

Army Research Laboratory Technical Assessment Board

Committee

Prabhat Hajela

Chair

PRABHAT HAJELA is the Edward P. Hamilton Distinguished Professor of Mechanical, Aerospace, and Nuclear Engineering at Rensselaer Polytechnic Institute and a visiting professor of aeronautics and astronautics at Massachusetts Institute of Technology. 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, Dr. Hajela served as a Congressional Fellow responsible for science and technology policy in the office of U.S. 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. Dr. 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). Dr. 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 four books in these areas. In 2004, he was the recipient of AIAA's Biennial Multidisciplinary Design Optimization Award. Dr. Hajela received his undergraduate degree in aeronautical engineering (1977) from the Indian Institute of Technology, Kanpur. He received masters' degrees in aerospace engineering from Iowa State University (1979) and in mechanical engineering from Stanford University (1981). He received a Ph.D. in aeronautics and astronautics from Stanford University (1982), and conducted postdoctoral research at the University of California, Los Angeles (1982-83).

Nadya T. Bliss

Member

NADYA T. BLISS is a computer scientist focused on national security research and engineering including specific expertise in cybersecurity, graph algorithms and disinformation. As the Executive Director of the Global Security Initiative (GSI) at Arizona State University (ASU), she leads a pan-university organization advancing research, education, and other programming at the intersection of technology and national security. Prior to leading GSI, Dr. Bliss spent time as Assistant Vice President of Research Strategy at ASU and a decade in various positions at MIT Lincoln Laboratory, most recently as the founding Group Leader of the Computing and Analytics Group. Dr. Bliss is a Professor of Practice and Graduate Faculty in ASU's School of Computing and Augmented Intelligence, and currently serves as the Chair of the Defense Advanced Research Projects Agency (DARPA) Information Science and Technology (ISAT) study group, as Vice-Chair of the Computing Community Consortium, and on the National Academies' Cyber Resilience Forum and Climate Security Roundtable. Dr. Bliss received bachelors and masters degrees in computer science from Cornell University and a Ph.D. in applied mathematics from Arizona State University.

Dana Dattelbaum

Member

Dana Dattelbaum is an American physicist and scientist at Los Alamos National Laboratory. She leads NNSA's Dynamic Materials Properties portfolio at LANL, which provides experimental data, platforms and diagnostics for materials behaviors relevant to nuclear weapons performance, ranging from plutonium to high explosives. Dattelbaum is internationally recognized for her research on shock and detonation physics, the shock initiation of energetic materials, static to time-resolved spectroscopies, and studying materials at extreme conditions. Dr. Dattelbaum completed her B.S. in from James Madison University and participated in NSF-REU and departmental internships at the University. She completed an honors thesis on nitrogen ylide chemistry under Gary Crowther. She received her Ph.D. from the University of North Carolina at Chapel Hill with Thomas J. Meyer. Her work elucidated excited state electronic structures in Re, Ru, and Os polypyridyl complexes and she was the first to develop time-resolved near infrared spectroscopy using step-scan Fourier transform interferometry.

N. Louise Glass

Member

N. LOUISE GLASS (NAS) is a recent Emeritus Professor in the Plant and Microbial Biology Department (PMB) at the University of California, Berkeley and a Senior Faculty Scientist in the Environmental Genomics and Systems Biology Division at the Lawrence Berkeley National Laboratory (LBNL). Her research focus has been on filamentous fungi, exploring molecular mechanisms of cell-to-cell communication and somatic cell fusion associated with hyphal network formation, plant cell wall deconstruction by fungi and how these processes affect ecosystems. Her recent work focuses on developing high throughput functional genomics for non-model fungi with an aim to understanding and controlling the interactions between plant roots and neighboring microbes to gain insights into carbon cycling, carbon sequestration, and plant productivity in natural and agricultural ecosystems. Dr. Glass was previously Chair/Associate Chair of the PMB Department and previously was Director of the Environmental Genomics and Systems Biology Division at LBNL. She is the Fred E. Dickinson Chair of Wood Science and Technology, a fellow of the American Society for the Advancement of Science, the American Academy of Microbiology, the Mycological Society of America, a recipient of an Alexander von Humboldt Research Award, and she was elected to the National Academy of Sciences in 2021. She received a Ph.D. in plant pathology from the University of California, Davis and performed postdoctoral work on fungal genetics and molecular biology at the University of Wisconsin, Madison.

John Klier

Member

JOHN KLIER (NAE) is the Dean of the Gallogly College of Engineering and professor in the School of Chemical, Biological, and Materials Engineering at the University of Oklahoma. His research examines novel materials for high performance coatings and adhesives, structured polymer colloids and emulsion polymers, and new approaches to polymer crosslinking. Dr. Klier served as a professor and Department Head of Chemical Engineering at the University of Massachusetts, Amherst, following a 26-year career at The Dow Chemical Company, where he worked in numerous areas of polymer, surfactant, and colloid science. His responsibilities included leading the materials-related organizations in Core R&D, leading the Dow Coating Materials research and development organization, and most recently leading the Performance Materials and Chemicals divisional research, development, and technical service organizations. In 2014, he was named Distinguished Fellow, the highest technical position at Dow. Dr. Klier is a member of the National Academy of Engineering, the National Academy of Inventors, and several professional organizations. He has been awarded with The AIChE Industrial Research and Development Award in 2015, and the Purdue Outstanding Chemical Engineering Award. He earned his B.S. from MIT, and his M.S. and Ph.D. from Purdue University, all in chemical engineering.

Beverley J. McKeon

Member

Beverley McKeon is Professor of Mechanical Engineering at Stanford University. Previously she was the Theodore von Karman Professor of Aeronautics at the Graduate Aerospace Laboratories at Caltech (GALCIT) and a former Deputy Chair of the Division of Engineering and Applied Science. Her research interests include interdisciplinary approaches to manipulation of boundary layer flows using morphing surfaces, fundamental experimental investigations of wall turbulence at high Reynolds number, the development of resolvent analysis for modeling turbulent flows, and assimilation of experimental data for efficient low-order flow modeling. Dr. McKeon was the recipient of a Vannevar Bush Faculty Fellowship from the DoD in 2017, a Presidential Early Career Award (PECASE) in 2009 and an NSF CAREER Award in 2008, and is a Fellow of the APS and AIAA. She currently serves as co-Lead Editor of Phys. Rev. Fluids and on the editorial board of the Annual Review of Fluid Mechanics, and is past Editor-in-Chief of Experimental Thermal and Fluid Science. She is the Past Chair of the US National Committee on Theoretical and Applied Mechanics and the APS representative. Dr. McKeon earned a B.A. from the University of Cambridge in Engineering and a M.A. and Ph.D. in Mechanical and Aerospace Engineering from Princeton University.

Mahta Moghaddam

Member

MAHTA MOGHADDAM (NAE) is distinguished professor and Ming Hsieh Chair in Electrical and Computer Engineering at the University of Southern California (USC) and Vice Dean for Research at the Viterbi School of Engineering. Previously, she was at the University of Michigan (2003-2011) and National Aeronautics and Space Administration's (NASA's) Jet Propulsion Laboratory (JPL) (1991-2003). Dr. Moghaddam's research interests are in variety of topics related to applied electromagnetics, including the development of advanced radar systems for environmental sensing and subsurface characterization, software-defined radar, mixed-mode high-resolution medical imaging techniques, and autonomous sensor webs for remote sensing data collection and validation. Each of these areas requires the development of state-of-the-art sensors as well as novel signal processing and physical models to characterize the sensors and their interaction with their intended environments. Her recent research includes the development of new radar technologies for subsurface and subcanopy characterization, forward and inverse scattering techniques for layered random media especially for water resource characterization, geophysical retrievals using signal-of-opportunity reflectometry, and transforming concepts of radar to medical imaging and therapy systems. She has led numerous multi-disciplinary projects in these areas and has been a member of the science teams of several NASA missions. She has expertise in microwave sensing across the spectrum for environmental and biomedical applications. She was Systems Engineer for the Cassini Radar and served as Science Chair of the JPL Team X (Advanced Mission Studies Team). She is on the Science Teams of the NASA Cyclone Global Navigation Satellite System (CYGNSS) mission and the Arctic Boreal Vulnerability Experiment (ABOVE). She was the principal investigator of the AirMOSS NASA Earth Ventures 1 mission. Dr. Moghaddam is a member of the National Academy of Engineering. She received a B.S. degree in 1986 from the University of Kansas with highest distinction, and M.S. and Ph.D. degrees in 1989 and 1991, respectively, from UIUC, in electrical and computer engineering.

Julie A. Shah

Member

Julie Shah is the H.N. Slater Professor and Head of Aeronautics and Astronautics, faculty director of MIT's Industrial Performance Center, and director of the Interactive Robotics Group, which aims to imagine the future of work by designing collaborative robot teammates that enhance human capability. She is expanding the use of human cognitive models for artificial intelligence and has translated her work to manufacturing assembly lines, healthcare applications, transportation and defense. Before joining the faculty, she worked at Boeing Research and Technology on robotics applications for aerospace manufacturing. Dr. Shah has been recognized by the National Science Foundation with a Faculty Early Career Development (CAREER) award and by MIT Technology Review on its 35 Innovators Under 35 list. She was also the recipient of the 2018 IEEE RAS Academic Early Career Award for contributions to human-robot collaboration and transition of results to real world application. She has received international recognition in the form of best paper awards and nominations from the ACM/IEEE International Conference on Human-Robot Interaction, the American Institute of Aeronautics and Astronautics, the Human Factors and Ergonomics Society, the International Conference on Automated Planning and Scheduling, and the International Symposium on Robotics. She earned degrees in aeronautics and astronautics and in autonomous systems from MIT and is co-author of the book, *What to Expect When You're Expecting Robots: The Future of Human-Robot Collaboration* (Basic Books, 2020).

William A. Sirignano

Member

WILLIAM A. SIRIGNANO (NAE) is the Henry Samueli Endowed Chair in Engineering and a professor of mechanical and aerospace engineering at the University of California, Irvine. Dr. Sirignano was a professor at Princeton University from 1967 to 1979. He was the George Tallman Ladd Professor and department head at Carnegie-Mellon University from 1979 to 1984, before becoming the engineering dean at the University of California, Irvine. He left the deanship and currently holds the Henry Samueli Endowed Chair in Engineering. His research and teaching interests have covered the topics of spray and droplet science and technology, combustion, aerospace propulsion, combustion instability, noise suppression, and applied mathematics. His research accomplishments include analysis predicting periodic nonlinear oscillations with shockwaves in an unstable combustor; analysis of driving mechanisms for combustion instability in rockets and ramjets; explanation of the nonlinear fluid dynamics associated with Helmholtz resonators; determination of admittance for oscillatory, three-dimensional nozzle flows; theory for flame spread above liquid and solid fuels; theory for ignition of combustible gas by a hot projectile; resolution of turbulent flame and propagation in reciprocating and rotary internal combustion engines; theory of droplet vaporization and convective heating with internal circulation; computational methods for spray flows; theory of droplet interactions in a dense spray; liquid atomization theory; and miniature combustor technology. He received a Ph.D. in aerospace and mechanical sciences in 1964 from Princeton University.

Samuel I. Stupp

Member

SAMUEL STUPP (NAE) is a Board of Trustees Professor of Chemistry, Materials Science, and Medicine and Director of the Institute for BioNanotechnology in Medicine at Northwestern University. His research focuses on self-assembly and supramolecular materials with special emphasis in regenerative medicine, cancer therapies, and solar energy. He has held the appointment of Joliot Curie Professor at Ecole Supérieure de Physique et de Chimie in Paris, Merck-Karl Pfister Visiting Professor in Organic Chemistry at MIT, visiting professor at the Institut de Science et d'Ingenierie Supramoléculaires in Strasbourg, and is currently distinguished professor of Eindhoven University of Technology in the Netherlands. He spent 18 years at the University of Illinois at Urbana-Champaign where he was the Swanlund Professor of Materials Science, Chemistry, and Bioengineering. He is also a fellow of the American Physical Society, the Materials Research Society, the American Association for the Advancement of Science, the World Technology Network, and the World Biomaterials Congress. Professor Stupp is a member of the U.S. National Academy of Engineering, the American Academy of Arts and Sciences, and the Spanish Royal Academy of Pharmacy. His awards include the Department of Energy Prize for Outstanding Achievement in Materials Chemistry, a Humboldt Senior Award, the Materials Research Society's Medal Award, the American Chemical Society Award in Polymer Chemistry, and the Sir Edward Youde Memorial Award in Hong Kong. In 2009, Dr. Stupp received an honorary doctorate from Eindhoven University for revolutionary research in complex molecular systems and, in 2011, an honorary doctorate from the National University of Costa Rica. He obtained his BS in chemistry at the University of California at Los Angeles and his PhD in materials science from Northwestern University.

Levi T. Thompson

Member

LEVI THOMPSON (NAE) is the Dean of the College of Engineering and Elizabeth Inez Kelley Professor of Chemical Engineering at the University of Delaware (UD). Before joining UD, Dr. Thompson was the Richard Balzhiser Professor of Chemical Engineering and Professor of Mechanical Engineering at the University of Michigan. He also served as Associate Dean for Undergraduate Education, Director of the Hydrogen Energy Technology Laboratory and Director of the Michigan-Louis Stokes Alliance for Minority Participation. Dr. Thompson's research focuses on nanomaterials for catalytic and energy storage applications, and he is an author on more than 150 publications and co-inventor on more than 10 patents. He was elected as a member of the National Academy of Engineering and Fellow of the American Institute of Chemical Engineers and is recipient of awards including a 2006 Michigania of the Year Award for his research, entrepreneurship, and teaching, and NSF Presidential Young Investigator Award. Dr. Thompson currently serves as an Associate Editor of the Proceedings of the National Academy of Sciences (PNAS) Nexus and on the Editorial Board of the Annual Review of Chemical and Biomolecular Engineering. Dr. Thompson is an experienced consultant, and co-founder and founding CEO of T/J Technologies, a developer of nanomaterials for advanced batteries (acquired by A123 Systems). He earned a B.Che. from the University of Delaware in chemical engineering, an M.S. in chemical and nuclear engineering, and a Ph.D. in chemical engineering, both from the University of Michigan.

Charles E. Thorpe

Member

CHUCK THORPE is a professor of computer science at Clarkson University in Potsdam NY. He served at Clarkson's Senior Vice President and Provost for a five-year term 2012 – 2017. Immediately prior to Clarkson, Dr. Thorpe served 2011-2012 in the Office of Science and Technology Policy as Assistant Director for Robotics and Advanced Manufacturing. The bulk of his career was spent with Carnegie Mellon University (CMU), where he was a Ph.D. student in computer science, then served in the Robotics Institute as faculty and as director (2000 – 2004). In 2004, he went to Doha Qatar as the inaugural Dean of Carnegie Mellon Qatar, from 2004 – 2010. Dr. Thorpe's research area is robotics, specifically self-driving vehicles. His CMU group was a core part of Defense Advanced Research Projects Agency's (DARPA's) Autonomous Land Vehicle program, the Army Research Laboratory's series of Unmanned Ground Vehicle Demos, and the Department of Transportation's Intelligent Vehicle Highway Systems program. He is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) and has contributed to National Academies studies through the Transportation Research Board, Naval Studies Board, and previous Army Research Laboratory (ARL) assessment studies.

Christine A. Wang

Member

CHRISTINE A. WANG (NAE) is a part-time flex Senior Staff member in the Laser Technology and Applications Group at MIT Lincoln Laboratory. She has done extensive work on compound semiconductor epitaxial materials for advanced optoelectronic devices. Her expertise is in organometallic vapor phase epitaxial crystal growth, materials characterization, and device development. She has advanced the state-of-the-art in gallium arsenide-, gallium antimonide-, and indium phosphide-based materials for diode lasers, quantum cascade lasers, and thermophotovoltaic cells. She received the American Association of Crystal Growth Award. Dr. Wang is a Fellow of the National Academy of Inventors and a member of the National Academy of Engineering. Dr. Wang received the S.B., M.S., and Ph.D. degrees from the Materials Science and Engineering Department at the Massachusetts Institute of Technology.).