

Decadal Survey on Biological and Physical Sciences in Space: Translation to Space Exploration Systems Panel

Committee

James P. Bagian

Chair

JAMES P. BAGIAN (NAE, IOM) is the director of the National Center for Patient Safety in the Veterans Health Administration of the Department of Veteran Affairs. From 1980 to 1995, Dr. Bagian served as a an astronaut for NASA. In particular, Dr. Bagian was the lead mission specialist for the first dedicated Life Sciences Spacelab mission. His primary interest and expertise involves the development and implementation of multidisciplinary programs and projects that involve the integration of engineering, medical/life sciences, and human factor disciplines. Presently, he is applying the majority of his attention to the application of systems engineering approaches to the analysis of medical errors and the development and implementation of suitable corrective actions that will enhance patient safety primarily through preventive means. He received his B.S. in mechanical engineering from Drexel University and his M.D. from Jefferson Medical College at Thomas Jefferson University. Dr. Bagian has served on numerous National Research Council Committees, including the Task Group on Research on the International Space Station (2001-2003), the Committee on Space Biology and Medicine (2000-2003), the Review of NASA Strategic Roadmaps: Space Station Panel (2005), the Committee on NASA's Bioastronautics Critical Path Roadmap (2004-2006), and the Committee on Optimizing Graduate Medical Trainee (Resident) Hours and Work Schedules to Improve Patient Safety (2007-2009). Dr. Bagian is a member of both the National Academy of Engineering and the Institute of Medicine.

Frederick R. Best

Member

FREDERICK R. BEST is an associate professor in the Nuclear Engineering Department at Texas A&M University and the director of the Space Engineering Research Center (SERC) and the Interphase Transport Phenomena Laboratory (ITP). Prior to joining Texas A&M in 1983, Dr. Best was a Visiting Professor at MIT and a Technical Coordinator in the nuclear area of the MIT Electric Utility Research Program. His research is focused on zero gravity two phase flow, reactor thermal hydraulics, and interphase transport phenomena. He earned his B.S. in mechanical engineering in 1968 from Manhattan College in New York City, his M.S. in nuclear engineering in 1969, and his Ph.D. in nuclear engineering in 1980, both from MIT. Dr. Best has served on the NASA BIO-PLEX Review Panel (2000-2001), the NASA Peer Review Panel (Chairman 2000-2001), the NASA Advanced Life Support, Science, and Technology Working Group (1999-2001), and the Air Force Science Advisory Board (1995-1996). He is presently serving on the NASA/JPL Technology Review Board for the New Millennium Program ST-8.

Leonard H. Caveny

Member

LEONARD H. CAVENY is an aerospace consultant and former director of science and technology for the Ballistic Missile Defense Organization (BMDO). His previous experience also includes service as assistant director of innovative science and technology for the Strategic Defense Initiative Organization/BMDO, staff specialist for the Office of the Deputy Undersecretary for Research and Advanced Technology for the Department of Defense (DOD), and program manager for energy conversion for the Air Force Office of Scientific Research. Dr. Caveny's expertise includes solid rocket propulsion, aerothermochemistry flight experiments, electric propulsion, space solar power, diagnostics of reacting flows, combustion, propellants, refractory materials, aeroacoustics. He earned his B.S. and M.S. in mechanical engineering from the Georgia Institute of Technology, and his Ph.D. in mechanical engineering from the University of Alabama. He served on the NRC's Panel to Review Air Force Office of Scientific Research Proposals in Propulsion and the Committee for the Review of NASA'S Pioneering Revolutionary Technology Program. Dr. Caveny is currently a member of the Microgravity Decadal Survey Steering Committee, and he was nominated to serve as both a panel member and a liaison to the Steering Committee.

Michael B. Duke

Member

MICHAEL B. DUKE is a planetary geologist who recently retired as the director of the Center for Commercial Applications of Combustion in Space at the Colorado School of Mines (CSM). His principal research focuses on the general area of study that relates to the use of in-situ resources to support human exploration missions to the Moon and Mars. His planetary science interests relate to the mineralogy and petrology of meteorites and lunar materials. Dr. Duke worked at the NASA Johnson Space Center for 25 years prior to accepting the position at CSM in 1998. He has also been a research scientist at the U.S. Geological Survey (1963-1970) and curator of NASA's lunar sample collection (1970-1977). Dr. Duke received the NASA Exceptional Scientific Achievement Award, the AIAA's Space Science Medal, and he was a distinguished federal executive. Dr. Duke received a B.S. and a Ph.D. from the California Institute of Technology. He has served on the NRC's Committee on the Scientific Context for the Exploration of the Moon and the Panel on Solar System Exploration. Dr. Duke is a member of the Microgravity Decadal Survey Steering Committee, and he was nominated to serve as both a panel member and a liaison to the steering committee.

John P. Kizito

Member

JOHN KIZITO is an assistant professor of mechanical engineering at North Carolina A&T State University. Prior to joining the faculty of A&T, Dr. Kizito was a research assistant, research scientist and adjunct assistant professor at Case Western Reserve University in Cleveland, Ohio from 1988 to 2007 and a staff scientist at the National Center for Space Exploration Research (USRA) at NASA Glenn Research Center from 1999 to 2007. His research focuses on developing thermal management methods, high heat flux control, energy storage (Phase Change Materials), water management in Polymer Electrolyte Membrane fuel cells, innovative computational fluid dynamics techniques, gravity driven transport phenomena, medical devices and instrumentation, microgravity research, In Situ Resource Utilization, and Lunar and Mars exploration equipment. He is a member of the American Society of Mechanical Engineers (ASME), the American Institute of Aeronautics and Astronautics (AIAA), and the American Society for Gravitational and Space Biology (ASGSB). Dr. Kizito was awarded a 1988 Fulbright Award, a 1988 Rice-Cullimore Award and five NASA Team Achievement Awards between the years of 2001 and 2003. He received his B.S. in mechanical engineering from Makere University and his M.S. and Ph.D. in mechanical engineering from Case Western Reserve University.

David Y. Kusnierkiewicz

Member

DAVID V. KUSNIERKIEWICZ is chief engineer of the Space Department of the Johns Hopkins University Advanced Physics Laboratory, where he has worked for 26 years. He has an extensive background in designing, integrating and testing power system electronics for spacecraft. Mr. Kusnierkiewicz held the position of mission system engineering for the NASA New Horizons Pluto-Kuiper-Belt Mission, and is still the mission and spacecraft system engineer for the NASA Thermosphere, Ionosphere, Mesosphere, Energetics and Dynamics (TIMED) program, which launched in December 2001. He has served on numerous review boards for NASA missions, including Lunar Reconnaissance Orbiter, Lunar Robotic Explorer; Dawn, Juno, and ST-8 (part of the New Millennium Program); and he has received two NASA Group Achievement Awards. Prior to working as a systems engineer, he spent over years designing space flight hardware. Mr. Kusnierkiewicz received his B.S. and M.S. in electrical engineering from the University of Michigan-Ann Arbor. He currently serves on the National Research Council Mitigation Panel (2009-2010).

E. T. Mahefkey, Jr.

Member

E. THOMAS MAHEFKEY is serving as a consultant to several firms in the areas of heat transfer and energy conversion. He retired from the Air Force Wright Laboratory in 1995 after 33 years as an engineer, scientist and research manager. Before retiring, he was deputy division chief for technology in the Propulsion Laboratory's Aerospace Power Division. Dr. Mahefkey was instrumental in establishing the Thermal Energy/Heat Pipe and the Thermionics laboratories within the Air Force Wright Laboratory. Dr. Mahefkey is also an experienced educator, having held the rank of adjunct professor of mechanical engineering at the University of Dayton, Wright State University, University of Kentucky, Ohio State University, and the Air Force Institute of Technology. Dr. Mahefkey's areas of expertise include thermionics, energy conversion, and heat transfer, and he has published extensively in these areas. He received his BS in aerospace engineering from Saint Louis University, and his MS in physics and his Ph.D. in mechanical engineering from the University of Dayton. Dr. Mahefkey previously served as chair of the NRC Committee on Thermionic Research and Technology.

Dava J. Newman

Member

DAVA J. NEWMAN is a professor of Aeronautics and Astronautics and Engineering Systems, director of the Technology and Policy Program, and MacVicar Faculty Fellow at the Massachusetts Institute of Technology (MIT). Her research focuses on the mechanics and energetic requirements of human performance across the continuum of gravity from microgravity to lunar and Martian gravity levels to hypergravity. This research combines aerospace bioengineering, human-in-the-loop dynamics and control modeling, biomechanics, human interface technology, life sciences, and systems analysis and design. She received her B.S. in Aerospace Engineering from the University of Notre Dame and her M.S. and Ph.D. in aerospace biomedical engineering from the Massachusetts Institute of Technology. Dr. Newman previously served as a member of the National Research Council Committee on Advanced Technology for Human Support in Space (1996-1997), the Committee on Engineering Challenges to the Long-Term Operation of the International Space Station (1998-2000), the Aeronautics and Space Engineering Board (19998-2004), the Steering Committee for Workshops on Issues of Technology Development for Human and Robotic Exploration and Development of Space (2003-2006), and the Committee on Full System Testing and Evaluation of Personal Protection Equipment Ensembles in Simulated Chemical and Biological Warfare Environments (2006-2007).

Richard J. Roby

Member

RICHARD J. ROBY is the president and technical director of Combustion and Science Engineering, Inc. (CSE). In addition to his role at CSE, he is an adjunct professor in the Department of Fire Protection Engineering at the University of Maryland, College Park and in the Mechanical Engineering Department of Virginia Polytechnic Institute & State University in Blacksburg, VA. He has more than twenty years of professional experience and skills in both chemical and mechanical engineering. Prior to joining CS&E, he served as director of combustion research at Hughes Associates, Inc. in Baltimore, MD from 1992 to 1998 and as a research assistant and research engineer at Stanford University (1983-1986), the Ford Motor Company Scientific Research Labs in Dearborn Michigan (1979-1983), and Cornell University (1977-1979). Dr. Roby serves as project manager for a variety of experimental and analytical combustion and fire science research and development projects including: modeling of blow-off and flashback in gas turbine combustors; determining the effects of fuel constituents on combustor performance; developing and incorporating reduced kinetics mechanisms in CFD codes; creating innovative fire detection devices; and developing new fire models. He is a member of a number of professional societies, including The Combustion Institute, The Society of Automotive Engineers, and the International Association for Fire Safety Science. He won the Outstanding Faculty Award from the Society of Automotive Engineers (1999), the National Fire Protection Research Foundation's Harry Bigglestone Award for Excellence in Communication of Fire Protection Concepts (1999) and the William M. Carey Award at the 5th Fire & Detection Research Application Symposium (2001). Dr. Roby holds a patent for his "Multi-Signature Fire Detector" . He received his A.B. and B.S. in chemistry and chemical engineering, respectively, in 1977 from Cornell University, his M.S. in mechanical engineering in 1980 from Cornell University and his Ph.D. in mechanical engineering from Stanford University in 1988

Guillermo Trotti

Member

GUILLERMO TROTTI is currently the president of Trotti & Associates, Inc. (TAI), a firm he founded in 1993 in Cambridge Massachusetts. He is an internationally recognized architect and industrial designer with over thirty years of experience designing architectural projects for the hospitality, entertainment, and education sectors. Previously, he was the president of Bell and Trotti, Inc. (BTI), a design and fabrication studio based in Houston, Texas that specialized in hi-technology architecture, exhibit design, industrial design, and space architecture. Since its inception the company had a key role in designing diverse elements of the International Space Station for NASA and leading aerospace companies. TAI has worked with the NASA's Institute of Advanced Concepts on revolutionary mission architecture concepts to explore the Moon with habitable rovers. The Extreme Expeditionary Architecture: Mobile, Adaptable Systems for Space and Earth Exploration (EXP-Arch) project proposes a revolutionary way for humans and machines to explore the Moon. TAI is also working with MIT on the Biosuit project, an advanced mechanical counter pressure space suit for Lunar and Mars surface exploration. Mr. Trotti has over twenty five years experience teaching design in architecture and industrial design at the University of Houston and at the Rhode Island School of design, respectively and he received his M.A. in architecture from Rice University in 1976. Mr. Trotti previously served on the National Research Council Committee to Review NASA's Exploration Technology Development Programs.

Alan Wilhite

Member

ALAN WILHITE is the Langley Distinguished Professor in the School of Aerospace Engineering at Georgia Institute of Technology and also serves as the co-director of the Georgia Institute of Technology Center for Aerospace Systems Engineering (CASE). He currently resides at the National Institute of Aerospace in Hampton, Virginia teaching graduate classes and conducting research at NASA Langley Research Center. He teaches and supervises research in systems engineering and aerospace systems design. He has numerous published articles and several book chapters in these areas. He has served as a researcher, systems program manager, and senior executive involved in the design and development of NASA space and aeronautic systems. He is an AIAA associate fellow and has served on several AIAA technical committees such as space systems, space transportation and computer aided design. He is also a member of the International Astronautical Federation on the Systems Engineering committee. He conducts research in systems of systems architecture design, robust design, aerodynamics, propulsion, MDO, operations, cost, systems engineering, and risk. He has served as NASA's external chair for systems engineering and conducts research supporting NASA's vision in space exploration. Dr. Wilhite received his B.S. in aerospace engineering from North Carolina State University, his M.S. in flight systems in from the George Washington University, and his Ph.D. in aerospace engineering from North Carolina State University .