace Engineering and Engineering Mechanics and Fellow of the Graduate School at the University of Cincinnati (UC). Dr. Ghia joined UC in 1969, after completing his graduate education in Mechanical and Aerospace Engineering at the Illinois Institute of Technology, Chicago. His research activities are in simulation of steady and unsteady separated viscous flows, high-incidence aerodynamics, vortex-dominated flows, nonlinear dynamics, turbomachinery flows, flow control, aeroelasticity, development of numerical methods, LES/DNS of turbulent flows, and grid generation techniques. Dr. Ghia's research work has been sponsored by the Air Force Office of Scientific Research, the Office of Naval Research, the Army Research Office, Wright Laboratory, NASA, the National Science Foundation, the Ohio Aerospace Institute, and the aerospace industry. The American Society of Mechanical Engineers (ASME) named him the Freeman Scholar for the 1995–1996 biennium and, at UC, he has been the recipient of numerous research and teaching awards. Dr. Ghia has held visiting positions at several organizations, including USC, 1986; ICASE, NASA Langley Research Center, 1985; Polytechnic Institute of New York, 1978; and Air Force Flight Dynamics Laboratories, 1976–1977. He has served as Associate Technical Editor of the *Journal of Fluids Engineering*, 1981–1990, Co-Editor of the *International Computational Fluid Dynamics Journal*, 1991–1998, and Co-Director of Computational Fluid Dynamics Research Laboratory, 1990–. Dr. Ghia has also served on the Fluid Mechanics Technical Committee of AIAA since 1986; ASME, since 1978; and as Chair of the Honors and Awards Committee of the Fluids Engineering Division of ASME, 1997–2000. He has chaired many national and international symposia and meetings. He is a Fellow of ASME and Associate Fellow of AIAA.



**PEYMAN GIVI** is William Kepler Whiteford Chair Professor of Mechanical Engineering at the University of Pittsburgh. Previously he held the position of University at Buffalo Distinguished Professor at the State University of New York at Buffalo (UB), where he served for 14 years and received the Professor of the Year Award by Tau Beta Pi (2002) and Outstanding Educator of the Year Award (1994). Dr. Givi has also worked as a Research Scientist at Flow Industries, Inc., in Seattle and has had visiting appointments at the NASA Langley Research Center and the NASA Glenn (Lewis) Research Center. Professor Givi is among the first 15 engineering faculty nationwide who received the Presidential Faculty Fellowship from President George Bush. He has also received the Young Investigator Award of the Office of Naval Research and the Presidential Young Investigator Award of the National Science Foundation. His current research interests include turbulence, combustion, computational methods, theoretical statistics, spectral analysis, stochastic processes, and systems analysis and controls. He received his Ph.D. from Carnegie-Mellon University (Pennsylvania) and B.E. from Youngstown State University (Ohio).



**ISKENDER GÖKALP** is Director of Research at the Centre National de la Recherche Scientifique (CNRS). He obtained his Aerospace Engineering degree from the Technical University of Istanbul in 1974 and his Ph.D. in Combustion from the University of Paris VI in 1981. He joined the Faculty of Mechanics of the University of Paris VI in 1979 as Assistant Professor and was promoted to Associate Professor in 1981. He joined the Laboratoire de Combustion et Systèmes Réactifs of the CNRS in Orléans in 1983 and was promoted to Director of Research in 1994. He is the Director of the Research Federation "Energétique, Propulsion, Espace, Environnement-EPEE" of the CNRS and the University of Orléans, created in 1998. His current research interests include turbulent combustion, droplet and spray combustion, metal combustion, microgravity combustion, variable density turbulent flows, and supersonic combustion. He is also active in the area of historical and philosophical studies on science and technology and on interdisciplinarity. He is the Chairperson of the French Section of the Combustion Institute and the Chairperson of the Federation of the European Sections of the Combustion Institute. He is a Senior Member of AIAA and is currently serving as a Member of the AIAA Propellants and Combustion Technical Committee. He also serves on the international board of the International Conference on Liquid Atomization and Spray Systems and on the Institute of Liquid Atomization and Spray Systems-Europe board. He is on the scientific boards of several French and European research programs. He is the Coeditor of the French journal *Combustion: Revue des Sciences et Techniques de Combustion*. He supervised more than 30 Ph.D. theses and is the author or coauthor of more than 500 articles and papers.



**JAY (JAYAVANT) P. GORE**, Vincent P. Reilly Professor within the School of Mechanical Engineering at Purdue University, received his B.E. (M.E.) degree from the University of Poona, India, in 1978 and his M.S. (1982) and Ph.D. (1986) degrees in Mechanical Engineering from the Pennsylvania State University. He completed a postdoctoral training program in Aerospace Engineering at the University of Michigan, Ann Arbor, prior to joining the University of Maryland in 1987. In 1991, Dr. Gore joined Purdue University as an Associate Professor and was promoted to the rank of full Professor in 1995 and to his present rank in 2000. His research interests include infrared sensing, diagnostics, and control, numerical and experimental studies of turbulent combustion, partially premixed flames, flame radiation, chemistry radiation interactions,  $\text{NO}_x$  and soot formation and emission, radiant burner flames, and sensors for pollutant control and fire detection. Dr. Gore teaches two graduate courses in combustion and two undergraduate courses in thermodynamics. He is the Chairman of the American Society of Mechanical Engineers (ASME) Committee on Heat Transfer in Fire and Combustion Systems, an Associate Fellow of the AIAA, and Chairman of the Board of Advisors of the Central States Section of the Combustion Institute. Dr. Gore is an author or coauthor of over 200 articles and papers. He received the 1987 Best Paper in ASME Heat Transfer Literature Award, a 1991 Presidential Young Investigator Award, and faculty sabbatical fellowships from the U.S. Department of Energy and the Japanese Ministry of Education in 1998. He is an Associate Editor of the ASME *Journal of Heat Transfer* and the U.S. Editor of the *Proceedings of the International Combustion Institute*, Vol. 28.



**ERIC RAYMOND JOHNSON** is a Professor in the Aerospace and Ocean Engineering Department, Virginia Polytechnic Institute and State University, Blacksburg. He earned his doctoral degree in Applied Mechanics from the University of Michigan in 1976 and has been a faculty Member at Virginia Tech since then. Prior to his doctorate, he worked in industry for four-and-one-half years on the analysis and design of servohydraulic control systems for vehicles and industrial applications. His research interests are in structures, solid mechanics, buckling and postbuckling, composite materials, and optimal design. In particular, his work has concentrated on the response and failure of composite material structures in application to flight vehicles, which includes composite stiffener crippling, failure of dropped-ply laminates, the nonlinear response of stiffened composite shells under internal pressure, and energy absorption of composite structure. Dr. Johnson has written 54 refereed technical publications. He teaches courses in thin-walled structures, elastic instability of structures, variational and energy methods, and optimal design of composite materials and structures. He is a Senior Member of the AIAA and a Member of the American Society of Mechanical Engineers.



**ANN R. KARAGOZIAN** is a Professor in the Department of Mechanical and Aerospace Engineering at the University of California, Los Angeles (UCLA). She received her M.S. and Ph.D. degrees in Mechanical Engineering from the California Institute of Technology in 1979 and 1982, respectively, and her B.S. in Engineering from UCLA in 1978. She joined the UCLA faculty in 1982. 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 improved efficiency and emissions reduction for aircraft engines, actively controlled jet mixing for high-speed aircraft systems, behavior and simulation of pulse detonation engines, microgravity combustion processes and their response to acoustic excitation, and environmental waste destruction systems. Professor Karagozian is a newly appointed member (2002–2006) and is a past member (1997–2001) of the Air Force Scientific Advisory Board (SAB). In 2001 she chaired a panel for the Air Force SAB that examined Sensor Technologies for Hard and Deeply Buried Targets. Professor Karagozian is also a past member of the NASA Aerospace Technology Advisory Committee and is currently on the Executive Committee for the Western States Section of the Combustion Institute. She is an alumna of the Defense Science Study Group sponsored by DARPA and the Institute for Defense Analyses and is a member of the AIAA Awards Committee. Professor Karagozian is an Associate Fellow of AIAA and has authored or coauthored over 100 archival and conference papers.



**ELI LIVNE** received his B.Sc (1974) and M.Sc. (1982) degrees in Aeronautical Engineering from the Technion—Israel Institute of Technology. From 1975 to 1984 he worked in the areas of structural dynamics, aeroelasticity, and aeroservoelasticity. He received his Ph.D. in Aerospace Engineering (1990) from the University of California, Los Angeles, and joined the Department of Aeronautics and Astronautics at the University of Washington in Seattle, where he is currently a Professor. Dr. Livne's research spans structures, structural dynamics, unsteady aerodynamics, flight mechanics, active control, and airplane multidisciplinary design optimization, with an emphasis on design-oriented modeling techniques. This work contributed to the development of efficient computational tools for integrated synthesis of actively-controlled aircraft and to some of the first studies in integrated multidisciplinary aeroservoelastic design. Dr. Livne's research has been supported by the U.S. Air Force, U.S. Navy, NASA, the National Science Foundation (NSF), and Boeing. He is a former member of the AIAA Multidisciplinary Design Optimization Technical Committee, the NASA/Boeing HSCT Aeroelastic Concept Evaluation Team, and the Boeing HSCT Aeroservoelastic working group. He is a recipient of a UCLA School of Engineering and Applied Science 1989–1990 Outstanding Ph.D. award and a 1992 NSF National Young Investigator Award. He won the 1998 ASME/Boeing Structures and Materials Award for the best paper given at the 1997 38th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference. He edited a January–February 1999 special Multidisciplinary Design Optimization issue of the *Journal of Aircraft* and is an Associate Fellow of AIAA.



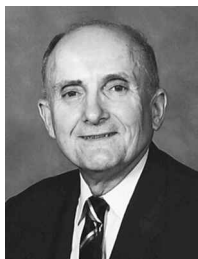
**ROBERT P. LUCHT** is currently a Professor in the School of Mechanical Engineering at Purdue University. He received his B.S. degree in Nuclear Engineering and his M.S. and Ph.D. degrees in Mechanical Engineering, all from Purdue University. He joined the Combustion Research Facility at Sandia National Laboratories in 1983 and was a member of the technical staff and then a department manager. In 1992, he became a faculty member at the University of Illinois at Urbana–Champaign. From 1998 to 2002 he was the G. Paul Pepper Professor of Mechanical Engineering at Texas A&M University. The focus of his research is the development and application of laser diagnostic techniques and optical sensor systems for probing both reacting and nonreacting flows. Currently, his research group is developing dual- and triple-pump CARS techniques for multiparameter measurements in combustions flows, investigating the potential of electronic resonance, dual-pump CARS for sensitive measurements of minor species, and investigating the physics of polarization spectroscopy and degenerate four-wave mixing. His group is also developing diode-laser-based optical absorption sensors for sensitive measurements of pollutant species, using sum- and difference-frequency mixing techniques to generate ultraviolet and midinfrared laser radiation, respectively. He is a member of the American Society of Mechanical Engineers, the Society of Automotive Engineers, the Optical Society of America, and the Combustion Institute. He is a Fellow of the Optical Society of America and an Associate Fellow of AIAA. He is the author or coauthor of over 70 archival journal papers.



**SHANKAR MAHALINGAM** is a Professor in the Department of Mechanical Engineering at the University of California (UC), Riverside. He received his B.Tech from the Indian Institute of Technology Madras in 1980, M.S. from the State University of New York at Stony Brook in 1982, and Ph.D. from Stanford University in 1989, all in Mechanical Engineering. From 1989 to 2000, he was on the faculty of the Department of Mechanical Engineering at the University of Colorado, Boulder. Since 2000, he has been on the faculty of the Department of Mechanical Engineering at UC, Riverside. In 2002 he was appointed Chair of the Department. Professor Mahalingam's research interests include direct and large eddy simulations of turbulent combustion, forest fire modeling, flame spread experiments, computational fluid dynamics applied to turbulent combustion, acoustic-flow interactions, and cardiovascular fluid dynamics. Dr. Mahalingam's research is currently funded by the National Science Foundation and the U.S. Department of Agriculture Forest Service through a cooperative agreement with the Forest Fire Laboratory, Riverside. He won two teaching awards and an outstanding advisor award while at the University of Colorado. Dr. Mahalingam teaches graduate and undergraduate classes in engineering mathematics, computational methods, fluid dynamics, heat transfer, computational fluid dynamics, and combustion. He served as a Member-at-Large of the Board of the Western States Section of the Combustion Institute from 1992 to 1998. He is a member of the Combustion Institute, American Physical Society (Fluid Dynamics), the American Society of Mechanical Engineers, and Sigma Xi and is a Senior Member of AIAA. He has authored or coauthored over 30 refereed papers and an equal number of conference papers.



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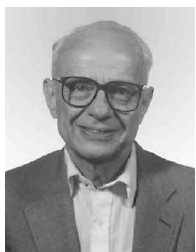


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