

Decadal Survey on Biological and Physical Sciences Research in Space 2023-2032: Engineering and Science Interface Panel

Committee

Michael G. Ryschkewitsch

Chair

Michael G. Ryschkewitsch is the sector head for the Space Exploration Sector of the Johns Hopkins University Applied Physics Laboratory (APL). In this role, Ryschkewitsch oversees APL's portfolio of space programs spanning many aspects of solar system research, from space physics to space situational awareness and planetary probes, leading an experienced science, engineering, and program management cadre to pursue groundbreaking space opportunities, enhance innovation and affordability, and meet high standards in product quality and timeliness. As the nation's largest University Affiliated Research Center, APL performs research and development on behalf of the Department of Defense, the Intelligence Community, the National Aeronautics and Space Administration, and other federal agencies. Before joining APL, Ryschkewitsch held several roles at NASA, including NASA Chief Engineer. Ryschkewitsch received a Ph.D. in physics from Duke University

Gale J. Allen

Member

Gale J. Allen is president of G-Allen Strategies LLC. Previously, Allen was executive director for the American Society for Gravitational and Space Research, the deputy chief scientist at NASA Headquarters, the chief of the Materials and Chemistry Branch, and the associate director of Technology Programs and Commercialization at NASA Kennedy Space Center. At NASA HQ, Allen managed the Bioastronautics (human research and life support) Research Program, served as deputy for the Human Systems Research and Technology Program, and director of the Strategic Integration and Management Division. Allen has received the Distinguished Service Medal, two NASA Exceptional Service Medals, and an Outstanding Leadership Medal. Allen serves on the board of directors of the CASIS, ISS-National Lab. Allen received a Ph.D. in business administration with an emphasis in high technology partnership development from Nova Southeastern University.

Robert V. Duncan

Member

Robert V. Duncan is a professor and President's Distinguished Chair in Physics at Texas Tech University. Duncan previously served as vice chancellor for research at the University of Missouri and as a visiting associate on the physics faculty of the California Institute of Technology. As well he has served as professor of physics and astronomy, as a joint associate professor of electrical and computer engineering and as the associate dean for research in the College of Arts and Sciences at the University of New Mexico (UNM). An expert in low temperature physics, Duncan has served as principal investigator on a fundamental physics research program for NASA. As director of the New Mexico Consortium's Institute for Advanced Studies at the Los Alamos National Laboratory, Duncan has worked to fund major conferences and summer schools in quantitative biology; information science and technology; energy and environment; and astrophysics and cosmology. Duncan is a fellow and life member of the American Physical Society. Duncan received a Ph.D. in physics from the University of California, Santa Barbara.

Antonio L. Elias

Member

Antonio L. Elias, NAE, retired from Orbital ATK, Inc. as executive vice president and chief technical officer. Before the merger between Orbital Sciences and ATK, Elias served as the Orbital Sciences Corporation chief technical officer, corporate senior vice president, and founder and general manager of its Advanced Programs Group. Some activities included lead architect of the Cygnus cargo resupply spacecraft and technical team lead for the design and production of the Pegasus air-launched booster and Orbital's APEX and Sea Star satellites and X-34 hypersonic research vehicle. Previously, Elias held various teaching and research positions at the Massachusetts Institute of Technology, including the Boeing Chair in the Department of Aeronautics and Astronautics. Elias serves as secretary-treasurer of the Virginia Academy of Science, Engineering, and Medicine and is a fellow of the American Institute of Aeronautics and Astronautics (AIAA), the American Astronautical Society (AAS), and the International Academy of Astronautics. Awards include the AIAA Engineer of the Year, the AIAA Aircraft Design Award, AIAA Von Karman Lectureship, the AAS Brouwer Award, and co-recipient of the National Medal of Technology and the National Air and Space Museum Trophy. Elias received a Ph.D. in flight transportation from the Massachusetts Institute of Technology.

Hans Koenigsmann

Member

Hans Koenigsmann is an independent technical advisor to several companies. Previously, Koenigsmann held several of senior positions at SpaceX and developed the avionics, guidance and control, and software departments; and designed the avionics system of Falcon 1 and supported the early launches directly as launch chief engineer. In management and flight reliability roles, Koenigsmann resolved high-profile anomalies and was responsible for production quality, as well as flight risk and safety. Such responsibilities included change engineering, process development, and the quality system. Koenigsmann has supported more than 100 launches with thorough readiness reviews prior, and flight data reviews post flight. Feeding back the lessons learned, preventing mission failures, and improving both production and operation remains the top priority. Koenigsmann received a Ph.D. in aerospace engineering and manufacturing from the University of Bremen in Germany.

Bruce M. Link

Member

Bruce M. Link is a subject matter expert and certified project management professional with the Southeastern Universities Research Association. Link is a section lead for the Laboratory Support Services and Operations contract with NASA at the Kennedy Space Center. Interest areas include long-term science needs for plants, plant-microbiomes, and crop production; open innovation to solve deep space food challenges; microgravity simulation and plant growth under simulated space environments; in-situ resource utilization including reducing waste, resource recovery from waste streams, regolith handling; and landing plume interactions with the lunar surface. Previously, Link served as an expert on crop biotechnologies helping to evaluate, innovate and integrate key new traits and technologies into Syngenta's R&D pipelines. Link received a Ph.D. in biology from the Pennsylvania State University.

Kathryn C. Thornton

Member

Kathryn C. Thornton is a professor emeritus in the department of mechanical and aerospace engineering at the University of Virginia (UVA). Thornton has extensive human spaceflight experience and previously served as a NASA astronaut, flying on four space shuttle missions and performing extravehicular activities (i.e. spacewalks) on two of them. Thornton serves on the board of the Space Foundation and the Astronaut Scholarship Foundation and is co-author of Pearson's Interactive Science, a K-8 science program. Thornton previously headed the NASA Johnson Space Center education working group which coordinated the educational outreach activities of astronauts and professional educators working under the "Teaching from Space" contract with Oklahoma State University and directed the UVA Center for Science, Mathematics, and Engineering Education. Thornton received a Ph.D. in physics from the University of Virginia.

Kasthuri Venkateswaran

Member

Kasthuri Venkateswaran is the senior scientist at the Jet Propulsion Laboratory, a NASA institution affiliated with the California Institute of Technology. Venkateswaran is the group lead of the Biotechnology and Planetary Protection working on various aspects of NASA's Planetary Protection, Astrobiology, Space Biology, and Human Research Program. Research interests encompass marine, food, and environmental microbiology. Venkateswaran leads microbial observatory projects (International Space Station) to measure microorganisms associated with U.S. nodes, as well as Kibo Japanese experiment modules. This work applies molecular microbial analysis to better understand the ecological aspects of microbes, while conducting field studies in several extreme environments, such as the deep sea, spacecraft missions, assembly facility clean rooms, and the space environment in Earth orbit. Venkateswaran received a Ph.D. in marine microbiology from Annamalai University, India and a D.Ag. in food microbiology from Hiroshima University, Japan.

Deborah S. Wells

Member

Deborah S. Wells is the strategic planner for Leidos' Space Exploration and Mission Operations division developing the business architecture for Leidos' end-to-end space services enabling early stage and growth opportunities for the commercial LEO marketplace. Previously, she led multiple laboratories supporting Kennedy Space Center's (KSC) operations, research, and technology development. These laboratory programs and projects include multi-disciplinary, full-range technical readiness level activities encompassing flight programs in crop production, dust mitigation, lunar regolith analyses, low earth orbit satellite repair, solar reflective materials, and other exploration capability demonstrations. As a biomedical engineer, Wells has contributed to health and wellness experiments aboard over 100 space shuttle missions and has served as Life Sciences Services Contract lead for the development of KSC and Armstrong Flight Research Center facilities for astronaut research and the design, construction, and start-up of the Space Life Sciences Lab – the first facility in Space Florida's Exploration Park. Wells has also served as director of product development at a renewable energy start-up with responsibility for recommending and implementing both manufacturing and business strategies for products in animal feed, fertilizer, fuels, and human food. Recognitions include Space Coast Women Engineer of the Year and NASA's Silver Snoopy. Wells received an M.B.A. from the University of Florida.

Lisa Williams Smith

Member

Lisa Williams Smith is a senior chief engineer (CE) at Marshall Space Flight Center, NASA. Smith is the lead CE for Business & Proposal efforts and CE for some space flight science missions. Smith provides engineering technical leadership to all aspects of a program or project which includes, but is not limited to formulation, design, fabrication, integration, test, flight hardware delivery, and launch and operations. Smith has years of experience in multiple supervision and leadership roles in software engineering, system engineering, project management, safety engineering, flight crew/flight ground controller training, mission operations. Smith received a B.S. in computer engineering from Auburn University.

Danielle Wood

Member

Danielle Wood is an assistant professor in Media Arts and Sciences and holds a joint appointment in the Department of Aeronautics and Astronautics at the Massachusetts Institute of Technology (MIT). Within the MIT Media Lab, Wood leads the Space Enabled Research Group. Wood is a scholar of societal development with a background that includes satellite design, earth science applications, systems engineering, and technology policy. Research interests include the design of innovative systems that harness space technology to address development challenges around the world and contribute to the long-term sustainability of outer space. Previously, Wood held positions at NASA Headquarters, NASA Goddard Space Flight Center, Aerospace Corporation, Johns Hopkins University, and the United Nations Office of Outer Space Affairs. Wood received a Ph.D. in engineering systems from the Massachusetts Institute of Technology.