

Board on Physics

Committee

Jill P. Dahlburg

Chair

JILL P. DAHLBURG retired from the U.S. Naval Research Laboratory (NRL) as the superintendent of the Space Science Division. In this position Dahlburg led the conception, planning, and execution of space science research theory and forefront space instrumentation relevant to geophysics, heliophysics, and the high-energy space environment. Dahlburg's research interests have also included inertial fusion technology, and the development of laser-plasma interactions (LPI) multi-group radiation transport hydrodynamics codes in two- and three-dimensions along with their application to the design and analysis of LPI laboratory experiments. Dahlburg is a former chair of the American Physical Society (APS) Division of Plasma Physics, of the Department of Energy (DOE) Office of Science Advanced Scientific Computing Advisory Committee, of the APS Panel on Public Affairs, of the National Aeronautics and Space Administration Heliophysics Division Advisory Committee, and of the Department of the Navy (DON) Space Experiments Review Board, and has served as a divisional associate editor (plasma physics) of The Physical Review Letters. Dahlburg is a fellow of the APS and a recipient of six NRL Allan Berman Awards for scientific publication excellence, a DOE Appreciation Award, and a DON Meritorious Civilian Service Award for exceptional leadership in ensuring DON access to space and revolutionary improvements to space products. Dahlburg earned a Ph.D. in physics from the College of William & Mary.

Abhay L. Deshpande

Member

ABHAY DESHPANDE is a SUNY Distinguished Professor in the Department of Physics and Astronomy at Stony Brook University. Deshpande currently serves as the Associate Laboratory Director for Fundamental Interactions and Particles Directorate & Director of EIC Science at Brookhaven National Laboratory. Deshpande is also the Founding Director of the Center for Frontiers in Nuclear Science (CFNS) at Stony Brook University. Deshpande studies the quark-gluon structure and dynamics inside the protons and nuclei to understand quantum chromodynamics (QCD), the theory of strong interactions within the Standard Model of physics. Deshpande also uses precision electroweak probes to explore the limits of the Standard Model (SM) of physics and search for effects beyond it. Deshpande is a Fellow of the American Physical Society (APS, 2014) and American Association for Advancement of Science (AAAS, 2021) and was inducted into NY State's Distinguished Academy (2022). Deshpande serves on the advisory boards of various national and international conferences, institutions and DOE's NSAC and NSAC Long Range Planning Committee in 2015. Deshpande earned a Ph.D. in experimental high-energy particle physics from Yale University.

Nikta Fakhri

Member

NIKTA FAKHRI is Professor of Physics at the Massachusetts Institute of Technology and a member of the Physics of Living and Nonequilibrium Systems research group. Fakhri joined the MIT faculty in 2015 and is an experimental physicist whose research focuses on nonequilibrium phenomena in living matter. Fakhri's group uses living systems across scales, from molecules and cells to whole organisms, to investigate fundamental questions about collective behavior, irreversibility, nonreciprocity, and the emergence of organization far from equilibrium. Fakhri's work combines quantitative experiments with statistical physics, geometry and topology, and data-driven modeling. Fakhri's honors include the APS Early Career Award for Soft Matter Research, the IUPAP Young Scientist Prize in Biological Physics, an NSF CAREER Award, an Alfred P. Sloan Research Fellowship in Physics, and a Human Frontier Science Program Career Development Award. She is elected a Fellow of the American Physical Society in 2026. Fakhri was a Human Frontier Science Program postdoctoral fellow at Georg-August-Universität Göttingen before joining MIT. Fakhri earned a Ph.D. from Rice University.

Shambhu Ghimire

Member

SHAMBHU GHIMIRE is a Lead Scientist at SLAC National Accelerator Laboratory. Ghimire's expertise is in ultrafast optical and x-ray instrumentation and its applications to probing the atomic-scale structure and dynamics of matter. Ghimire conducted seminal experiments revealing the fundamental nonlinear optical response of materials to intense femtosecond x-ray pulses that are now available at modern x-ray free-electron laser facilities. Ghimire pioneered strong-field-driven high-order harmonic generation in bulk crystals, from its initial observation and elucidation of its microscopic mechanisms to its development as a novel spectroscopic tool for studying ultrafast dynamics in condensed matter. Ghimire is a Fellow of Optica, recognized for his pioneering contributions to attosecond physics, and a Fellow of the American Physical Society, where he serves in the Division of Laser Science. Prior to joining SLAC, Ghimire completed postdoctoral research in condensed matter physics at the University of Michigan after earning a Ph.D. in experimental atomic, molecular, and optical (AMO) physics from Kansas State University.

Stephen O. Hill

Member

STEPHEN O. HILL is a Distinguished Research Professor at Florida State University (FSU) and Quantum Chief Scientist at the National High Magnetic Field Laboratory (NHMFL). Following postdoctoral appointments at Boston University (1995) and the NHMFL (1995-1997), Hill held faculty positions at Montana State University and the University of Florida before returning to FSU in 2008 to lead the NHMFL Electron Magnetic Resonance User Program. Hill has more than 30 years of experience in microwave and far-infrared spectroscopy in high magnetic fields and has established an international reputation for studies of low-dimensional conducting, superconducting, and magnetic systems, alongside significant advances in spectroscopy techniques. Hill's current research focuses on fundamental quantum phenomena in magnetic materials. Hill is a Fellow of the American Physical Society, the American Association for the Advancement of Science, and the Academy of Science, Engineering and Medicine of Florida. Hill has received several international awards for contributions to magnetic resonance spectroscopy. He previously served as Chair of the APS Topical Group on Magnetism and as a member of the National Academies committee on Identifying Opportunities at the Interface of Chemistry and Quantum Information Science. Hill earned a DPhil (1995) from the University of Oxford.

Suxing Hu

Member

SUXING HU is a Distinguished Scientist and Group Leader of the HED-Theory Group at the Laboratory for Laser Energetics (LLE) and a Professor of Physics and a Professor of Mechanical Engineering at the University of Rochester. Before joining LLE in 2006, Hu held postdoctoral appointments at Los Alamos National Laboratory, the University of Nebraska-Lincoln, the Max Born Institute, and the University of Freiburg. Hu is a computational physicist specializing in quantum high-energy-density physics, warm dense matter, and inertial confinement fusion. Hu develops first-principles methods for quantum many-body physics, including density-functional theory (DFT), time-dependent DFT, and path-integral approaches, to model matter at extreme pressures and temperatures. Hu has authored 300 peer-reviewed articles and the monograph Computational Methods for Quantum High-Energy-Density Physics (Oxford University Press, 2026), and leads the Hydro and Property Working Group of the U.S. National HED Council. Hu is a Fellow of the American Physical Society and a former Alexander von Humboldt Fellow and Los Alamos National Laboratory Director's Postdoctoral Fellow. Hu earned a Ph.D. in physics from the Chinese Academy of Sciences (Shanghai Institute of Optics and Fine Mechanics).

Miriam E. John

Member

MIRIAM “MIM” E JOHN (NAE) is a vice president emerita of the Sandia National Laboratories in Livermore California. She has been serving in various consulting and board roles since her retirement. During her Sandia career, she worked on a wide variety of programs, including nuclear weapons, chemical and biological defense, missile defense, solar energy, and provided leadership for several of the laboratory’s energy, national security, biosciences and homeland security programs. In her consulting and board roles, she has supported the Department of Defense (DoD) through its Defense Science Board (DSB), Threat Reduction Advisory Committee, Air Force Scientific Advisory Board, and USSTRATCOM’s Strategic Advisory Committee. She currently co-chairs the Permanent Subcommittee of the DSB on Threat Reduction. She has also been a member of the Naval Studies Board, Board on Army Science and Technology, Board on Chemical Sciences and Technology and the Intelligence Community Studies Board of the National Academies. She is a member of the National Academy of Engineering and was named a National Associate. Her non-government roles have included advisory and program review roles for Sandia, Lawrence Livermore, Los Alamos, and MIT Lincoln Laboratory, as well as fiduciary responsibilities as a member of the Board of Directors for SAIC, Leidos, and Draper Laboratory. As an advisor she is regularly called on to review programs at the national laboratories and Federally Funded Research and Development Centers; currently involved in review of Lawrence Livermore National Laboratory’s fusion energy programs. For her numerous contributions, especially on homeland defense and military operations, she has been awarded the Navy’s Superior Public Service Award, Air Force’s Meritorious Civilian Service Medal and DoD’s prestigious Eugene G. Fubini Award for her “highly significant contributions to the DoD in an advisory capacity over a sustained period of time.” She has also been awarded the John S. Foster, Jr., Medal for “exceptional leadership in scientific, technical, and engineering development and policy formulation in support of U.S. nuclear security.” She has been recognized as an outstanding alumna of both Rice University and Tulane University.

Young-Kee Kim

Member

YOUNG-KEE KIM (NAS) is the Albert Michelson Distinguished Service Professor of Physics and special advisor to the provost at the University of Chicago. She is an experimental particle physicist whose research focuses on understanding the origin of mass for fundamental particles. Before joining University of Chicago in 2003, where she was chair of the Physics Department from 2016 to 2022, she was professor of physics at University of California Berkeley. During her tenure at University of Chicago, she served as deputy director of Fermilab (2006-2013) and president of the Korean-American Science and Engineering Association (2022-2023). She is currently president of the American Physical Society. She is a member of the National Academy of Sciences and the American Academy of Arts and Sciences, a foreign member of the Korean Academy of Science and Technology, a fellow of the American Physical Society, the American Association for the Advancement of Science, and the Sloan Foundation, and the recipient of the Ho-Am Prize and the Arthur Kelly Faculty Prize. She has served on numerous national and international advisory committees and boards. She is a member of the Committee of Visitors for the High Energy Physics Division of the Department of Energy's Office of Science and on advisory boards for Lawrence Livermore National Laboratory and SLAC National Accelerator Laboratory. She received her B.S. and M.S. in physics from Korea University, South Korea, and Ph.D. in physics from University of Rochester. She was a postdoc at Lawrence Berkeley National Laboratory.

Rachel A. Martin

Member

RACHEL MARTIN is a Professor of Chemistry at UC Irvine. Martin's research program is in chemical physics and biophysics, with particular emphasis on instrumentation development and the biophysical basis of protein function. Martin is a fellow of the American Association for the Advancement of Science and the International Society of Magnetic Resonance. Martin regularly serves on NSF panels and NIH study sections focused on instrumentation grants and has served on the scientific advisory board for the MagLab in Florida. Martin was a postdoctoral fellow with Alex Pines at the University of California, Berkeley. Martin earned a Ph.D. from Yale University.

Jianwei (John) Miao

Member

JIANWEI (JOHN) MIAO is Professor of Physics and Astronomy at the University of California, Los Angeles, and Deputy Director of the NSF STROBE Science and Technology Center. From 2000 to 2004, Miao was a staff scientist at the Stanford Synchrotron Radiation Lightsource, SLAC National Accelerator Laboratory. Miao's research focuses on computational microscopy and three-dimensional atomic imaging. In 1999, Miao pioneered coherent diffractive imaging, unifying crystallography and microscopy through coherent diffraction and computational algorithms and laying the foundation for modern ptychography. Miao later pioneered atomic electron tomography in 2012, enabling three-dimensional atomic imaging without relying on crystallinity, and in 2021 reported the first three-dimensional atomic structure of an amorphous solid. More recently, Miao advanced ptychographic atomic electron tomography to image individual light atoms in three dimensions with picometer precision. Miao's honors include the Werner Meyer-Ilse Memorial Award, Sloan Research Fellowship, 2021 MRS Innovation in Materials Characterization Award, and 2026 APS Joseph F. Keithley Award for Advances in Measurement Science. Miao is a Fellow of the American Physical Society and Materials Research Society. Miao earned a Ph.D. in physics from Stony Brook University.

Andrew J. Millis

Member

ANDREW J. MILLIS (NAS) is a professor of physics at Columbia and co-director of the Center for Computational Quantum Physics in the Simons Foundation's Flatiron Institute. Millis has also served as chair of the Physics Department at Columbia University and as associate director for physics in the grants program at the Simons Foundation. Millis' research focuses on the intersection of quantum mechanics and materials science and on the development and use of numerical methods for the quantum many-body problem. Among the areas to which Millis has contributed are the theory of high transition temperature, superconductivity and other phenomena in copper-oxide superconductors, understanding of colossal magnetoresistance in perovskite manganites, theory of quantum critical phenomena in metals and in nonequilibrium systems, and physics of metal-insulator transitions. Millis also contributed to the development of continuous time quantum Monte Carlo methods. Millis is a fellow of the American Physical Society and of the American Association for the Advancement of Science and the recipient of the Hamburg Prize in Theoretical Physics. Millis's service to the field includes membership in the advisory board of the U.S. Summer School on Condensed Matter and Materials Physics, which he helped establish; membership and chair of the Scientific Advisory Board of the Kavli Institute for Theoretical Physics; trustee of the Aspen Center for Physics; and membership in the Scientific Advisory Board of the Mathematical and Physical Sciences Division of the National Science Foundation. Millis earned a Ph.D. in physics from the Massachusetts Institute of Technology.

Leslie A. Momoda

Member

LESLIE A. MOMODA (NAE) is vice president for strategy at HRL Laboratories,. Momoda leads the strategic planning, technology transfer activities and customer and LLC member (Boeing and General Motors) interfaces for HRL. Prior to this, Momoda was the director for Sensors and Materials Laboratory, leading the research and development of advanced structural, battery, architected and nanomaterials and characterization as well as cutting edge microelectromechanical (MEMS) sensors and infrared detector materials. As a research department manager, Momoda oversaw several major projects in the area of smart materials, including the DARPA Compact Hybrid Actuation and Morphing Airframe Structures programs, materials for thermal management, gas sensing, fuel cell components and the modeling and prediction of materials reliability. Momoda's initial research focused on mixed metal oxide materials for electronic, optical and chemical sensor applications. Momoda received a Ph.D. in materials science and engineering from the University of California, Los Angeles.

David H. Reitze

Member

DAVID H. REITZE is the executive director of the LIGO Laboratory at California Institute of Technology (Caltech) and a research professor of physics at Caltech. At LIGO Laboratory he is responsible for leading the LIGO Observatories at Hanford, WA, and Livingston, LA, and the LIGO Caltech and Massachusetts Institute of Technology campus-based research laboratories. His research is focused on the development of instrumentation for current and future large-scale gravitational-wave detectors. Previously, Dr. Reitze held previous positions as a professor of physics at the University of Florida (2003-2021) and the spokesperson for the LIGO Scientific Collaboration (2007-2011). He is a member of the board for the Associated Universities for Research in Astronomy. Dr. Reitze is a fellow of the Optica, the American Physical Society, and the American Association for the Advancement of Science. He jointly received the National Academy of Science Award for Scientific Discovery in 2017 and has won several awards as a member of the LIGO Scientific Collaboration, including a Special Breakthrough Prize in Fundamental Physics in 2016, the Gruber Prize for Cosmology (2016), and the American Astronomical Association Bruno Rossi Prize (2017). He has previously served as a member of the National Academies Committee on Atomic, Molecular, and Optical Sciences (2014-2016) and currently serves on the National Academies Intelligence Science and Technology Experts Group. Dr. Reitze has a Ph.D. in physics at the University of Texas, Austin.

Edward E. Thomas, Jr.

Member

EDWARD E. THOMAS, JR. is the dean of the College of Sciences and Mathematics and a professor of physics at Auburn University. Previously, he was a faculty member at Fisk University in the Department of Physics. His initial research studied edge particle transport in fusion plasmas. Over the years, his work has become centered in basic plasma physics, including experimental plasma physics research on dusty (complex) plasmas, magnetized plasmas, and plasma diagnostic development, with an emphasis on the particle, wave, and energy transport in low temperature plasmas. Most recently, Thomas led the development of the Magnetized Dusty Plasma Experiment (MDPX) device, a superconducting, 4-Tesla, multi-configuration, multi-user research platform for studying plasmas in which the electron, ion, and charged microparticle components are dominated by the presence of a magnetic field. Dr. Thomas is an elected member of the International Union of Radio Science – Commission H and is a fellow of the American Physical Society and the National Society of Black Physicists. He is a member of the National Science Foundation's Mathematics and Physical Sciences Advisory Committee. He is an associate editor for the Journal of plasma physics. He has served as a member of numerous advisory committees for the American Physical Society, National Science Foundation, Department of Energy, European Space Agency, and several research centers in the US, Europe, and India. He earned a Ph.D. in physics from Auburn University.

Amir Yacoby

Member

AMIR YACOBY (NAS) is a professor of physics and applied physics at Harvard University. He works to develop new experimental techniques to explore quantum matter and uses these techniques to obtain new insights into their underlying quantum mechanical properties. He serves on the Brookhaven Science Associates board of directors. He is co-founder of a startup software company in the quantum science area. Dr. Yacoby is a member of the National Academy of Sciences, a member of the American Academy of Arts and Sciences, fellow of the American Physical Society, member of the American Academy for Advancement of Science and an external member of the Max Planck Society. He received his bachelor's degree in the field of aerospace engineering and then transitioned into physics. Following a Master's degree in theoretical physics, he received his PhD in experimental condensed matter physics in 1994 from the Weizmann Institute of Science.

Christopher Jones

Staff Officer