Division on Engineering and Physical Sciences
Army Research Laboratory Technical Assessment Board

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2017 Provisional Biographical Sketches

Chair

JENNIE S. HWANG (NAE) is CEO of H-Technologies Group, and board trustee and distinguished adj. professor at Case Western Reserve University. Her career encompasses corporate and entrepreneurial businesses, international collaboration, research management, technology transfer and global leadership positions, as well as corporate and university governance. Among her many honors and awards are U.S. Congressional Certificates of Recognition; induction into International Hall of Fame –Women in Technology and Ohio Women Hall of Fame; named the R&D-Stars-to-Watch; Distinguished Alumni Awards; Honorary Doctoral degree; and YWCA Achievement Award. She was the 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. She is internationally recognized as a pioneer and long-standing leader in the infrastructure development of electronics miniaturization and green 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 475+ publications including several internationally-used books, she has lectured to tens of thousands of managers, engineers and researchers on 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, and on the 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 Technical Assessment Board of Army Research Laboratory, and has served as NAE Membership Search Executive (Materials Section), National Materials and Manufacturing Board, DoD R&D Globalization Board, Committee on Forecasting Future Disruptive Technologies and NAE Award Committee, among others. She also has served as a reviewer for National Academies Reports and other national/international publications. Her formal education include 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 and Metallurgical 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 17 years running, to encourage and recognize outstanding women students in STEM, Further info: www.JennieHwang.com.

Members

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 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.

GEORGE T. (Rusty) GRAY III (NAE) is a Laboratory Fellow and staff member in the dynamic properties and constitutive modeling team within the Materials Science Division of Los Alamos National Laboratory (LANL). He came to LANL following a three-year visiting scholar position at the Technical University of Hamburg-Harburg in Hamburg, Germany having received his Ph.D. in Materials Science in 1981 from Carnegie-Mellon University. As a staff member (1985-1987) and later team leader (1987-2003) in the Dynamic Materials Properties and Constitutive Modeling Section within the Structure / Property Relations Group (MST-8) at LANL, he has directed a research team working on investigations of the dynamic response of materials. He conducts fundamental, applied, and focused programmatic research on materials and structures, in particular in response to high-strain-rate and shock deformation. His research is focused on experimental and modeling studies of substructure evolution and mechanical response of materials. These constitutive and damage models are utilized in engineering computer codes to support large-scale finite element modeling simulations of structures ranging from national defense (DOE, DoD, DARPA), industry (GM, Ford, Chrysler, and Bettis), foreign object damage, and manufacturing. He is a Life Member of Clare Hall, University of Cambridge in the UK where he was on sabbatical in the summer of 1998. He co-chaired the Physical Metallurgy Gordon Conference in 2000. He is a Fellow of the American Physical Society(APS), a Fellow of ASM International(ASM), and a Fellow of the Minerals, Metals, and Materials Society(TMS). He is a member of APS, ASM, TMS, and serves on the International Scientific Advisory Board of the European DYMAT Association. In 2010, he served as the President of the Minerals, Metals, and Materials Society. Starting in 2012 he became the Chair of the Acta Materialia Board of Governors which oversees the publication of the journals Acta Materialia, Scripta Materialia, and Acta Biomaterialia. He has authored or co-authored over 430 technical publications. In 2017, he was elected to the National Academy of Engineering.

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 (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.

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.

ALAN NEEDLEMAN (NAE) is University Distinguished Professor and TEES Distinguished Research Professor in the Department of Materials Science and Engineering at Texas A&M. His research contributions include the development of a ductile fracture computational methodology, the development of cohesive surface methods for fracture analysis and creation of a framework that enables using discrete dislocation plasticity to solve general boundary value Topics of particular interest have been the micromechanics of ductile fracture by the nucleation, growth and coalescence of microvoids, brittle-ductile transitions, material and structural instabilities, relations between microstructure and mechanical properties in heterogeneous solids, and dynamic crack growth. He is a fellow of the American Society of Mechanical Engineers, 1989; a fellow of the American Academy of Mechanics, 1995; a Member of the American Academy of Arts and

Sciences, 2007; and a member of the Academy of Medicine, Engineering and Science of Texas, 2009.

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.