Army Research Laboratory Technical Assessment Board

Committee

Jennie S. Hwang

Chair

JENNIE S. HWANG (NAE, 1998) is CEO of H-Technologies Group and a Board Trustee at Case Western Reserve University. Her career encompasses corporate and entrepreneurial businesses, international collaboration, innovative research, technology transfer and global leadership positions, as well as corporate and university governance. Among her many honors and awards are Congressional Certificates of Achievement & Recognition; induction into International Hall of Fame – Women in Technology; named the R&D-Stars-to-Watch; Ohio Women Hall of Fame; Distinguished Alumni Awards; Honorary Doctoral degree; and YWCA Achievement Award. She was CEO of International Electronic Materials Corp. and has held senior executive positions with Lockheed Martin Corp., Hanson, PLC and Sherwin-Williams Co. and co-founded entrepreneurial businesses. Internationally recognized as a pioneer and long-standing leader in the infrastructure development of electronics miniaturization and advanced manufacturing, she has served as Global President of the Surface Mount Technology Association and in other global leadership positions. An international speaker and author of 600+ publications and several textbooks, she has lectured to tens of thousands of managers/engineers/researchers on emerging technologies via professional development courses. Her speeches range from university commencement addresses to keynote at DoD Federal Women's Program to tutorials at the U.S. Patent and Trademark Office. She is also a prolific author and speaker on education, workforce, and social and business issues. Additionally, Dr. Hwang has served as a board director for Fortune 500 NYSE-traded and private companies and various university and civic boards (e.g., International Advisory Board of the Singapore Advanced Technology and Manufacturing Institute and a number of international industry boards.) On serving the National Academies, she chairs the Assessment Board of Army Research Laboratory, and has served as the NAE Membership Search Executive and Chair of Peer Committee (Materials Section), National Materials and Manufacturing Board, Army Science & Technology Board, NIST Technical Assessment Board and Panels, DoD R&D Globalization Board, Committee on Forecasting Future Disruptive Technologies and NAE Award Committee, among others. She also serves on the Board on Army RDT&E, Systems Acquisition, and Logistics. Her formal education includes Harvard University Executive Program, Columbia University Business School Governance Program, and four academic degrees (Ph.D., M.A., M.S., B.S.) in Materials Science & Engineering, Chemistry, and Liquid Crystal Science. The Dr. Jennie S. Hwang Award for Faculty Excellence was established at her Alma Maters. The Dr. Jennie S. Hwang YWCA Award is established in her honor, now for 20 years running, to encourage and recognize outstanding women students in STEM. The Dr. Jennie S. Hwang Endeavor Fund, an endowment at NAE, funds programs that support high school and college students - with a preference for women and underrepresented minorities - to enhance exposure to diverse and/or international perspectives in engineering education, networking, and the profession. Further: www.JennieHwang.com.

Frederick R. Chang

Member

FREDERICK R. CHANG (NAE) is the executive director of the Darwin Deason Institute for Cyber Security, the Bobby B. Lyle Centennial Distinguished Chair in Cyber Security, and Professor in the Department of Computer Science and Engineering in the Lyle School of Engineering at Southern Methodist University (SMU). He is also a senior fellow in the John Goodwin Tower Center for Political Studies in SMU's Dedman College. Additionally, Dr. Chang's career spans service in the private sector and in government including as the former director of research at the National Security Agency (NSA). He is currently the Co-Chair of the Intelligence Community Studies Board of the National Academies. He has also served as a member of the Commission on Cybersecurity for the 44th Presidency, and as a member of the Computer Science and Telecommunications Board of the National Academies. Dr. Chang is a member of the National Academy of Engineering (2016) and he has been awarded the NSA Director's Distinguished Service Medal. Dr. Chang received his B.A. from the University of California, San Diego and his M.A. and Ph.D. from the University of Oregon. He has also completed the senior executive program at the Sloan School of Management at the Massachusetts Institute of Technology.

Mark Eberhart

Member

MARK EBERHART is a Professor in the Department of Chemistry and Geochemistry at the Colorado School of Mines, where he directs the Molecular Theory Group (MTG). At the MTG knowledge of bonding is obtained through detailed topological analyses of the spatial distribution of electrons in molecules and solids. Many subtle aspects of the distribution become obvious when viewed from a topological perspective. The accompanying topological formalism gives well-defined, unambiguous, meaningful and consistent definitions to previously indeterminate quantities such as atomic bonds and basins. His work is based primarily on first principles computations, which provide the electron charge densities, and topological analysis software developed at the MTG. He is also exploring the topological and geometric origins responsible for the stability of amorphous metallic alloys. In addition to his work on condensed phase systems, his group has active research programs exploring the relationships between charge density and the chemical properties of molecular systems, both organic and inorganic. Dr. Eberhart holds a B.S. degree in Chemistry and Applied Mathematics from the University of Colorado, an M.S. degree in Physical Biochemistry from the University of Colorado, and a Ph.D. in Materials Science and Engineering from the Massachusetts Institute of Technology.

Prabhat Hajela

Member

PRABHAT HAJELA is Provost and Professor of Mechanical and Aerospace Engineering at the Rensselaer Polytechnic Institute. His research interests include analysis and design optimization of multidisciplinary systems; system reliability; emergent computing paradigms for design; artificial intelligence; and machine learning in multidisciplinary analysis and design. Before joining Rensselaer, he worked as a research fellow at the University of California, Los Angeles for a year, and was on the faculty at the University of Florida for seven years. He has conducted research at NASA's Langley and Glenn Research Centers, and the Eglin Air Force Armament Laboratory. In 2003, Hajela served as a Congressional Fellow responsible for Science and Technology Policy in the Office of US Senator Conrad Burns (R-MT). He worked on several legislative issues related to aerospace and telecommunications policy, including the anti-SPAM legislation that was signed into law in December 2003. Hajela is a Fellow of the American Institute of Aeronautics and Astronautics (AIAA), a Fellow of the Aeronautical Society of India (AeSI), and a Fellow of the American Society of Mechanical Engineers (ASME). Hajela has held many editorial assignments including editor of Evolutionary Optimization, Associate Editor of the AIAA journal, and is on the editorial board of six other international journals. He has published over 270 papers and articles in the areas of structural and multidisciplinary optimization, and is an author or co-author of 4 books in these areas. In 2004, he was the recipient of AIAA's Biennial Multidisciplinary Design Optimization Award.

Wesley L. Harris

Member

WESLEY L. HARRIS (NAE) is the Charles Stark Draper Professor of Aeronautics and Astronautics and Director of the Lean Sustainment Initiative at the Massachusetts Institute of Technology. He was elected to the NAE "for contributions to understanding of helicopter rotor noise, for encouragement of minorities in engineering, and for service to the aeronautical industry." He has performed research and published in refereed journals in the following areas: fluid mechanics; aerodynamics; unsteady, non-linear aerodynamics; acoustics; lean manufacturing processes; military logistics and sustainment. Harris has substantial experience as a leader in higher education administration and management. Harris also has demonstrated outstanding leadership in managing major national and international aeronautical and aviation programs and personnel in the executive branch of the federal government. He is an elected Fellow of the AIAA, AHS, and of the NTA for personal engineering achievements, engineering education, management, and advancing cultural diversity.

James S. Harris

Member

JAMES S. HARRIS (NAE) is the James and Ellenor Chesebrough Professor Emeritus in the School of Engineering at the Stanford University. Prior to joining the Stanford department of Electrical Engineering in 1982, James Harris was with Rockwell International Science Center, where he held various positions from Technical Staff Member to Director Optoelectronics Research. His major interest is to use molecular beam epitaxy (MBE) to produce unique materials. The growth of such unique combinations of materials enable quantum size effects to create entirely new device structures based upon tunneling electron spin and transitions between quantum states. Most recently, he has applied this technology to incorporate photonic crystal and plasmonic structures to produce an integrated bio-fluorescence sensor that has been implanted into mice to study cancer development and therapies. He is a fellow of IEEE, the American Physical Society and the Optical Society of America. In 2000, he received the IEEE Third Millennium Medal. In 2011, he was elected to the NAE “for contributions to epitaxial growth of compound semiconductor materials and their applications.” In 2013, he received the Aristotle Award from the Semiconductor Research Corporation. In 2014, he received the Alfred Y. Cho MBE Award at International MBE Conference. Dr. Harris completed his B.S. (1964), M.S. (1965), and Ph.D. (1969) in electrical engineering from Stanford University.

William S. Marras

Member

WILLIAM S. MARRAS (NAE) is the Honda Chair Professor in the Department of Integrated Systems Engineering at Ohio State University, and holds joint appointments in the Departments of Orthopaedic Surgery, Physical Medicine, and Neurosurgery. Dr. Marras is also executive director and scientific director of the Spine Research Institute and the executive director of the Institute for Ergonomics. His research is centered on understanding the role of biomechanics in spine disorder causation and its role in the prevention, evaluation, and treatment of spine disorders. His research includes epidemiologic studies, laboratory biomechanics studies, mathematical modeling, and clinical studies. His findings have been published in over 200 peer-reviewed journal articles, and have been cited over 15,000 times. He also has written numerous books and book chapters including his most recent book entitled The Working Back: A Systems View. He holds Fellow status in six professional societies including the American Society for the Advancement of Science (AAAS) and has been widely recognized for his contributions through numerous national and international awards including two Volvo Awards for Low Back Pain Research. Professor Marras has been active in the National Research Council (NRC) having served on over a dozen boards and committees and has served as Chair of the Board on Human Systems Integration for multiple terms. He has also served as Editor-in-Chief of Human Factors and is currently Deputy Editor of Spine and is the immediate past President of the Human Factors and Ergonomics Society. Dr. Marras recorded a TEDx talk entitled “Back Pain and your Brain” and was recently featured on NPR’s All Things Considered. He received a B.S. in engineering from Wright State University, an M.S.in industrial engineering from Wayne State University, a Ph.D. in bioengineering and ergonomics from Wayne State University, and a D.Sc. Honoris Causa from the University of Waterloo.

Daniel A. Reed

Member

DANIEL A. REED is the Vice President for Research and Economic Development at the University of Iowa. He is also the University Computational Science and Bioinformatics Chair, and Professor of Computer Science and Electrical and Computer Engineering. Dr. Reed was named Vice President for Research and Economic Development at the University of Iowa in September 2012. He was Corporate Vice President at Microsoft from 2009 – 2012, responsible for global technology policy and extreme computing, and Director of Scalable and Multicore Computing at Microsoft from 2007 until 2009. He founded the Renaissance Computing Institute in 2004 and served as its director until December 2007. He was also Chancellor's Eminent Professor and served as senior adviser for strategy and innovation to Chancellor James Moeser, UNC-Chapel Hill. He served as CIO and Vice Chancellor for Information Technology Services at UNC-Chapel Hill from June 2004 through April 2007. Prior to that, he was Director of the National Center for Supercomputing Applications (NCSA), Gutgsell Professor and head of the Department of Computer Science at the University of Illinois at Urbana-Champaign. He was appointed to the President's Council of Advisors on Science and Technology (PCAST), by President Bush, in 2006 and served on the President's Information Technology Advisory Committee (PITAC) from 2003–2005. As chair of PITAC's computational science subcommittee, he was lead author of the report Computational Science: Ensuring America's Competitiveness. On PCAST, he co-chaired the Networking and Information Technology subcommittee (with George Scalise of the Semiconductor Industry Association) and co-authored a report on the Networking and Information Technology Research and Development (NITRD) program called Leadership Under Challenge: Information Technology R&D in Competitive World. He is also a member of PCAST's Personalized Medicine subcommittee. Dr. Reed is the past chair of the Board of Directors of the Computing Research Association (CRA) and currently serves on its Government Affairs Committee. CRA represents the research interests of the university, national laboratory and industrial research laboratory communities in computing across North America. Dr. Reed received his B. S. (summa cum laude) in computer science from the University of Missouri-Rolla in 1978, and his M. S. and Ph.D. in computer science Purdue University in 1980 and 1983.

Leslie E. Smith

Member

LESLIE E. SMITH is scientist emeritus at the National Institute of Standards and Technology (NIST) after retiring as director of the Materials Science and Engineering Laboratory. He was previously chief of the Polymers Division at NIST where he built a world-class scientific program in polymer science that has made both fundamental advances to science and significant contributions to industrial technology. His personal research interests have been in the absorption of polymers and biological polymers relevant to artificial vascular materials and degradation reactions of polyesters, primarily as related to the lifetime of magnetic storage media. He has also edited a number of professional reference books. His external positions have included: U.S. editor, Polymer Communications; member, Advisory Committee on Preservation, National Archives; Advisory Board for Polymer Programs, University of Connecticut; Council for Polymer Science and Engineering, University of Akron; chair, Materials Technology Subcommittee, NSTC, OSTP; and member, Board of Directors ASTM International.

David A. Weitz

Member

DAVID A. WEITZ (NAS/NAE) is the Mallinckrodt Professor of Physics and Applied Physics at Harvard University in the John A. Paulson School of Engineering and Applied Science (SEAS). He is also the director of the Materials Research Science and Engineering Center (MRSEC), the co-director of the BASF Advanced Research Initiative, a core faculty member of the Wyss Institute for Biologically Inspired Engineering, and a member of the Kavli Institute for Bionano Science and Technology. At Harvard University, Dr. Weitz's research interests are the physics of soft condensed matter, specifically their structural and mechanical properties, the properties of colloidal suspensions, the mechanical properties of biomaterials, and microfluidics for making emulsions using multiphase flow. He also works closely with industry, having served on the board of directors for several start-ups including microfluidics-driven startups GnuBIO and Raindance. He has served as associate editor and member on the Proceedings of the National Academy of Sciences editorial board, was a member of the Academies' Panel on Review of the Physical Measurement Laboratory at the National Institute of Standards and Technology, and was a chair on the Condensed Matter and Materials Research Committee. Dr. Weitz has served as a member of the Academies' standing Committee on Biological and Physical Sciences in Space. Dr. Weitz earned his B.Sc. with honors in physics in 1973, from the University of Waterloo; his A.M. in physics in 1975, from Harvard University; and his Ph.D. in physics also from Harvard University.

Arul Mozhi

Staff Officer

ARUL MOZHI is study director at the Laboratory Assessments Board (LAB). Since 1999, Dr. Mozhi has been directing projects in the areas of defense science and technology, including those carried out by numerous study committees of the LAB, the Army Research Laboratory Technical Assessment Board (ARLTAB), the Naval Studies Board, and the National Materials and Manufacturing Board. Prior to joining the National Academies, Dr. Mozhi held technical and management positions in systems engineering and applied materials research and development at 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. Dr. Mozhi received his B.Tech. in metallurgical engineering from the Indian Institute of Technology, Kanpur, in 1982.