

APPENDIX A. PANELIST BIOGRAPHIES



George Bekey
(Panel Chair)

Dr. Bekey is an emeritus professor of computer science at the University of Southern California. His research interests include autonomous robotic systems, multi-robot cooperation and human-robot interaction. He received his PhD in engineering from University of California, Los Angeles (UCLA). Following employment at Beckman Instruments and TRW Systems he joined the faculty at USC in 1962. He served as chairman of the Electrical Engineering Systems Department from 1978 to 1982, as chairman of the Computer Science Department from 1984 to 1989, and as associate dean for research of the USC School of Engineering from 1996 to 1999, in addition to founding the Biomedical Engineering Department and the Robotics Research Laboratory. He has published over 200 papers and several books in robotics, biomedical engineering, computer simulation, control systems, and human-machine systems. Dr. Bekey is a member of the National Academy of Engineering, a fellow of the Institute of Electrical and Electronics Engineers (IEEE) and of the American Association for Artificial Intelligence (AAAI). He is editor-in-chief of the journal *Autonomous Robots*, and founding editor of the *IEEE Transactions on Robotics and Automation*. During 1996 and 1997 he served as president of the IEEE Robotics and Automation Society.

His new book, *Autonomous Robots: from Biological Inspiration to Implementation and Control*, was published by MIT Press in May 2005.

George officially retired from USC in 2003, but continues to be active on a part-time basis at the University, as well as in consulting and service on the advisory boards of several high technology companies. He is also affiliated with a medical devices startup company in San Luis Obispo and a robotics company in Los Angeles. Effective September 2005, he will also be an adjunct professor of engineering at California State Polytechnic University in San Luis Obispo.



Robert Ambrose

Dr. Ambrose serves as the chief of the Robotics Systems Technology Branch within the Automation, Robotics and Simulation Division at NASA's Johnson Space Center (JSC). His branch is tasked with developing new robot technology for NASA's Space Operations and Exploration Mission Directorates.

Robert Ambrose received his BS (1986) and MS (1987) in mechanical engineering from Washington University, and his PhD (1991) from the University of Texas. During his post-doctoral year at the University of Texas, he was a co-investigator on a NASA grant studying remote operations of robots, and furthered his work on robot design methodologies. In 1992, he joined NASA's Johnson Space Center working for MITRE and then Metrica, Inc., on contract assisting in the design of new robotic systems. In 1995 he led the development of space-worthy joint drive components for the Dexterous Robot System. In 1997 he served as the principal investigator on a project that designed and built robots for service in the plant growth chamber of JSC's BioPlex, a Mars habitat mockup. In 1998 he served as the manipulator subsystem lead for

Robonaut, and in 1999 he was selected to lead the Robonaut Team. In 2000 he was hired by NASA, and continued to lead the Robonaut Team through the integration of the first robot, then a second prototype with multiple lower body options. In 2004 he served as the acting chief of the Robotics Systems Technology Branch, and in 2005 was selected as the permanent chief, leading personnel working on Robonaut and other JSC projects. In these and other assignments he has built robotic systems for space, microelectronics, nuclear and agricultural applications, including manipulators, force feedback joysticks, gantries, walking machines and wheeled robots.

Dr. Ambrose currently serves as the principal investigator on two research projects for the NASA Exploration Directorate, titled "Telepresence for Remote Supervision of Robots," and "Flight Demonstration of a Dexterous Robot with EVA Crew." He also serves as a co-investigator on three additional projects with Jet Propulsion Laboratory (JPL), Ames, and Langley personnel. He is a member of the review board for the Mars Rover Technology Program at JPL, and has served on numerous NASA grant review boards. He has chaired two accident investigations at JSC, recommending changes in facility designs to improve safety. He is on the editorial board of *Industrial Robot*, *The International Journal of Humanoid Robotics*, and *The Journal of Field Robotics*. He has authored over 60 papers on topics in robot design, space environmental modeling, actuator development, kinematics, kinetics, bio-mechanics, interactive design software and non-linear optimization.



Vijay Kumar

Dr. Kumar received his MSc and PhD in mechanical engineering from The Ohio State University in 1985 and 1987, respectively. He has been on the faculty in the Mechanical Engineering and Applied Mechanics Department with a secondary appointment in the Computer and Information Science Department at the University of Pennsylvania since 1987. He is currently the UPS Foundation professor and the chairman of the Mechanical Engineering and Applied Mechanics Department.

Dr. Kumar served as the deputy dean of the School of Engineering and Applied Science from 2000 to 2004. He directed the General Robotics, Automation, Sensing and Perception (GRASP) Laboratory, a multidisciplinary robotics and perception laboratory, from 1998 to 2004. He is a co-founder of Bio Software Systems, a start-up company in Camden commercializing novel software tools for the analysis of regulatory networks.

Dr. Kumar's research interests lie in the area of robotics and networked multi-agent systems. He is a fellow of the American Society of Mechanical Engineers, a fellow member of the Institute of Electrical and Electronic Engineers (IEEE), and a member of the Robotics International, Society of Manufacturing Engineers. He has served on the editorial board of the *IEEE Transactions on Robotics and Automation*, editorial board of the *Journal of Franklin Institute* and the *American Society of Mechanical Engineers (ASME) Journal of Mechanical Design*. He is the recipient of the 1991 National Science Foundation Presidential Young Investigator award, the Lindback Award for Distinguished Teaching, the 1997 Freudenstein Award for significant accomplishments in mechanisms and robotics, and the 2004 IEEE International Conference on Robotics and Automation Kawamori Best Paper Award.



Arthur Sanderson

Dr. Sanderson received his BS degree from Brown University, Providence, RI, in 1968, and MS and PhD degrees from Carnegie Mellon University, Pittsburgh, in 1970 and 1972, respectively. Dr. Sanderson held faculty positions at Carnegie Mellon University from 1973 to 1987, where he was co-director of the Robotics Institute, the largest university-based robotics research center in the U.S. In that role, he provided guidance for programs in industrial robotics, mobile robotics with applications to space, defense, and hazardous environments, medical robotics, and fundamental research in intelligent systems. He pioneered research on real-time visual servo control systems for robotics applications, and introduced sensor-based control architectures in a number of different domains.

He has held visiting positions at Delft University of Technology, Universidad Iberoamericana, Mexico City, Mexico, and Philips Laboratories, Briarcliff Manor, NY. In 1987, he joined Rensselaer Polytechnic Institute as professor and served as department head of the Electrical, Computer and Systems Engineering Department from 1987 to 1994. He was co-director of the Center for Advanced Technology in Automation and Robotics, and co-principal investigator of the Center for Intelligent Robotic Systems for Space Exploration, and developed real-time hierarchical architectures for space flight applications. He developed the “Tetrobot” system of modular distributed robotics that provides flexible reconfiguration of robotics capability for different applications.

Dr. Sanderson is the author of over 250 publications and proceedings in the areas of biomedical signal processing, robotics and automation systems, sensor-based control, computer vision, and applications of knowledge-based systems. He has published the following books: *Intelligent Task Planning using Fuzzy Petri Nets*, World Scientific Publishers, 1996, with T. Cao; *Tetrobot: A Modular Approach to Reconfigurable Parallel Robotics*, Kluwer Academic Press, 1998, with G. Hamlin; and *Multisensor Fusion: A Minimal Representation Framework*, World Scientific Publishers, 1999, with R. Joshi. The book *Network-based Distributed Planning Using Coevolutionary Algorithms*, co-authored with R. Subbu, World Scientific Publishers, is currently in press.

In January 2000, Dr. Sanderson was appointed the vice president for research of Rensselaer Polytechnic Institute. In this role, he is responsible for coordination of all research programs on the campus. He has a leadership role in the development of strategic priorities for research at Rensselaer, and has oversight of interdisciplinary research centers in nanotechnology, microelectronics, scientific computation, automation technology, terahertz research, and pervasive computing and networking. In April 2003, New York State established the Rivers and Estuaries Center on the Hudson with strong involvement of Rensselaer, and Dr. Sanderson is currently working with the Center on the application of distributed systems, sensors and sensor networks, and robotics to environmental sensing and monitoring.



Brian Wilcox

Brian Wilcox is the principal investigator of the Rough and Steep Terrain Lunar Surface Mobility Project, which is developing a robot for use in the upcoming NASA Vision for Space Exploration of the moon and Mars outlined by President Bush in January of 2004.

Brian was the supervisor of the Robotic Vehicles Group at JPL for over 20 years, leading the development of numerous robotic vehicles, and has also been the manager of the JPL Solar System Exploration Mobility Technology program. Under his leadership, the Robotic Vehicles group was responsible for the electronics, software, and mission operations for the Sojourner Rover that explored a small part of Mars in 1997, and he was personally responsible for Sojourner's hazard avoidance sensors and cameras and autonomous navigation algorithms.

He is a member of the Committee on Autonomous Vehicles in Support of Naval Operations under the auspices of the National Academies, is a member and past chair (2000–2004) of the Space Automation and Robotics Technical Committee of the American Institute of Aeronautics and Astronautics, is a recipient of the NASA Exceptional Engineering Achievement Medal, and has seven U.S. patents. He has a BS degree in physics and a BA degree in mathematics from the University of California at Santa Barbara, and an MS degree in electrical engineering from the University of Southern California.



Yuan Zheng

Professor Yuan F. Zheng received MS and PhD degrees in electrical engineering from The Ohio State University, Columbus, Ohio, in 1980 and 1984, respectively. His undergraduate studies took place at Tsinghua University, Beijing, China from 1970 to 1974.

From 1984 to 1989, he was with the Department of Electrical and Computer Engineering at Clemson University, Clemson, South Carolina. Since August 1989, he has been with The Ohio State University, where he is currently Winbigler professor of electrical and computer engineering. Professor Zheng served as the chairman of the department from 1994 to 2004. Between 2004 and 2005, Professor Zheng was on leave at the Shanghai Jiao Tong University (SJTU) in Shanghai, China where he continues to have an adjunct appointment.

Professor Zheng was vice president for technical affairs of the IEEE Robotics and Automation Society from 1996 to 1999. He was an associate editor of the IEEE Transactions on Robotics and Automation between 1995 and 1997. He was the program chair of the 1999 IEEE International Conference on Robotics and Automation, held in Detroit, Michigan, on May 10–15, 1999. Professor Zheng received the Presidential Young Investigator Award from President Ronald Reagan in 1986.