Transformative Science and Technology for the Department of Defense: Standing Committee and Seminar Series

Committee

Richard M. Murray

Chair

Richard M. Murray (NAE) is Thomas E. and Doris Everhart professor of control & dynamical systems and bioengineering at the California Institute of Technology. His group researches the application of feedback and control to networked systems, with applications in biology and autonomy. His current projects include novel control-system architectures, biomolecular feedback systems, and networked control systems. Dr. Murray is a member of the National Academy of Engineering and serves on the NAE Awards Committee. Previously, he served as chair of the National Academies' Aerospace Engineering Search Committee, member of the Committee on Defense Research at Historically Black Colleges and Universities and Other Minority Institutions, chair of the Committee on Future Biotechnology Products and Opportunities to Enhance Capabilities of the Biotechnology Regulatory System, and cochair of the Forum on Synthetic Biology. Dr. Murray received a Ph.D. in electrical engineering and computer sciences from University of California, Berkeley, in 1990.

Samuel Achilefu

Member

Samuel Achilefu (NAM) is the inaugural chair and professor of the Department of Biomedical Engineering at the University of Texas Southwestern (UTSW) in Dallas. He holds the Lyda Hill Distinguished University Chair and other faculty appointments as a professor of radiology and of the Simmons Comprehensive Cancer Center. Dr. Achilefu is a member of National Academy of Medicine, fellow of the National Academy of Inventors, and member of the National Advisory Council for Biomedical Imaging and Bioengineering at the National Institutes of Health. He is a fellow of many professional societies, including the SPIE, Optica, AIMBE, and AAAS. Before joining UTSW in February 2022, he spent over 20 years at Washington University in St. Louis, MO. Dr. Achilefu received his Ph.D. in molecular physical and materials chemistry at the University of Nancy, France, in 1991. In 1993, he completed his postdoctoral training at Oxford University, in England, where he trained in the chemistry of oxygen transport mechanisms and hematology.

Cecilia Bitz

Member

Cecilia Bitz is a Professor in the Atmospheric Sciences Department at the University of Washington. Her research interests include climate dynamics, climate change and climate intervention, polar climate predictability, the role of sea ice in the climate system, and sea ice model development. The primary tools for her research are a variety of models, from simple reduced models to sophisticated climate system models. She has also done field work in the Arctic and Antarctic. Dr. Bitz serves on the Climate Working Group of the NOAA Science Advisory Board and on the Advisory Board of the Virtual Earth System Research Institute for Schmidt Futures. Dr. Bitz was recently chair of her department and Director of the University of Washington Program on Climate Change. Dr. Bitz has served on the Advisory Board and Scientific Steering Committee of the Community Earth System Model, which is sponsored by the National Science Foundation. Dr. Bitz was a Fulbright Scholar to New Zealand. She received her Ph.D. in Atmospheric Sciences from the University of Washington in 1997.

Nadya T. Bliss

Member

Nadya T. Bliss is a computer scientist focused on national security research and engineering, with specific expertise in cybersecurity and graph algorithms. As the Executive Director of the Advanced Capabilities for National Security Institute at Arizona State University, she leads a pan-university organization advancing research, education, and other programming at the intersection of technology and national security. ACNSI centers focus on cybersecurity, artificial intelligence, data visualization and analytics, and geopolitical strategic competition. Prior to leading ACNSI, Bliss spent time as Assistant Vice President, 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. Bliss is a Professor of Practice and Graduate Faculty in ASU’s School of Computing and Augmented Intelligence.

Actively involved in national service, Bliss currently serves on multiple National Academies engagements, including the Cyber Resilience Forum and a Standing Committee on Transformative Science and Technology for Defense. In July 2024, she was appointed as a member of the National Academies’ Army Research Laboratory Technical Assessment Board (ARLTAB) and chaired its Panel on Assessment of Network, Cyber, and Computational Sciences. She is past chair of the Computing Community Consortium as well as past chair and current steering committee member of DARPA’s Information Science and Technology Study Group.

Robert Braun

Member

Robert Braun (NAE) is the Head of the Space Exploration Sector at the Johns Hopkins Applied Physics Laboratory where he is responsible for all aspects of the Lab’s civil and national security space efforts. He formerly served as Director for Planetary Science at the Jet Propulsion Laboratory, and as a Professor of Aerospace Engineering at the California Institute of Technology, the University of Colorado Boulder, and the Georgia Institute of Technology. He was the NASA chief technologist in 2010-2011, serving as the principle advisor and advocate for agency-wide technology policy and programs. Formerly, he was a faculty member in the Daniel Guggenheim School of Aerospace Engineering at the Georgia Institute of Technology (Georgia Tech) where he led a research and education program focused on the design of advanced flight systems and technologies for planetary exploration. Prior to joining the Georgia Tech faculty, Dr. Braun worked for sixteen years at the NASA Langley Research Center. While at NASA, he contributed to the design and flight operations of multiple spaceflight projects including the Mars Pathfinder mission. Dr. Braun is a fellow of the American Institute of Aeronautics and Astronautics and the American Astronautical Society, and the author or co-author of more than 300 technical publications in the fields of atmospheric flight dynamics, planetary exploration systems, multidisciplinary design optimization and systems engineering. Dr. Braun received his Ph.D. in Aeronautics and Astronautics from Stanford University.

William J. Dally

Member

Bill Dally (NAE) joined NVIDIA in January 2009 as chief scientist, after spending 12 years at Stanford University, where he was chairman of the computer science department. Dally and his Stanford team developed the system architecture, network architecture, signaling, routing and synchronization technology that is found in most large parallel computers today. Dally was previously at the Massachusetts Institute of Technology from 1986 to 1997, where he and his team built the J-Machine and the M-Machine, experimental parallel computer systems that pioneered the separation of mechanism from programming models and demonstrated very low overhead synchronization and communication mechanisms. From 1983 to 1986, he was at California Institute of Technology (CalTech), where he designed the MOSSIM Simulation Engine and the Torus Routing chip, which pioneered “wormhole” routing and virtual-channel flow control. He is a member of the National Academy of Engineering, a Fellow of the American Academy of Arts & Sciences, a Fellow of the IEEE and the ACM, and has received the ACM Eckert-Mauchly Award, the IEEE Seymour Cray Award, and the ACM Maurice Wilkes award. He has published over 250 papers, holds over 120 issued patents, and is an author of four textbooks. Dally received a bachelor's degree in Electrical Engineering from Virginia Tech, a master’s in Electrical Engineering from Stanford University and a Ph.D. in Computer Science from CalTech.

Deepakraj M. Divan

Member

Deepakraj Divan (NAE) is Professor, John E Pippin Chair, GRA Eminent Scholar and Director of the Center for Distributed Energy at the Georgia Institute of Technology in Atlanta, GA. His field of research is in the areas of power electronics, power systems, smart grids and distributed control of power systems. He works closely with utilities, industry and is actively involved in research, teaching, entrepreneurship and starting new ventures. Dr. Divan has started several companies, including Varentec in Santa Clara, CA, where he served as Founder, President and CTO from 2011-14, and as Chief Scientist for several years after. Under his leadership, Varentec, which was funded by leading green-tech Venture Capital firm Khosla Ventures and renowned investor Bill Gates, developed a suite of innovative distributed real-time grid control technologies. He has founded or seeded several new ventures including Soft Switching Technologies, Innovolt, Varentec and Smart Wires, which together have raised >$160M in venture funding. Dr. Divan is an elected Member of the US National Academy of Engineering, member of the National Academies Board on Energy and Environmental Systems and NASEM Committee on the Future of Electric Power in the US. He a Fellow of the IEEE, past President of the IEEE Power Electronics Society, is a recipient of the IEEE William E Newell Field Medal and is International Steering Committee Chair of the IEEE Empower a Billion Lives global competition to crowdsource scalable energy access solutions. He has 40 years of academic and industrial experience, 85 issued and pending patents, and over 400 reviewed publications. He has been a Professor at the University of Wisconsin-Madison from 1985 to 1995 and has been with Georgia Tech since 2004. He has taken time off from academia to found and run two companies – Soft Switching Technologies from 1995-2004, and Varentec from 2011-2015. Dr. Divan received his B. Tech from IIT Kanpur, and his MS and PhD degrees from the University of Calgary, Canada.

Markita P. Landry

Member

Markita Landry is an assistant professor in the department of Chemical and Biomolecular Engineering at the University of California, Berkeley. Prof. Landry's current research centers on the development of synthetic nanoparticle-polymer conjugates for imaging neuromodulation in the brain, and for the delivery of genetic materials into plants. The Landry lab exploits the highly tunable chemical and physical properties of nanomaterials for the creation of bio-mimetic structures, molecular imaging, and plant genome editing. Prof. Landry has presented at the National Academies of Science and National Academies of Engineering Frontiers of Science Symposia, and is also on the scientific advisory board of Terramera and on the scientific advisory board of Chi-Botanic. She is a recent recipient of over 20 early career awards, including awards from the Brain and Behavior Research Foundation, the Burroughs Wellcome Fund, the DARPA Young Investigator program, the Beckman Young Investigator program, the Howard Hughes Medical Institute, the NSF CAREER award, the Dreyfus Foundation Teacher-Scholar award, is a Sloan Research Fellow, an FFAR New Innovator, and is a Chan-Zuckerberg Biohub Investigator. Prof. Landry received a B.S. in Chemistry and a B.A. in Physics from the University of North Carolina at Chapel Hill, a Ph.D. in Chemical Physics and a Certificate in Business Administration from the University of Illinois at Urbana-Champaign and completed an NSF postdoctoral fellowship in Chemical Engineering at the Massachusetts Institute of Technology.

Robert H. Latiff

Member

Robert H. Latiff is a private consultant, providing advice on advanced technology matters to corporate and government clients and universities. He retired from the U.S. Air Force (USAF) as a Major General in 2006. General Latiff is an adjunct faculty member with the John J. Reilly Center for Science, Technology, and Values at the University of Notre Dame and a research professor at George Mason University. His last active duty assignment was at the National Reconnaissance Office, where he was director, advanced systems and technology, and deputy director for systems engineering. Latiff has also served as the vice commander, USAF Electronic Systems Center, and commander of the NORAD Cheyenne Mountain Operations Center. While in the U.S. Army, he served in both the infantry branch and the ordnance corps, where he commanded a tactical nuclear weapons unit. Latiff is a recipient of the National Intelligence Distinguished Service Medal and the Air Force Distinguished Service Medal. He is currently a member of the NRC Air Force Studies Board, the Intelligence Community Studies Board, and the Committee on Ballistic Missile Defense in the Context of Strategic Stability. Latiff received his commission from the Army ROTC program at the University of Notre Dame and later transferred to the Air Force. He received his Ph.D. and his M.S. in materials science and his B.S. in physics from the University of Notre Dame and is a graduate of the National Security Fellows Program at Harvard University's John F. Kennedy School of Government.

Ivett A. Leyva

Member

Ivett A. Leyva became the head of the Department of Aerospace Engineering at Texas A&M University in September 2021. Previously, she was at the Air Force for 15 years. She was the program officer for Hypersonic Aerodynamics at the Air Force Office of Scientific Research, AFRL and prior to that she was a researcher at the AFRL Rocket Lab working on liquid rocket instabilities. Her technical expertise is in hypersonic aerodynamics and liquid rocket engines. While at the Air Force Ivett also worked on the protection of basic and applied research. Ivett holds a bachelor's, master's and doctoral degree from Caltech. Her Ph.D. was in Aeronautics. Ivett has six patents and has authored numerous papers and two book chapters. She is a fellow of the American Institute for Aeronautics and Astronautics and the Air Force Research Laboratory, a National Associate of the National Research Council of the National Academies, and a recipient of a Civilian Achievement Medal and two meritorious Civilian Service Awards and Medals from the Air Force. Ivett has participated in six NRC reports and was a member of the ASEB for 6 years.

Laura A. McNamara

Member

Laura A. McNamara is an anthropologist currently managing the Radar ISR Advanced Exploitation and Human-Systems Integration group at Sandia National Laboratories in Albuquerque, NM, and was named a Distinguished Member of the Technical Staff at Sandia in 2017. Dr. McNamara is an expert in the application of industry human usability standards for defense and intelligence technologies. She began her career at Los Alamos National Laboratory in 1997, studying the problem of technical knowledge loss in the nuclear weapons program at the end of the Cold War. After spending several years in LANL's statistical sciences group, she accepted a position at Sandia National Laboratories in 2003. She has spent most of her career examining, often critiquing, how computational technologies impact human interaction with information in high-consequence analysis and decision environments. She edited an Elsevier book series Studies in Multidisciplinarity and has written extensively on ethnographic research in the national security community. She was a member of the American Anthropological Association's (AAA) Committee on the Engagement of Anthropology with the United States' Security and Intelligence Communities and worked with the AAA to modernize the Association's code of ethics. From 2011-2012, she served on the National Research Council's Committee on Improving the Decision-Making Abilities of Small Unit Leaders for the US Marine Corps. Dr. McNamara received her Ph.D. in Cultural Anthropology from the University of New Mexico.

Jill C. Pipher

Member

Jill Pipher is vice president for research at Brown University and Elisha Benjamin Andrews Professor of Mathematics. In 2018, she became president-elect of the American Mathematical Society. She was the founding director of the Institute for Computational and Experimental Research in Mathematics (ICERM), a National Science Foundation mathematics institute, from 2010 to 2016. She was a Dickson Instructor and assistant professor at the University of Chicago before joining the faculty of Brown as associate professor in 1989. Pipher's research areas include harmonic analysis, partial differential equations, and lattice-based cryptography. She has frequently lectured for both specialist and general audiences at venues in the U.S. and abroad. In 2014, she was an invited speaker at the International Congress of Mathematicians. She has published many papers in her areas of expertise and has co-authored an undergraduate cryptography textbook. She jointly holds four patents related to the NTRU encryption algorithm. She was a co-founder of Ntru Cryptosystems, Inc., now part of Security Innovation, Inc. Pipher's professional honors include an NSF postdoctoral fellowship, an NSF Presidential Young Investigator Award, and an Alfred P. Sloan Foundation fellowship. She is an inaugural fellow of the American Mathematical Society, served as president of the Association for Women in Mathematics from 2011 to 2013, and was a National Women's History Month 2013 honoree. In 2015, she was elected to the American Academy of Arts and Sciences. Dr. Pipher obtained her B.A. in mathematics from UCLA in 1979 and her Ph.D. in mathematics from UCLA in 1985.

William H. Press

Member

William H. Press (NAS) is a computer scientist and computational biologist with broad interests in the physical and biological sciences. Press is the Leslie Surginer Professor of Computer Science and Integrative Biology at the University of Texas at Austin and also a senior fellow (emeritus) at the Los Alamos National Laboratory. From 2009 to 2017, Press was a member of President Obama's Council of Advisors on Science and Technology (PCAST). He is a past (2012-2013) president of the American Association for the Advancement of Science. He is currently the elected Treasurer of the National Academy of Sciences and is a member of the Governing Board of the National Research Council. From 1998 to 2004, Press was Deputy Laboratory Director for Science and Technology at Los Alamos National Laboratory. Prior to that, he was for more than two decades Professor of Astronomy and of Physics at Harvard University, in part as a department chair. His current board service includes the Simons Foundation and the Institute for Defense Analysis.

Amina A. Qutub

Member

Amina Ann Qutub is an Associate Professor at the University of Texas, San Antonio (UTSA), and research thrust lead of the Artificial Intelligence MATRIX Consortium. She is also Director of the UTSA – UT Health Joint Graduate Group in Biomedical Engineering. Bridging basic science to translational impact, she directs the Quantu Project, a nationwide study to optimize brain health over a lifespan using an integration of biosensing technology, modeling and functional neurogenesis bioassays. Dr. Qutub also serves as the computational lead for the international Leukemia Protein Atlases, a clinical and engineering collaboration to identify new therapeutic targets for pediatric and adult leukemias. Dr. Qutub completed her postdoc as a National Institute of Health NRSA fellow in Biomedical Engineering at The Johns Hopkins University, School of Medicine. She is an American Institute for Medical and Biological Engineering Fellow, National Academies' Keck Future Initiatives Awardee, and National Science Foundation CAREER Awardee. Dr. Qutub has served as Conference Chair and Co-Organizer for two National Academies of Sciences, Engineering & Medicine Arab-America Frontiers Symposia, and participated as an invited speaker or participant at four other Frontiers of Engineering Symposia (Indo-American, China-America, and two additional Arab-America meetings). She was a National Academy of Engineering nominated participant in the Royal Academy of Engineering Global Grand Challenges (London, 2019), and she was nominated this year by the National Academy of Sciences as a participant in the World Laureates Symposium (Shanghai, 2021). She also is leading a project started under the auspices of the National Academy of Engineering COVID-19 Call-for-Engineering Action on studying neurovascular effects of viral infection. Dr. Qutub received her B.S. in chemical engineering at Rice University in 1999, and Ph.D. in Bioengineering from Berkeley and UCSF in 2004 with a major in mathematical modeling and minor in neurology.

Darlene J. Solomon

Vice Chair

Darlene Solomon (NAE) is senior vice president and chief technology officer for Agilent Technologies. Her responsibilities include Agilent Research Laboratories which focuses on high impact, longer range research in support of Agilent's sustained business growth, and Agilent's programs in university relations, external research and venture investment. In her leadership role, she works closely with Agilent's businesses to define the company's technology strategy and R&D priorities. She joined Hewlett-Packard Laboratories in 1984 as a research scientist and soon moved into leadership as the Research & Development Manager of their Chemical and Biological Systems Department. When Agilent Technologies was spun off from H-P in 1999, she became responsible for Research and Development/Technology for Agilent's Life Sciences and Chemical Analysis business. She was promoted to Vice President and Director of Agilent Laboratories in 2003, and has been Agilent Technologies' Chief Technology Officer and Senior Vice President since 2006. Amongst the recognition for her accomplishments Solomon was elected to the National Academy of Engineering and received the USC Viterbi School of Engineering's Daniel J Epstein Engineering Management Award. She was also elected Fellow, American Institute for Medical and Biological Engineering, inducted into the Women in Technology International's Hall of Fame, received the YWCA Tribute to Women and Industry Award, and named to Corporate Board Member's 50 Top Women in Technology. Solomon serves on the board of directors at Materion Corporation. She also participates in multiple academic and government advisory and review boards, including current and recent appointments to the National Academies' Board on Chemical Sciences and Technology, Visiting Committee on Advanced Technology of the National Institutes of Standards and Technology, Stanford Interdisciplinary Life Sciences Council, UC Berkeley's College of Engineering Advisory Board, and Singapore National Research Foundation's Scientific Advisory Board. Dr. Solomon earned her bachelor's degree in chemistry from Stanford University and a doctorate in bioinorganic chemistry from the Massachusetts Institute of Technology, and she completed Stanford University's Executive Development Program.