Strengthening the Talent for National Defense: Infusing Advanced Manufacturing in Engineering Education

Committee

Maxine L. Savitz

Co-Chair

Maxine L. Savitz (NAE) is a retired General Manager of Technology/Partnerships at Honeywell, Inc., formerly Allied Signal. She is a member and served two terms as Vice President of the National Academy of Engineering (2006–2014). She was appointed to the President's Council of Advisors for Science and Technology in 2009 and served until January 2017; she served as Vice Co-Chair from 2010–2017. Dr. Savitz was employed at the U.S. Department of Energy and its predecessor agencies (1974–1983) and served as the Deputy Assistant Secretary for Conservation. Dr. Savitz serves on the Board of the American Council for an Energy Efficient Economy (Emeritus) and on advisory bodies for Pacific Northwest National Laboratory, FERMI National Laboratory, CRDF Global and Energy Futures Initiative. In 2019 - 2020, she chaired the visiting committee for the Harvard John A. Paulson School of Engineering and Applied Sciences. Past board memberships include the National Science Board, Secretary of Energy Advisory Board, Defense Science Board, Electric Power Research Institute (EPRI), Draper Laboratories, and the Energy Foundation. Dr. Savitz's awards and honors include: elected a Fellow to the American Academy of Arts and Sciences in 2013; C3E Lifetime Achievement Award in 2013; the Orton Memorial Lecturer Award (American Ceramic Society) in 1998; the DOE Outstanding Service Medal in1981; the President's Meritorious Rank Award in 1980; recognition by the Engineering News Record for Contribution to the Construction Industry in 1979 and 1975; and the MERDC Commander Award for Scientific Excellence in 1967. She is the author of about 20 publications. Dr. Savitz has served on numerous National Research Council committees and boards and participated in multiple Academies activities.

Robert F. Sproull

Co-Chair

Robert F. Sproull (NAE) retired as vice president and director of Oracle Labs, an applied research group that originated at Sun Microsystems. Since undergraduate days, he has been building hardware and software for computer graphics: clipping hardware, an early device-independent graphics package, page description languages, laser printing software, and window systems. He has also been involved in VLSI design, especially of asynchronous circuits and systems. Before joining Sun Microsystems in 1990 (acquired by Oracle in 2010), he was a principal with Sutherland, Sproull and Associates, an associate professor at Carnegie Mellon University and a member of the Xerox Palo Alto Research Center. He is a coauthor with William Newman of the early text, Principles of Interactive Computer Graphics. He is also an author of the book Logical Effort, which deals with designing fast CMOS circuits. He is a member of the National Academy of Engineering, a fellow of the American Academy of Arts and Sciences, and has served on the U.S. Air Force Scientific Advisory Board and as a technology partner of Advanced Technology Ventures. He is currently a co-chair of the National Research Council's Report Review Committee, a member of the NRC Committee on Science, Engineering, Medicine, and Public Policy (COSEMPUP), and an adjunct professor of computer science at University of Massachusetts, Amherst.

Stephanie G. Adams

Member

Stephanie G. Adams is the fifth dean of the Erik Jonsson School of Engineering and Computer Science since 2019 at the University of Texas at Dallas. She is also a professor of systems engineering. Dr. Adams is a pioneer in engineering education. In 2003 she received a National Science Foundation (NSF) Faculty Early Career Development (CAREER) award to research effective teaming in the engineering classroom. In addition to teamwork and team effectiveness, her other areas of research expertise include broadening participation in STEM (science, technology, engineering and mathematics), faculty and graduate student development, global education, and quality control and management. Dr. Adams has served in leadership roles in several organizations, including as president of the American Society for Engineering Education from 2019 to 2020, on the advisory board of the National Society of Black Engineers and on the board of directors of the Women in Engineering ProActive Network. Prior to joining UT Dallas, Dr. Adams was dean of the Frank Batten College of Engineering & Technology at Old Dominion University. She also served in various academic leadership positions at Virginia Tech, Virginia Commonwealth University, the University of Nebraska-Lincoln, the NSF Division of Engineering Education and Centers, North Carolina State University, Texas A&M University, Texas Tech University, South Plains Community College and 3M Co. Dr. Adams is an honors graduate of North Carolina A&T State University, where she earned a Bachelor of Science in mechanical engineering. She earned a Master of Engineering in systems engineering from the University of Virginia, and a PhD in interdisciplinary engineering and management from Texas A&M University, where she concentrated on industrial engineering and management.

S. K. Hargrove

Member

S. Keith Hargrove is the provost & sr. vice president of academic affairs at Tuskegee University. Previously, he served as the Dean of the College of Engineering at Tennessee State University (TSU). Dr. Hargrove received his BS in Mechanical Engineering from TSU, MS from the Missouri University of Science & Technology in Rolla, MO. as a GEM (National Consortium for Graduate Degrees for Minorities in Science and Engineering) Fellow, and the Ph.D. from the University of Iowa as a CIC (Committee on Institutional Cooperation) Fellow. He is a Certified Manufacturing Engineer recognized by the Society of Manufacturing Engineering, and registered Professional Engineer. Dr. Hargrove was a Boeing Welliver Faculty Fellow in 2008, and has worked for General Electric as a Manufacturing Engineer, and with Battelle Pacific Northwest Laboratories, NIST, Oak Ridge Laboratories as a researcher in advanced manufacturing engineering. He has been awarded research contracts and grants with Lockheed Martin, Sikorsky, US Navy, Air Force, and the National Science Foundation for work in manufacturing, advanced materials, and engineering education. Dr. Hargrove is a K12 STEM advisor and board member for several local schools, and is the author of “Navigating Academia: A Guide for Women and Minority STEM Faculty” (Academic Press), and “In Search of Academic Leadership – A Primer for Faculty Development.”

Kathryn W. Jablokow

Member

Kathryn Jablokow is a Professor of Engineering Design and Mechanical Engineering at Penn State University and currently serves the National Science Foundation in the Civil, Mechanical and Manufacturing Innovation Division as Program Director for the Engineering Design and Systems Engineering program. Dr. Jablokow is widely recognized for her expertise in cognitive diversity and its impact in engineering education and practice, including manufacturing education and student design experiences. Her research includes the use of rapid manufacturability analysis tools to enhance decision-making in engineering design education, as well as the characterization and mediation of manufacturing fixation in design education and practice (i.e., interventions to address an engineer’s overreliance on a specific manufacturing technique). Dr. Jablokow has received many major teaching and research awards, including the W. M. Keck Foundation Teaching Excellence Award, the American Society of Mechanical Engineers (ASME) Ruth and Joel Spira Outstanding Design Educator Award, and multiple Best Paper Awards. Dr. Jablokow is a Fellow of ASME, a Senior Member of IEEE, and a Member of ASEE, Sigma Xi, and the Design Society. She earned her BS, MS, and PhD degrees in electrical engineering from The Ohio State University in 1983, 1985, and 1989, respectively.

Don A. Kinard

Member

Don Kinard is a Senior Fellow for Lockheed Martin Aeronautics Production Operations and has been with LM for 36 years. Don supports Digital Transformation as well as programs such as F-35. Prior to his current assignment he was lead for F-35 production rate transition and earlier the Director of F-35 Production Engineering responsible for Joint Strike Fighter Tooling, Planning, Manufacturing Engineering, and Aircraft Systems Testing. Before joining F-35 in 2004 Dr. Kinard held various positions in both Engineering and Manufacturing during his 18 years on the F-22. Don is the lead for the LM Corporate Strategic Technology Advisory program for Advanced Manufacturing as well as the Manufacturing Fellow's team whose objectives are to develop and share engineering, manufacturing, and sustainment technologies throughout all of the LM business units. His technical interests include materials and structures, digital thread/twin integration, digital transformation, Industry 4.0, manufacturing technology, manufacturing system design, and production management.

Sundar Krishnamurty

Member

Sundar Krishnamurty has served as professor and head of the Department of Mechanical and Industrial Engineering at UMass Amherst since 2015. In 2020, Krishnamurty was named the Ronnie & Eugene Isenberg Distinguished Professorship in Engineering, which was created to enhance interdisciplinary teaching and research between fields of management, engineering, and science. He is a fellow of American Society of Mechanical Engineers (ASME), and he is an elected member of the 2020-22 Department Head/Chair of the ASME Executive Committee. Krishnamurty is the Site-Director for the NSF-sponsored Industry-University Cooperative Research Center (I/UCRC) Center for e-Design, a joint research coalition comprised of seven universities working closely with numerous businesses and government organizations. His research interests include advanced manufacturing, manufacturing automation, predictive analytics in design and manufacturing, and innovation and entrepreneurship. He was a member of the Brain Trust for the UMass Advanced Manufacturing Summit in Spring 2021 and a member of the Chancellor's Task Force for the UMass Innovation & Entrepreneurship in 2020. Krishnamurty received his BS in civil engineering at the Indian Institute of Technology, Kanpur in 1982; an MS in civil engineering at the University of Pennsylvania in 1984 and PhD in mechanical engineering from the University of Wisconsin-Madison in 1989.

Thomas R. Kurfess

Member

Thomas R. Kurfess [NAE] is Professor and HUSCO/Ramirez Distinguished Chair in Fluid Power and Motion Control in the George W. Woodruff School of Mechanical Engineering at Georgia Institute of Technology. Previously, he was the Chief Manufacturing Officer at the Manufacturing Demonstration Facility at Oak Ridge National Laboratory. Previously he was the BMW Chair in Manufacturing and a Professor in the Campbell Graduate Engineering Center at Clemson University. His current research focuses on the control of precision grinding systems that involve the development and implementation of adaptive controllers for precision grinding operations, including bore grinding, through feed centerless grinding, and surface grinding. Ultrarigid machine tools with open architecture controls are employed. The results of this work are used in a number of industrial environments. His project on precision measurement involves the use of coordinate measurement machines to verify part geometry in three dimensions. Currently, the metrology systems developed in this project are being used in the verification of parts on actual production lines. Dr .Kurfess is a fellow of the American Society of Mechanical Engineers, and has received both the Presidential Faculty Fellowship and the Presidential Young Investigator Award from the National Science Foundation. He received his Ph.D. from the Massachusetts Institute of Technology and he is a member of the National Academy of Engineering.

Chinedum Okwudire

Member

Chinedum Okwudire received his Ph.D. degree in Mechanical Engineering from the University of British Columbia in 2009 and joined the Mechanical Engineering faculty at the University of Michigan in 2011, where he is currently an associate professor. Prior to joining Michigan, he was the mechatronic systems optimization team leader at DMG Mori USA. His research is focused on exploiting knowledge at the intersection of machine design, control and, more-recently, computer science, to boost the performance of manufacturing automation systems at low cost. He has recently led the development of a new educational track in Additive Manufacturing, and co-led the development of Smart Manufacturing curriculum at the University of Michigan. Chinedum has received a number of awards and recognitions including the CAREER Award from the National Science Foundation; the Young Investigator Award from the International Symposium on Flexible Automation; the Outstanding Young Manufacturing Engineer Award from the Society of Manufacturing Engineers; the Ralph Teetor Educational Award from SAE International; and the Russell Severance Springer Visiting Professorship from UC Berkeley. He participated in the 2014 Frontiers of Engineering Education Symposium. He has co-authored a number of best paper award winning papers in the areas of control and mechatronics.

David E. Parekh

Member

Dr. David Parekh is the Chief Executive Officer of SRI International. He serves on various boards, including the Board of Trustees of the Connecticut Science Center and the Board of the Advanced Robotics for Manufacturing (ARM) Institute. Previously, he served as corporate vice president, research, and director, United Technologies Research Center (UTRC), providing global leadership for United Technologies Corporation's (UTC) central research organization. Under his leadership, UTRC developed a broad portfolio of advanced manufacturing technologies for the UTC business units and established the corporation's Additive Manufacturing Center of Excellence. Prior to joining UTRC, Parekh served as deputy director of Georgia Tech Research Institute (GTRI) and associate vice provost for research at the university. A Fellow of the American Institute of Aeronautics and Astronautics (AIAA), Parekh is also a member of the Connecticut Academy of Science and Engineering (CASE). He earned a doctorate in mechanical engineering and master's degrees in mechanical and electrical engineering from Stanford University, Stanford, California, as well as a bachelor's degree in mechanical engineering from Virginia Tech, Blacksburg, Virginia.

Arul Mozhi

Staff Officer

Arul Mozhi is study director at the National Academies of Sciences, Engineering, and Medicine. Since 1999, Dr. Mozhi has been directing projects in the areas of defense and broader science and technology carried out by numerous committees of Laboratory Assessments Board, Army Research Laboratory Technical Assessment Board, Naval Studies Board, Air Force Studies Board, National Materials and Manufacturing Board, and Aeronautics and Space Engineering Board. Prior to joining the National Academies, Dr. Mozhi held technical and management positions in systems engineering and applied materials research and development (R&D) at several small- and mid-size high tech R&D and consulting companies in the Washington, DC, and Boston areas—UTRON, Roy F. Weston, and Marko Materials. He received his M.S. and Ph.D. degrees (the latter in 1986) in materials engineering from The Ohio State University and then served as a postdoctoral research associate there for two years. He received his B.Tech. in metallurgical engineering from the Indian Institute of Technology, Kanpur, in 1982.